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PHOTOGRAPHIC PROGRESS DURING THE PAST YEAR.

During 1884 excellent progress has been made in the technical aspects of photography, and more notably in the process of photographing coloured objects, so as to secure degrees of shading which approximately correspond to the visual intensities of the various colours. Early in the year Dr. Vogel published details of his method of using eosine and azaline as a means of rendering a photographic film isochromatic; and further researches in the same direction have been made by Dr. Eder and Dr. Lohse, the latter gentleman using extract of turmeric root. In connection with this subject it is of great interest to note that Mr. Ives, of Philadelphia, calls attention to the fact that, as far back as 1879, he perfected a process of isochromatic photography on collodio-bromide films stained with the chlorophyll of the blue myrtle; and in the Year-Book for 1885 there is a striking illustration of the value of Ives' method; two reproductions of a highly-coloured chromolithograph being given, one taken on an ordinary collodio-bromide plate, and the other on a similar plate treated with the extract of the blue myrtle leaves.

In connection with emulsion photography we must mention the fact that of late a gelatine emulsion paper has come into use for small work, the tones obtainable having all that range which one is accustomed to in the case of ordinary albumenized paper. One may expect that during the coming year emulsion paper will be largely used when the light is weak, or when pressure of business necessitates the rapid production of positive copies.

Photographers have gradually realised the fact that it is practicable to abolish the unpleasant ruby light of the dark-room, and to substitute yellow or greenish-yellow tints far less trying to the eyes; and to Mr. W. E. Debenham belongs the credit of having made the advantages of yellow light generally known.

With respect to the various methods of photo-mechanical printing—such as collotype, Woodburytype, photo-lithography, and photo-typography—one has rather to report as to their much more extended use than to enumerate any definite steps in advance as regards the methods themselves; it is in the production of phototype blocks for the ordinary printing press that photo-mechanical work has most extended, the blocks made by the Meisenbach Co. and others being now very largely used for book and magazine illustration.

Photographs of the solar corona have been taken by Mr. C. Ray Woods from the top of the Riffel in Switzerland, and although the results are not by any means so perfect as those obtainable during an obscuration of the solar disc, the photographs possess great value as demonstrating the fact that one may hope to obtain valuable records of this kind, even though the sun is shining on the earth with its full force. Mr. Ray Woods' results show how important it is to perform difficult astronomical work from elevated stations; if, indeed, any further proof were wanted after the experiments of Professor Piazzi Smyth on the Peak of Teneriffe in 1856. It is to be hoped that a permanent solar observing station will soon be established at as great an elevation as that at which Professor Smyth worked.

Abney's experiments on the remarkable effect of heat in exalting the sensitiveness of gelatino-bromide films are of great interest; and one may hope that improvements in working may be the ultimate outcome of these researches.

The death-list of the year just past is as heavy as in the previous year it was light; and among those whose names are well-known to our readers, the following have departed:—Mr. J. Henry Dallmeyer, the Rev. F. F. Statham, Mr. H. Baden Pritchard, Mr. C. Jabez Hughes, Mr. Henry E. Anthony (of New York), Mr. J. Hubbard, Mr. H. Nathaniel White, and Mr. Henry Greenwood.

The spirit of enquiring activity which is now displaying itself in so many quarters, leads us to hope that during the year just commenced much good work will be done.

COATING PAPER WITH EMULSION.

On all sides we hear of the use of gelatine emulsion for the preparation of paper to be used in positive printing, and it seems not unlikely that at no distant date the ordinary process of silver printing on albumenized paper is destined to be largely replaced by a development process in which a bromide, chloride, or bromo-chloride emulsion is used. When describing the various methods of working which give good results on paper, we have repeatedly insisted on the importance of photographers giving due attention to development methods for the production of positive prints, and we now propose to say a few words about the manipulations incident to coating sheets of paper with gelatine emulsion.

It is needless to recapitulate in this place either the directions we have recently given for making emulsion suitable for paper, or the details of methods of coating which we have described from time to time;* but we will now describe two simple modes of coating paper, which were explained at the last meeting of the Photographic Society of Great Britain, which modes of coating were brought forward by Captain Abney and Mr. Cowan respectively.

The first method of coating—that of Captain Abney—is especially of service when only a few sheets of paper are to be prepared for experimental purposes, while the method described by Mr. Cowan is better adapted for coating a considerable number of sheets in rapid succession.

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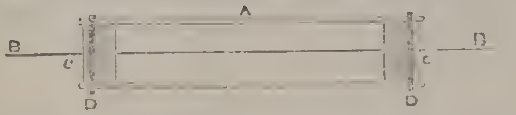
* Vol. for 1882, p. 450; 1883, p. 98; 1884, p. 619.

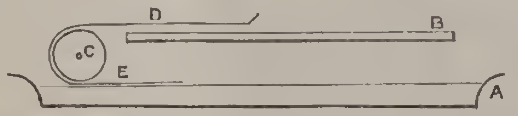
Captain Abney first moistens the sheet of paper to be coated, and lays this on a slab of plate glass, after which contact with the glass is established by smoothing down the damp paper by means of a squeegee; that is to say, a strip of soft india-rubber sandwiched between two laths of wood, so that about a quarter of an inch in width of the rubber strip projects. The slab of glass bearing the moist paper being now placed in a level position, a convenient quantity of the emulsion is poured upon it, and evenly distributed by means of a glass roller made as follows:—

A glass tube, A, about an inch in diameter and of suitable length, and of which each end is closed by a cork (C C), forms the body of the apparatus; and for convenience in use, a stout wire (B B) is run through the corks, as shown. In order to prevent the glass roller coming into actual contact with the paper, two rubber rings (D D) are placed round it, the exact position of these rings being determined by the width of the sheet of paper to be coated. It is convenient that they should be placed so as to be about a quarter of an inch from the edge of the sheet of paper when the roller is in use. It need scarcely be remarked that the roller will drive any excess of emulsion over the edge of the glass plate, and a dish should be so placed as to catch this overflow.



When the layer of emulsion on the paper has set, the sheet may be lifted from the glass and hung up to dry.

Mr. Cowan's arrangement for coating paper consists of a dish, A, containing the emulsion, and near one end of this is placed a glass tube, C, which may either be fixed, or may turn on a pin, like Abney's roller. At about the same height as the top of the roller is a slab of stout glass, B, this being either supported by a board placed over the top of the dish, or in any other way which may be found convenient. A sheet of paper is now floated on the surface of the emulsion in the dish, and is next drawn over the tube C on to the slab B, as indicated in the diagram, E D representing the paper. As soon as the gelatine has set the sheet may be removed from the glass slab and hung up to dry.



Emulsion for paper should not contain quite so much water as when used for coating glass, and it is very easy to remove any required proportion of water from the washed emulsion by soaking it for a longer or shorter time in methylated alcohol. It may also be mentioned that it is a very great advantage to previously prepare the paper with an enamel substratum, such as that recommended on p. 619 of our volume for 1884.

When the paper is coated by Cowan's method or by any analogous process, the question whether it should be slightly damped first suggests itself, but in this case the worker must be influenced by the quality of the paper itself. If the sheets, when laid on the warm gelatinous solution, absorb moisture unequally, and, as a consequence of this, become so much puckered and distorted that they will not lie flat on the glass slab, there is no alternative but to damp the paper before commencing; but if, on the other hand, the paper expands equally while floating on the emulsion, there is no necessity whatever to moisten it.

Single sheets may be moistened by means of a damp sponge; but if a quantity is to be damped, a convenient way is to rapidly draw a bundle of a dozen sheets or so through water, to lay this bundle on a sheet of glass, after which a similar quantity of dry paper is laid on the wet bundle. Wet and dry bundles are now piled up alternately, and a heavy slab of stout glass is laid on the top, when the whole must be allowed to remain at rest until the moisture has diffused uniformly through the pile.

It is scarcely necessary to say that the methods of coating just described are quite as applicable to the preparation of carbon tissue or of photo-lithographic transfer paper as to the coating of paper with emulsion.

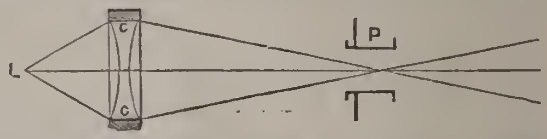
◆

THE FUNCTION OF THE CONDENSER IN THE OPTICAL LANTERN OR THE ENLARGING APPARATUS.

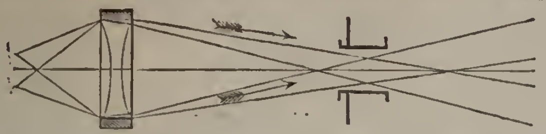
That it is possible to make a satisfactory enlargement by artificial light without using a condenser has been abundantly demonstrated; but this can only be done when the material on which the enlargement is to be made is so sensitive as to render a considerable loss of light a matter of no very great importance, but in other cases, the condenser is essential; and indeed, one may consider the condenser necessary in almost all cases where a photographic transparency is to be exhibited by means of the optical lantern.

It is, however, a remarkable circumstance that the optical lantern is seldom so constructed as to enable one to get the full advantage of the condensing lens, and many users of the lantern have by no means a clear idea as to the relative positions which should be occupied by the light, the condenser, and the objective in order to obtain the maximum of illumination and definition.

Let us assume that the source of light is a point—a condition of things impossible in practice; but in the case of the limelight the radiant is small, and one may consider the matter as if the source of light were actually a point. The subjoined diagram shows what should be the relative position of the source of light, the condenser, and the objective; the essential for good illumination being that the image of the source of light, as formed by the condenser, should be produced exactly at the optical centre of the objective. If this matter is attended to, not only is there a minimum loss of light, but one realises all the sharpness which would result from working with a small diaphragm; in fact, a diaphragm may be introduced into the lens without in any way altering the conditions. The most perfect lantern, whether for enlarging or for projection, is one in which light, condenser, and objective are immovably fixed according to the positions indicated by the diagram, and the focussing is effected by shifting the position of the slide in the cone of rays. Such a lantern was, we believe, manufactured by Mr. George Smith, but the public preferred the ordinary model. If it is required to shift the objective P inwards towards the condenser, the balance of the system is overturned, and can only be restored by removing the light further from the condenser; while a movement of the objective outwards would make it necessary to place the light nearer in towards the condensing lens. If one had only occasion to use one objective on the lantern, it would be possible to so gear the lime-light holder and the objective together that both movements could be made simultaneously; but there is often occasion to change the objective for one of another focus.



The following diagram will illustrate the condition of things when the radiant is large, as is the case of a lamp flame; and it will be seen how some rays from the radiant may be brought to a focus outside the tube of the objective, and others at the extreme edges and inside the tube; a condition of things which not only occasions a loss of light, but also unsharpness at the edges of the field.



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NORTHAMPTON EXHIBITION.

Third Notice.

"Waiting for Nursie" and "This Little Pig went to Market" (115, 116), by T. Whaley, are two domestic studies far above the average. The latter is very good in composition, and the little story is extremely well told. T. M. Brownrigg sends a large number of extremely fine landscapes, all of which exhibit fine taste in selection, and great technical knowledge. They are all of large dimensions, and are bold in treatment, and yet there is no want of delicacy in the details. To No. 315, "On the Way," has been awarded a silver medal. Mr. H. P. Robinson, to some of whose pictures we referred to in our previous notice, is a large exhibitor. The well-known "Wayside Gossip" is here, and is without doubt one of the finest pictures ever produced by photography. "The Mill Door," "The Stream in Summer," "The Music of the Birds," "Come Across," and many others, all well-known favourites, are here, and are seen to great advantage, for they are all well hung, and form an important feature of the principal wall of the gallery. "He never told his love," full of humour and fresh as ever, is also here, as well as the "Nor'easter," so much admired at Pall Mall a year or two ago. "At the Wheel" (126), by Geo. Hadley, is the fine nautical study re-produced in these pages a fortnight ago.

A series of studies of expression by R. Faulkner show that master of infantine portraiture at his best, while "Phyllis Frere" (136) is perhaps the finest example of portraiture in the room, and is worthy of Sir Joshua Reynolds himself. C. Wyrall shows great diversity of talent. His well-known instantaneous studies of athletic sports at Aldershot (395) are here, as well as some capital examples of boy life, notably "Peg in the ring" (448), and "Shoot Fair" (449); but besides these he has some capital landscapes—"Elstead Bridge" (154) being perhaps actually the best. "Getting under weigh" (152) is an extremely good marine study, and gains immensely by enlargement. This is by R. Slingsby, whose picture "Homeward" was described last week, but the name omitted by oversight. He also exhibits a very beautiful group of children, "Tales of other Lands" (159). This is an oblong picture, and is broad in effect and most artistic in treatment. "A portrait of a young girl" (163), by Abel Lewis, is the only example of portraiture sent by him. It is an enlargement, and is printed in red chalk. Dainty and delicate in the extreme, it has one fault—the beautiful profile of the child is all that could be desired, but the figure is posed too close to the background, and there is great stiffness in the pose in consequence. It is, however, a charming study, notwithstanding.

"Wroxton Abbey" (166), by G. Mould, is a good picture, as well as a fine photograph. "After the Day's Toil" (178), by T. Whaley, is a good composition picture. Italian girls are eagerly counting money. The background is an architectural one, and a distant view at the left-hand corner is well introduced, and gives reality to the scene. "Reading the News," by John Terras, is a capital picture—well planned, and well carried out. It is a cottage interior, simple and homely—homely, too, the figure enjoying his newspaper and his well-earned repose at the same time. There is not the slightest suggestion of studio accessories about the *mise-en-scène*, and the result is a great success. "A Reverie" is a landscape composition by E. Smithells, and is very nearly a successful picture; but the female figure leaning against the trunk of an old tree in the foreground is so stiffly posed against it, that it quite spoils an otherwise harmonious landscape.

T. J. Dixon has sent a large number of very fine carbon enlargements of animals in the "Zoo," and hence very justly taken the silver medal for enlargements done by the exhibitor. "Queen's Cross, Northampton" (201), by H. Manfield, is one of the three Eleanor Crosses still remaining, and is interesting alike to the antiquary and the lover of the picturesque. This gentleman has sent a large collection of pictures, all of the highest merit, but they are all marked "not for competition," being the work of the most energetic secretary. "The Half-Holiday" (203) has carried off the bronze medal offered for local views, and is the work of C. Law. It is a thoroughly English country lane, and the children evidently like the sport. W. McLeish sends some of his well known river scenes, but they have often before been described in these pages.

The arctic scenes by W. J. A. Grant are wonderful examples of successful photography under great difficulties. S. J. Newman sends some capital landscapes, but being the work of a member of the committee, they are marked "not for competition." The work of the School of Military Engineering is very fine, and we were particularly struck with "Bridge on the Lynn" (280), and "Study of Trees, Lynn Valley" (281).

F. M. Sutcliffe sends some of his most artistic marine studies, and they quite deserve the medal awarded to them. The yacht studies of H. Symonds are extremely good, and are taken from a sailing boat. The interiors of Strawberry Hill are of large size, and are very perfect. They are by T. Fall, and a bronze medal has been awarded to them. The Rev. S. J. W. Sanders sends a large quantity of capital work, all marked "not for competition"—"Compton Wynyates" (303) being particularly worthy of notice. The Hon. Mrs. Hamborough's large photographs mark the enthusiastic worker, for they are on 12 by 10 plates, and while some of them are rather hard from under-exposure, others are extremely good, and they all show artistic skill. G. Renwick has a number of his artistic snow scenes, but they have been described before in these pages. The Alpine scenes by W. F. Donkin are most effective on these well-lit walls, and all their exquisite delicacy is fully evident. "Venetian Boats," by Robinson V. Thompson, is skied, but the artistic treatment tells, in spite of the elevated position.

The large portraits direct from life (317), by J. Lafayette, have worthily taken a medal. J. P. Gibson's landscapes are most artistic; they are low in tone, but extremely harmonious, and to 319, "An Autumn Evening on the South Tyne," a bronze medal has been given; but 321, "At the Foot of the Tinkling Fall," is quite as beautiful. Andrew Pringle sends a series of his well-known landscapes, but as he is one of the Jurors, they do not compete for medals.

E. Brightman has a large series of very fine pictures, all so extremely good that it is difficult to particularize; "An Interior of a Mansion of the Olden Time," and "Lynmouth Village," may be specially mentioned for their artistic merit, and the first-named, from the extreme contrast between the time-blackened oak panelled walls and the white stone of the grand old chimney-piece, offers as difficult a subject as could well be conceived. That most artistic picture, "The Old Inn Yard," reproduced recently in these pages, is here, and, though skied, is well seen. Abel Lewis sends three very fine marine studies, and to "Douglass Harbour" a medal has been rightly awarded.

Mr. R. G. Scriven sends some very good work, 559, "Castle Ashby Ponds," produced in platinum, being extremely good; but being the work of a member of Committee, it is not for competition.

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WINTER PHOTOGRAPHY.

BY W. D. VALENTINE.

Although the introduction of gelatine plates has materially simplified the production of negatives in this department of landscape work, hitherto I have failed to obtain, by their use, the brilliancy in the high-lights and softness in shadow formerly secured by the use of wet collodion. Still, looking at the enormous difficulties to be overcome in getting clean work—such as the liability of the plate to freeze, &c., not to speak of the personal discomfort of working with water at a low temperature—the photographer of to-day has little reason to regret that wet collodion is now a thing of the past. Snow pictures are, to a certain extent, a misnomer; you have to get for the foundation of the picture a fall of snow, but the most beautiful effects are secured when the ground is thus covered, and a strong hoar-frost follows. Sun-light is an absolute necessity. As to subjects suitable for snow pictures, they are varied and numerous, and one need not go far to find them. The magic touch of "hoar frost" will transform a most prosaic town garden into fairyland. Trees are *par excellence* the most fascinating, but hardly anything comes amiss. A country lane with hedge-rows and occasional trees, the low rays of the winter sun alternating with the shadows cast by them, bearing in mind to introduce in the foreground, or where the eye may be led to it, some patch of furze or withered grass stems, now transformed into a bewildering loveliness of silver tracery and bending spears; a wayside cottage, its thatch roof gleaming with icicles, and its probably rather ugly surroundings now changed into things of beauty.

My way of securing these pictures, when snow and hoar frost are favourable, is as follows:—I get a dog cart, drive a few miles out of town, stopping where I see a suitable subject. It is almost impossible to select your picture beforehand. I prefer a rather slow plate, with a dense film My experience as to exposure is that it should be a quarter less than for the same subject in early spring. As to lens, I prefer a single landscape one, taking the precaution, before leaving home, to unscrew the lens and slightly moisten it with glycerine, which entirely prevents condensation.

Most of my snow pictures have been developed with the sulphite of soda pyro developer, but I fancy any formulæ one is accustomed to use will do equally well. In development, caution has to be exercised that it is carried far enough, the appearance of density in these pictures being most deceptive.

Lastly, as to printing, I have tried platinotype and silver; the first I do not like for these subjects. I find white albumenised paper to give the best effect.

In conclusion, I would commend both amateur and professional photographers to lose none of the few opportunities we have in this country to secure, in the shape of negatives, the beautiful effects to be obtained during a hoar frost. The former will add to his collection most unique and lovely pictures; and the latter, when getting the same, will find them remunerative.

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HOW TO PHOTOGRAPH MICROSCOPIC OBJECTS.

BY I. H. JENNINGS.

Lesson XI.—Preparing Sections of Hard Substances for Photography.

Many of the sections of hard substances, such as bone, rock, &c., sold in the shops, are too thick. Those prepared by the best lapidaries cannot be excelled; and if the student can afford to pay the high price charged for making these sections—from 2s. to 2s. 6d. each—he is advised not to undertake the labour and trouble of preparing them himself. For, although the manipulator may be skilful and patient, even when a machine is used, cutting sections of rocks is both tedious and laborious.

There are many excellent machines in the market specially devised for cutting sections; but they are all more or less expensive, and good work may be done by using very simple appliances, which we shall now proceed to mention. In the first place, procure an iron plate, preferably cast iron, about twelve inches square, and as thick as can be obtained. Next, a Water-of-Ayr stone, and one of harder texture, such as a Washita stone. These may be obtained at any tool-shop. A Turkey stone is very good for sections of bone. For grinding down rocks, emery of various degrees of fineness will be required —buy one pound of medium coarse, one pound of medium fine, and one pound of flour emery.

To grind down a rock section, proceed as follows. Make a chip with a hammer, about one inch square, and not more than one-eighth inch thick. Sedimentary rocks, such as limestones, may be thicker. Rub down the chip with coarse emery and water on the iron plate, until one side is perfectly flat. Remove the scratches by next rubbing the chip on a piece of plate-glass with fine emery, and then polish with water on the Water-of-Ayr stone; when quite smooth, wash it well, and let it dry. Meantime put some old, hard balsam on a glass slip, and warm it over a lamp until all the more volatile parts of the balsam evaporate, so that, on cooling, it becomes hard and tough. Don't *boil* the balsam, and don't continue the heat too long. When the balsam is properly hard, heat the chip on a metal plate, rub over it a little turpentine, and remelt the balsam; lower one end of the chip slowly into the balsam, and press it down close to the glass slip. When the balsam is cold, rub down the chip on the iron plate with coarse emery until too thin to bear further friction. Very hard rocks may be brought down to the requisite thinness on the iron plate alone, and will only require a little polishing on a stone to remove the deeper scratches. Sections intended for photography should be cut down to the extreme of thinness, and *all* sections should be cut thin enough to read through when placed on the page of a book. When the section becomes too thin to bear any longer the friction of the coarse emery, wash it well, and grind it thinner on the glass plate with fine emery, and finish off on the Water-of-Ayr stone. If the section is strong enough to bear it, it should be removed from the slip on which it has been ground, and mounted on a clean slip. Warm the slide over the lamp sufficiently to melt the balsam, and push the section off with a needle into a cup of turpentine, and wash it carefully with a small soft brush. Now pour a little balsam and benzol on the clean slip, put the section upon it, add a little more balsam, and cover with a circle or square of thin glass.

Sections of bone or horn must be first cut with a fine saw, and ground down in the same way, only *no emery* must be used, and the iron plate will not be required, as the Water-of-Ayr and Washita stones will prove sufficient. Before such sections are mounted, they should be soaked for a day or two in balsam and benzol to render them perfectly transparent.

Sections of soft rocks, and sedimentary rocks generally, are prepared and mounted in the same way, only no emery must be used, or it will imbed itself in the section and cause false appearances under the microscope. Most sedimentary rocks can be finished on the Water-of-Ayr stone. Some very friable rocks, or substances such as boiler incrustations, which readily disintegrate on the grinding-stone, must first undergo a preliminary hardening. Two hardening solutions are generally made use of—balsam and benzole or a solution of shellac in alcohol. The latter is much the better of the two. The solution should be quite limpid. For soft limestones, a soaking of two or three days will be sufficient, but a piece of boiler incrustation will require to be left in the solution for at least a fortnight. When the rock is thoroughly impregnated with the hardening solution, take it out, and put it to dry in a warm place until the solvent has evaporated, leaving the balsam or shellac in the pores quite hard.

Sections of rocks which contain organisms—such as foraminifera, should not be ground very thin, or most of the fossils will be ground away, leaving the section quite useless as a specimen.

Most thin rock sections photograph better by polarised light, as the structure is thus much better shown. Sedimentary rocks, even white limestones, stop a great deal of light, and will require a long exposure. Such sections are always much improved by a few days' soaking in balsam and benzol, to render them more transparent.

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TAKING PHOTOGRAPHS BY ARTIFICIAL LIGHT.

BY EUGEN HIMLY.

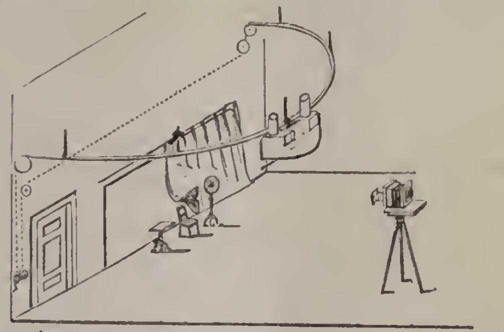
In many countries, especially in the larger cities, there has been for a long time a desire for sources of artificial light, so as to be independent of the time of day and the weather in taking photographs. Of course, many photographers may say that since the introduction of dry plates the want is not so pressing; but to those I answer that it is almost impossible in dark foggy weather to make good negatives; also that, in some countries—as, for instance, Russia, Sweden, Norway, Denmark, England, Canada, &c.—it is for most of the time very cloudy and foggy, and, in consequence, almost impossible to make good exposures; further, in the larger cities, it is inconvenient for the public and for the artist to have the studios on the ground-floor.

In the year 1887, Mr. Vander Weyde opened in London his studio illuminated by electric light, and used at first for illumination a system of Fresnel lenses, behind which a white-washed reflector was placed. The Fresnel lenses send parallel rays, but without giving really diffused light, so that a part of the shades is very dark, while, on the other side, the light of the electrical arc is so bright and dazzling as to be disagreeable to the eye. With the electrical apparatus thus arranged, it is only possible to afford front and top light (in which case the negative is flat), or side and top light, when that side of the face which is nearest to the light is very brightly illuminated, and the other side too dark in the shades. The sensitive plates take at first the impressions of the high-lights, and later the shades, so that it generally happens that the high-lights are over-exposed when the shades begin to make impression on the sensitive plate. Vander Weyde, of London, and Lièbert, in Paris, altered the arrangement, and put the Fresnel lenses aside, and took a spherical hollow reflector, placed the electric lamp and arc in the centre, which they blended off by means of opaque or ground glass, to hide the bright flame of the arc. The reflector was then painted inside dull white. The faults of this system are the same as above mentioned—the shades are too deep, and have too much contrast with the high-lights; besides, the electric arc shines so brightly that it is almost impossible for many persons to look into it without injuring the eyes.

In the year 1878, when I experimented a good deal, I had the idea to use, for instance, five electric lamps, and to place three in front, which should give front and top light, and two sidewards, which should give side and top light; but, at that time, it was necessary to have one dynamo-electric machine for each lamp; the division of the electric current was not discovered, the differential lamp of Siemens and Halske not invented, and such an arrangement would have been too costly. I tried my best to succeed with two lamps, but in vain. Mr. Kurtz, of New York, has now his studio illuminated with seven or nine arc lamps; he places the larger part in front of the sitting person, and a few to give side light. To ward off the extreme dazzling light, he shades it off by means of Joseph paper. My experience of long years' standing is, that all kinds of blending off of the arc is bad, because every uneven place in the paper, or even in the ground or opaque glass, shows itself enlarged on the background. Kurtz uses besides a kind of platform, on which the camera and the sitting person are placed, and this is turned during the exposure at an angle of about 30 deg.; through this movement he succeeds in equalizing the seven or nine shades which his lamps make, for each lamp must absolutely have its distinct shadow.

In the spring of 1824, I commenced to experiment upon an entirely new idea, and invented an apparatus, which is well tried, so that I can safely say my system of artificial illumination for studios is at present the best. I will try to give a short description of it below.

The best artificial light would always be that which is diffuse, and equal to diffuse daylight, and my aim was to invent a reflector (diffusor, I will call it), which really spends diffuse light. I constructed a diffusor in which the sources of the artificial light were hidden in cornices on the sides of it, so that the direct rays of the lights cannot come out, but are compelled to cross themselves on the hollow inside of the diffusor. This diffusor I can mount either on a crane which is movable, or I fasten a ⊥-rail, bent into a semicircle of two meters radius, under the ceiling, on which I place a small carriage which carries the diffusor; the arrangement being shown by the cut.



The carriage can be moved in the circle by means of a small steel wire cord. The movement can be made by a lever, pulley movement. The diffusor spends a beautiful light which is agreeable to the eye, and really diffuse, so that it is a good imitation of diffuse daylight. When I place the diffusor in front of the sitter, I have front and top light; when I slowly move the same to the side at an angle of about 30 degrees, I have side and top light. I commence, when I expose, with the diffusor in front, and move now during the exposure the same sidewards; by this manner I have illuminated the deepest shadows, and have more light on that side of the face to which the crane with the diffusor was swung. The result is a picture produced by front, top, and side light.

As an auxiliary, I make use of a funnel shaped side screen, made of tin, which is mounted on a solid iron stand (like head-rests generally have), and by means of ball-and-socket joint, the screen can be fastened and kept in any position. This screen can also be used in daylight exposures; it can be made of bright tin or pasteboard lined with tinfoil or white paper, and I can well recommend the same, for its reflection power is astonishing.

The sources of artificial light which can be used are the following:—1. Electric light, which is costly when no steam or other power is at command. 2. Gas light, with the powerful regenerator burners of Mr. Fredr. Siemens, of Dresden. Mr. Law, of Newcastle-on-Tyne, and others, have taken photographs by gas light since 1880, and since the introduction of the most sensitive dry plates, I can safely say that this light will be made very much use of for reason of cheapness and easy management.

3. Magnesium light. 4. Bengalic or pyrotechnic light. To all these sources of artificial lights my new system can be adapted, so that it is even possible for photographers who have not larger means to select, instead of electric light, the apparatus for gas light.

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NOTES FROM NEW YORK.

Meeting of the Amateur Society—A New Camera—Eastman's Transfer Process—Enlarging on Argentic Bromide Paper—New Vignetting Device—Improved Focussing Screen—The New Orleans Exhibition.

The activity of our Amateur Society here is so great that the management have found it necessary to hold two meetings a month, and informal social meetings every week, in order to satisfy the interest and desire of members to see novelties as fast as they appear.

On the 25th November, at a special meeting, a set of Mr. H. P. Robinson's handsome photographs was shown, also Mr. Cotesworth's "Awkward Lead," and "The Revoke." Mr. Robinson's views were specially admired for the naturalness of the grouping and artistic cloud effects.

Mr. Walter Clark exhibited a model of his improved camera for taking instantaneous photographs, so arranged that the image is thrown non-reversed upon a horizontal ground glass by a mirror fixed at an angle of 45° in the box. At the moment of exposure, the lens, which is attached to a vertically swinging pivoted plate, drops suddenly, and at once transfers the image to the sensitive plate by automatically releasing, during its fall, a drop shutter arranged on the outside front of the box. Diagrams of the arrangement have been published in the News (1884, pp. 810 and 811). Owing to the weight of the lens, some noise or jar occurred during the fall. The idea is novel, and with some improvements, which I learn Mr. Clark contemplates making, his instrument will doubtless prove quite useful and practical.

Specimens of the new gelatine argentic bromide film and paper, with prints from the same, exhibited by Mr. Beach, attracted considerable attention. In a communication received from Mr. Eastman, who is preparing machinery to make this paper on a large scale, it was stated that many of the defects incident to coating gelatine emulsion on glass would be avoided. A very uniform coating was promised, and the process of taking the film off the paper was said to be very easy and simple.

A machine has been made which will coat a strip of paper 2½ feet wide by 3,000 feet long; and in an improved roller-holder, which is being manufactured, enough sensitive paper can be stored to make fifty negatives, whose total weight would be 1 lb. less than two of our lightest double wood plate-holders loaded with plates. The paper is first coated with a soft gelatine, dried, rolled, and callendered, so as to be very smooth and hard. Next it is coated with an insoluble sensitive gelatine emulsion. After exposure, development, and fixing, the film side, while damp, is laid upon a sheet of glass, and the whole plunged for a minute into hot water. The paper is then pulled off, and the film, when dry, is next pulled off the glass. The film shown was very tough, and would bear rough handling. It is held by some that the amateur will not care to go to so much bother; this may be true; still, if a uniform article can be manufactured, it will tend to materially lessen the labour and annoyance of carrying around a lot of fragile glass.

Several questions from the question-box were discussed, two of which were quite interesting. One was.—"What varnish can be flowed over a sensitive gelatine plate which will protect the film from the injurious action of salt water when in contact with the same?"

The answer given was, to flow collodion over the film, which made it impervious to water of any kind; then, after exposure, to remove the collodion, by dissolving same with ether and alcohol. Development of the film could then be made.

The other question was:—"Whether a picture could be made with the lens pointed directly towards the sun, or with the sun shining on the lens?"

In answer, one gentleman replied that he had seen two negatives taken on the Greeley Relief Expedition to the Arctic region, where the Arctic sun was shown in the middle of the picture. Another said the reason was that the snow and surrounding objects appeared nearly as bright as the sun; hence, no injurious effects resulted. Still another related as his experience the possibility of taking a view with the sun shining on lens when it was nearly setting behind objects, such as houses and trees.

On the 9th inst. a very large meeting was held, several ladies being present, at which Mr. Beach read a paper on Enlarging on Bromo-argentic Paper. [We shall publish this in a later number.—Ed. P.N.] He demonstrated very successfully, by apparatus and illustrations on the black board, some of the ways of enlarging, and went through the process of exposing, developing, and fixing an enlargement.

Mr. C. Roche made a demonstration on the glacé process of coating a gelatine print with collodion, and afterwards with his improved enlarging camera (which has been shown in News) made a very quick enlargement on gelatine paper of his own make. Mr. John Carbutt, of Phil., enlarged upon some new opal porcelain plates which he has recently introduced, and also successfully developed a gelatino-chloride transparency before the audience, made on a plate of his own manufacture. It was quite clear and brilliant, and the result satisfied him sufficiently to commence immediately their manufacture on a large scale.

A new camera, designed by Mr. George H. Ripley, was shown. It possessed great length of focus, was light and substantial.

Mr. Traill Taylor, who was present, kindly loaned Mr. Beach the new incandescent platinum lamp which he had brought over from London. It attracted considerable notice, and I imagine in a short time several members will have the lamp in operation.

Mr. H. V. Parsell showed an improved focussing-board for enlarging on. A vertical board was attached to the top of a stand moving on castors. To focus, the ground-glass end was kept up; to expose, it was reversed by wheeling around, the board end being at top; it was easily moved to or from the enlarging camera. Several excellent specimens of enlargements, made mostly by Morgan and Kidd, and sent to Mr. Beach, were very tastefully framed and hung upon the wall. One of the latest efforts made on their paper was a fine enlargement by Mr. H. V. Parsell, from a small tin-type head, ¼ inch in diameter to ¾ inch life-size. It was neatly made, and enclosed in handsome frame.

Messrs. Walmsley and Company, of Philadelphia, exhibited a great variety of English shutters, lenses, and cameras.

It was a very late hour when the meeting closed, several things on the programme going over.

At last we are to have an enterprising, practical, weekly photo journal in New York—the *Photo Times* henceforth is to appear every Friday. With the known ability of its editor, and the American enterprise shown by the publishers, I do not see why it will not prove a blessing to them, as well as the photo-fraternity.

I hear Mr. G. G. Rockwood is overrun with holiday business, and by some new French process he is turning out some elegant specimens of porcelain work.

The formal opening of the New Orleans Exhibition will occur on the 16th inst., but the latest reports indicate that it will be a month thereafter before it gets in working order. Amateur exhibits are going forward, and will attract attention in the Photo Department.

The Boston Amateur Exhibition closed on the 27th ult.

Nearly a thousand prints were shown from various parts of the country, and several prizes were awarded. The prevailing size of the pictures was 5 by 8.

The New York Amateur.

N. Y., December 13th, 1884.

Reviews.

Manuel du Touriste Photographie. Par M. Leon Vidal. (*Paris: Gauthier-Villars.*)

We have here a comprehensive volume of over three hundred octavo pages, and copiously illustrated with sketches of such appliances as are calculated to be of most value to the photographic wanderer. As a hand-book for the tourist, this work of M. Vidal stands alone, so that any person who wishes to make himself familiar with all the branches of the subject, without the labour of collecting matter which is diffused through the pages of photographic publications, has no alternative but to obtain M. Vidal's book.

The work before us treats of the making of the negative, whether on a plate, or in pellicular form, and will be followed by a second volume relating to the production of positive pictures of various kinds.

M. Vidal is to be congratulated on his success in having produced a work so much wanted, and in having made his book so attractive and practical.

FASHIONABLE PHOTOGRAPHY.

Scene—A palatial reception room. Elegantly attired lady assistant discovered. Enter lady and gentleman sitters.

G. S. (somewhat awed by the gorgeous surroundings) "We would like our photographs taken, if you please."

Lady Assistant. "Certainly; what style would you like?"

G. S. (hesitatingly to lady sitter) "Well, I scarcely know. What do you think, Jane?"

L. A. "These are our cabinets—a very nice size—or perhaps you'd like the panel or promenade portraits; they're very fashionable just now."

G. S. "But they're so thick. You can't put them in an album."

L. S. "How absurd you are, George. They're not meant for albums, are they?" (to lady assistant)

L. A. "No, madam. You place them on a stand on the table, or on a wall. We have ornamental stands, brackets, screens in plush, ormulu, or the new reponsé work of every design. Here is a very chaste article."

G. S. (beginning to be frightened) "Oh, very chaste indeed. But I don't think we want panel portraits (confers with lady sitter). No, something to go in an album."

L. A. (decidedly) "Then I should recommend the cabinet size."

G. S. (much relieved) "Yes, I think so."

L. A. "How many will you have?"

G. S. (after another conference with L. S.) "Well, a dozen of my wife, and—and, oh! half-a-dozen will do for me."

L. A. (insinuatingly) "Will that be *enough?*"

G. S. (hastily) "Oh, quite enough.

(L. A. sits down at desk, and scribbles on a printed form, stamps, hands it to G. S., and all in twenty seconds).

G. S. "Eh, what's this? Three Guineas!"

L. A. (blandly) "You said a dozen and a half, you know."

G. S. (in dismay) "Oh, but I'm not going to pay two guineas a dozen. I thought about 12s. 6d. or 15s."

L. A. (with dignity) "Oh, I daresay you *can* get them at that price at some places, but ours is a first-class establishment. I think the operator is disengaged now." (*whistles up pipe*).

G. S. (agitated) "Well, but—(to L. S.)—my dear, I was not prepared for this. (To L. A.) No, no, pray don't trouble the operator. I—I—"

L. A. (sweetly) "Oh, it's no trouble, I assure you. Perhaps you'll kindly show the receipt to the operator. Yes, through that door on the right."

G. S. (to L. S.) "Jane, I will *not*. The portraits may be very good, but I can't afford the price. (To L. A.) Good morning. I'm so sorry I troubled you." (Drags lady through door on left, and finds himself in palatial reception room, No. 2. Gentlemanly assistant advances towards him).

G. A. "You would like to see our portraits in oils, sir?"

G. S. (nervously) "No, I wanted to"—

(Enter lady assistant, and whispers to gentlemanly assistant)

G. A. "I beg your pardon, sir, but have you examined the quality of the work we turn out?"

G. S. "Oh, it's admirable, but"—

(rushes into palatial reception-room, No. 3, is met by bland elderly gentleman)

B. E. G. "Good morning, sir! Photographs in ivory or porcelain, eh!" (to G. A. who has entered and whispered something). "Ah, I think we shall be able to arrange this little difficulty. Allow me to point out the advantages which our establishment possesses over any other. In the first place, there is absolutely no waiting. A short time ago a gentleman called here in a great hurry—ah! that is his picture, madam, and a very fine work of art it is. He could only give us five minutes, and I assure you, sir, that in four minutes and a-half we had taken his portrait, received his money, and he was out of the house. Now comes the curious part of the business. Within a fortnight of being photographed he was a dead man."

G. S. (alarmed) "Eh, bless me—Jane, for goodness sake let's get out."

B. E. G. "Think, sir, what a comfort his portrait must be to his family."

G. S. (to lady, who *will* look at the photographs) "Jane, I say"—

B. E. G. "You never can tell what may happen; I should certainly advise you not to delay a single ins"—

(G. S. clutches lady by the waist and drags her out of the reception-room, finds his way on to staircase, and never stops till he gets outside. Left hailing a Hanson.

Notes.

To say anything in praise of the magnificent winter scene by Mr. Valentine, which forms our supplement this week, would be superfluous; but its value to our readers is much enhanced by the fact that Mr. Valentine contributes a practical article on winter photography (p. 4).

Just as necessity brings one strange bed-fellows, so popularity introduces one to most incongruous window-mates. Photographic portraiture is a great leveller and non-respecter of persons or opinions. We have seen a High Church bishop's carte supported—as they say in heraldry—by a sensational ballet-dancer and a Liberationist Dissenting parson. Actors' portraits are cheek-by-jowl with politicians—though this, perhaps, is not such an incongruous association, after all. Great inventors and notorious criminals, cardinals and courtesans, noblemen and republicans, are all mixed up with absolute indifference and impartiality.

Greatness has become accustomed to this sort of thing, however, and does not seem to mind it. So, too, it will gradually survive the new shock to its nerves which recent photographic enterprise is calculated to cause it. Thus, but a day or two since we saw the Premier's likeness—a cabinet portrait, of course—between photographs of a flash of forked lightning and of a tornado. Both friend and enemy can draw deductions from this juxta-position. But it is certainly a somewhat startling one at first. Ere long we shall doubtless see the portrait, say, of Mr. Chamberlain, flanked by one of an earthquake, or a theatrical star's "promenade" portrait side by side with that of a shooting one. In fact, we shall soon cease to wonder at anything.

One often wants to make a same sized transparency from a thin negative, or a negative from a thin transparency; and in spite of the most careful attention to exposure and development, the result is not always what one could wish. Mr. W. Brooks, however, points out that if the exposure is made through red glass, it becomes possible to obtain a much more vigorous reproduction than would otherwise be obtained. It is needless to say that a proper allowance for the feebleness of the light must, of course, be made in exposing.

This proceeding of Mr. Brooks is strictly analogous to the common practice of shading the printing-frame when a print is wanted from a thin negative.

The technical expert is, of all critics, the most difficult to please. A sailor, after looking at Mr. Hadley's picture "At the Wheel," observed, patronisingly: "It ain't a bad photograph; but what's that chap doing at the wheel when the craft's moored fast? And if the vessel warn't moored, what's he mean by a looking off? How's he to prevent running into something if he don't look ahead?' We felt it useless to point out to the critic the exigencies of pictorial effect as to pose, and left him in possession of the field.

Apropos of frauds, it is necessary once more to caution photographers who want to sell their business against the pair of diminutive individuals whose sharp practices were disclosed in an article which appeared some three months ago in these columns, and afterwards corroborated by a correspondent. We understand that the man and woman are still on the look out for the unwary.

There would seem to be something in photography which makes it a convenient vehicle for fraud in the hands of the unscrupulous. The latest dodge is that practised by a "Company," which established itself in a street off the Strand, and laid its traps for the unwary. The "Company" consisted of two individuals who advertised for customers, holding out as baits good pictures and low prices. The *modus operandi* was this: An arrangement was made with a neighbouring photographer to take the negatives, the "Company" executing the prints and arranging the business portion of the matter. When a sitter presented himself to the "Company," he was trotted off to the photographer, who, no doubt, did his work conscientiously, being paid by the "Company;" but after a specimen print had been forwarded, nothing more was forthcoming. Finally, when the sitters began to be angry at the delay, the shutters of the "Company's" offices were put up, and the "Company" disappeared.

In order to make the dark-room lamp burn vigorously and well, Mr. F. C. Beach suggests that it should be furnished with a tall chimney of sheet metal. Under these circumstances a good draught is produced, and there is little fear of carbon-monoxide—the highly-poisonous product of incomplete combustion—being produced. Mr. Beach's suggestion is an excellent one.

Mr. C. Ray Woods will shortly proceed to the Cape to make a series of star maps of the Southern Hemisphere. Is it necessary to say that the maps will be photographic ones?

By adopting the now almost discarded practice of glazing the studio with glass of a bluish tint, one does not shorten the exposure in an absolute sense, although one certainly would expect to shorten it in relation to the amount of light present inside. In other words, for equal photographic activity, there is less glare on the eyes of a sitter, in a blue studio.

Perhaps one reason why one hears or sees so little of the blue glazing, is the circumstance that there is not sufficient demand for the light blue or violet glass, to induce manufacturers to produce it at a low price.

Herr Himly had occasion to photograph some writing executed with violet aniline ink, but could get no impression on his sensitive plate. With one of Dr. Vogel's azaline plates the case was different, a vigorous negative being obtained at once. A drawing made on yellow paper was also copied without difficulty.

In the hands of Mr. R. Keene, of Derby, the Platinotype process makes headway as a means of book illustration, the latest announcement of this gentleman being "Bridgehouse, its Scenery and Antiquities," by George Hepworth. The book is to contain thirty Platinotypes by Mr. Keene, from the author's negatives.

The first of Mr. Dixon's lectures "On the use of Coal Gas" appears in the current number of the *Journal of the Society of Arts*, and he tells us that London gas contains about twelve grains of sulphur per hundred cubic feet—say the amount of gas which would be burned by three jets in the course of an evening. It is probably this sulphur which gradually spoils dry plates which are kept where much gas is burned, and its destructive action on metal work is well known.

Further on, in the same number of the *Journal of the Society of Arts*, one finds a paper on the best method of slaughtering the lower animals, by Dr. Richardson, and he finds coal gas to be one of the most efficient agents for producing, first, insensibility, and afterwards death. One hundred dogs were put into a close chamber, and between two and three hundred feet of gas being allowed to flow in, the dogs were insensible in about two minutes, and died shortly afterwards.

The poisonous action of coal gas is largely due to the fact that it contains a small proportion of the extremely poisonous gas—carbon menoxide.

Photographers should, however, remember that a very considerable amount of the highly poisonous carbon monoxide, or carbonic oxide, is formed whenever the combustion of a gas flame or lamp flame is rendered less intense by the partial shutting off of the air supply; and, as a matter of fact, very many dark-room lamps evolve large quantities of carbon monoxide. The first result of inhaling carbon monoxide is headache and lassitude; it may be mentioned that the invariable product of the complete combustion of carbonaceous fuel—carbon dioxide—is by no means poisonous in the same sense that carbon monoxide is a poison.

Two methods suggest themselves as a means of avoiding the contamination of the air of the dark room by products of combustion. One is the simple expedient of keeping the lamp outside, and allowing the light to enter the dark room through a suitably tinted window; and the other is to use the incandescent electric light, as suggested in the Photographic News, and now carried into practice by several manufacturers of dry plates.

The editor of a contemporary devoted solely to the interests of the kennel—for journalism "went to the dogs" in this sense many months ago—has been saying a few words to his readers on the subject of dog *cartes*. A budget of these is frequently received, he states, with a note saying: "So-and-so's tail is better in one portrait, and her head in the other; please let your artist arrange this." On this the canine editor goes on to say that his artist can do nothing of the kind, and he wishes it "to be distinctly understood that it is utterly impossible to join two photos. together—that is, take the best part of both to make one portrait." This is strong and positive language, but in spite of it we have a notion that some artists, by dint of dogged perseverance, let us say, would be able to make the extremities of two dog likenesses meet. Surely a clever "joiner" would have no difficulty in accomplishing the necessary "dove-tailing," which, in this case, by the way, might with good reason be called "dog tailing."

"Atlas," in the *World*, gravely announces that "there is to be a great revival in the world of amateur photography consequent upon the entire abolition of the "wet" process and the substitution of a "dry." The discovery is made rather late in the day, but we welcome it, nevertheless.

RUSSIAN CORRESPONDENCE.

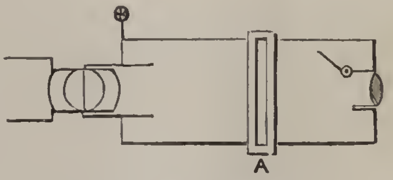
The first meeting of the V section of the Imperial Polytechnical Society took place on Friday, November 7th, 1884, when the election of officers for the ensuing year resulted as follows:—

President—Lt.-Gen. Birkin.
Vice-President—Gen. Tschagin.
Members of Council—S. Levitski, V. Sreznevski, G. Scamoni, Baron Koussoff, A. Frebus, and V. Sabanayef.

Several members brought collections of their summer's work. Baron Koussoff showed some fine interiors taken on 33 by 27 plates, at the Government cartridge factory. M. Chapiro brought several prints (portraits) of a very large size taken in his usual first-class style; one of the negatives, measuring 40 by 50 c., was pronounced by those present as superb. M. Chapiro uses Monckhoven's plates, and ferrous-oxalate developer rather weaker than that given in the instructions sent out with them. Mr. Degoe's collection of instantaneous views taken at the several naval and military reviews and manœuvres last summer were much admired. Altogether, this gentleman has taken 60 naval and 138 military views, which are very interesting, and possibly instructive to many. H.I.M. the Czar has been pleased to inspect some of them.

The President handed round a number of instantaneous views by Herr Brandel, taken with his new portable apparatus and simplified process (for which he is asking 6,000 roubs). The views are taken on half-plates, and everything is in focus to within ten yards; exposures are made at the rate of 15 in thirty-five seconds; the double backs are, it is believed, made of thin steel to ensure strength and portability.

Col. Phillipenko exhibited an interesting and novel pocket camera, with which he had obtained some good pictures.



Col. Phillipenko's Pocket-Camera.

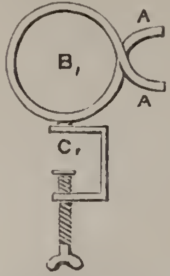
Two thin tubes about 2 inches diameter, and 3 inches long, are soldered to either side of a frame with openings corresponding to the diameter of the tube (like the case of a central stop-shutter is made); in the orifice of one tube a disc of metal is soldered, having an opening to carry a lens of short focus, with or without rack-and-pinion movement. In the model the lens slides within another tube. The plates are all carried in bags made of a pliant water and light-tight material about 4½ in. deep, so that after the plates are dropped into them, they can be folded doubly, and then no light can penetrate through the opening.

To use this camera, a piece of ground glass is dropped into the opening *a*, a spring in the interior pressing it up to the rebate, the camera is turned a quarter of a revolution to bring the sight or view meter to the top, and when the intended point of view is obtained the focus is adjusted on the ground glass by moving the lens, the hind tube serving the place of a focussing cloth.

The ground glass is now removed, and the slit A is inserted into the mouth of one of the plate bags or holders, and an elastic band is slipped over it to prevent all ingress of light. When the bag is unfolded, the sensitive plate drops into the place previously occupied by the ground glass. The exposure being made as usual, the camera is tilted, and the plate is returned to its envelope, which is folded and packed away. The bags containing the sensitive plates are carried in a pouch fastened to a belt, like the military cartridge pouches.

For use with a stand, the Colonel has a spring collar or ring B soldered to a screw clamp C, which can be fixed to almost anything; the protruding ends A A serve to release the collar to admit the hind tube of the camera, which is firmly grasped when the ends are released.

To change the plates, the collar is loosened, then the camera is twisted or turned round to eject them without having to disturb the stand.



Anyone of a mechanical turn of mind could make one for himself in a short time, as brass tubing can be bought of sufficient diameter. It is almost superfluous to state that when finished it should receive a coating of dead black varnish.

A Mr. Metinkoff, of Ekaterinburg, sent some pictures taken with a new camera of his own invention, which, according to the photograph sent of it, is so constructed that objects in different planes are all in focus. It was noticed, however, that the resulting pictures were devoid of ærial perspective. The plate carrier admits of a part of the plate being exposed, the focus altered, then the second and third plates are taken in a like manner. How the joints are masked was not explained. Some of the pictures were passable, the figures and objects all being sharp; but on close examination their relative sizes were found to be incorrect.

The President read a letter from the VII section (ærial navigation), asking the co-operation of the V section in their proposed experiments in balloon photography.

The secretary remarked that it would be as well to become acquainted as far as possible with the trials which had been made abroad in that direction, and asked Mr. Chesterman, in the name of those present, to collect data and lay them before the Society at a future meeting.

Several others brought prints, among whom was Herr Reinhardt. This gentleman has been experimenting with collotype plates for transfers to lithographic stones, and recommends the following instead of the ordinary transfer ink, as it does not smear like the latter. 20 to 25 parts of yellow wax, 15 parts of mutton fat, and 100 parts of a good chalk litho ink, are heated together in a pipkin over a fire, until thoroughly incorporated; pour on to a stone slab, and grind with a muller while hot. Thus prepared, the ink spreads evenly, and makes a strong transfer without blurring, sinking deep into the stone. The transfer paper he prepares by coating paper of an even texture with the following mixture, used warm:—

Dextrin	10 parts
Gelatine	6 „
Gum tragacanth	5 „
Water	100 „

Boil and strain through a cloth, then add a few drops of nitric acid, or *quant. suff.* of a concentrated solution of pot. bichromate to tinge a slight yellow. Paper prepared with the latter is unfit for use after the lapse of a month.

By introducing acetic acid into the chromated gelatine, M. Scamoni says he has obtained a grain or stipple similar to that in the "photo-ink" supplements to the News. Perhaps transfers to stone could be made from such plates.

Spiller's Solution for Reducing Over-dense Negatives.—Having on hand a few negatives which yielded unsatisfactory prints, we set to work to reduce them by the above method. The subjects were all studies from the nude figure, taken for an academician; and which, owing to the difficulty of the model retaining the constrained positions for a sufficient length of time, had all turned out very chalky in the high lights, and lacking vigour in the shadows.

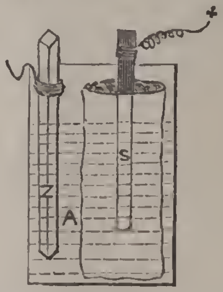
The first negative experimented on was immersed in the solution until whitened through; afterwards a print was made, but it proved that we had overstepped the mark, and had made it too weak. We attempted to re-intensify, or at least change its colour, but did not succeed in our endeavours, as it refused to change in the least, although we rang the changes with several intensifiers. At last we tried to blacken it with sodium sulphite instead of ammonia, when lo and behold, the image was nearly obliterated therein! We determined to risk another negative, but this time took one that had been previously intensified with bichloride of mercury. This behaved altogether different from the preceding one, as we found it could be bleached and re-intensified at will by simple immersion in weak ammonia.

The remainder of our batch of negatives were therefore subjected to a preliminary sojourn in the bichloride of mercury sol. 1-100, before placing them in the chloride of copper bath, and we were rewarded with negatives which had gained detail in the shadows and were sufficiently transparent to show the most delicate gradations in the flesh tints. Some exquisite prints from them were afterwards obtained on Herr E. Risse's collodio-chloride emulsion; this, I may remark, is invaluable for very thin negatives rich in detail, such as one sometimes gets through over-exposure, and which give sickly looking prints on albumenized paper.

An Inexpensive Battery for Electric Bells.—My apology for introducing the above is, that I believe more photographers would fit up electric bells in their studios if they could obtain a battery that would neither require a large sum of money nor the aid of special workmen to renew.

To make such a battery, take a jam jar or glass tumbler (mine are about 3 ins. high and 2 ins. diameter), then make a little sack of canvas or coarse linen with an opening about half the diameter of the jar, fill this with equal parts of coke and black oxide of manganese broken in pieces about the size of a pea; then introduce a pencil of carbon (one from a Jablochkoff candle will do), leaving about an inch of the same protruding out of the mouth of the sack; a strip or rod of zinc the length of the jar and a few ounces of a strong solution of ammonium chloride are all that is required. The connecting wires are made by filing grooves near the top of the carbon and zinc, and winding short pieces of soft copper wire round them, leaving a few inches free to make the connections; a little asphalt or other varnish smeared over these joints will prevent corrosion.

The accompanying sketch will clearly explain how to put the whole together. The zinc Z should not be allowed to touch the bottom of the jar, and a space must remain between it and the sack S. When all is in position, nearly fill with the solution and the battery is ready. Two such batteries placed in a box and surrounded with saw-dust will be found very portable and sufficiently strong for most purposes—of course more strength can be obtained by connecting extra batteries, being careful, however, to join zinc to carbon, and to scour the wires with emery-paper before making the connections.



Mine have been in use for several months, and have merely required the addition of an ounce of water from time to time to replace that lost by evaporation.

Patent Intelligence.

Applications for Letters Patent.

16,864. William Speirs Simpson and James Francis Sutton, 166, Fleet Street, London, for "A new or improved means of reproducing drawings, photographs, engravings, and prints."—Dated 23rd December, 1884.

16,694. Emanuel Falk, 323, High Holborn, London, W.C., for "Improvements in the production of half-tones or 'grain' in plates or surfaces for photo-mechanical printing."—Dated 19th December, 1884.

16,727. Israel Todd, Crossley Street, Halifax, for "Improvements in double dark slides for use in cameras for photographic purposes."—Dated 20th December, 1884.

16,970. Henry Harris Lake, 45, Southampton Buildings, London, for "Improvements in stands, chiefly designed for photographic cameras." — Communicated by A. Stegemann, Berlin.—Dated 27th December, 1884.

16,976. James Brown Jordan, The Elms, Cherry Orchard, Staines, for "Recording the duration and intensity of sunshine."—Dated 29th December, 1884.

16,979. T. Schenkenhofer, Hamburg, Barmbeck, for "Producing photographic prints of all kinds of drawings with the pen, brush, and lead-pencil direct from the drawings, without applying either wet or dry plates, camera and lenses, consequently to be named briefly photography without camera (Leukography)."—Dated 29th December, 1884.

Patents Sealed.

114. Henry Vander Weyde, of Regent Street, in the county of Middlesex, Artist, Electrician, and Photographer, for "Improvements in producing vignetted photographs."—Dated 1st January, 1884.

4906. Arthur Fullerton Howman, George Street, Oxford, Oxfordshire, Photographer, for "Dark slide for photographic cameras."—Dated 14th March, 1884.

Specification published during the week.

2312. Alfred George Brookes, of No. 55, Chancery Lane, in the County of Middlesex, Fellow of the Institute of Patent Agents, for "Improvements in the method and apparatus to be employed in the preparation of surfaces for printing or etching by the aid of photography." Dated 29th January, 1884.—*Complete Specification.*

The invention relates to an improved process for the manufacture of photographic negative and positive plates hatched or grained of glass, paper, or any other suitably transparent or translucent material adapted to the production of types, cliches, or negatives, which can at once in a direct manner be used for the production of highly and deeply etched devices on metals, lithographic-stone, or other suitable materials. The methods or processes hitherto known and in use for the production of cliches, types, or negatives, adapted for the etching on metals, stone, &c., generally require, for the true rendering of the photographic images taken after Nature with their middle tones, one or more intermediate manipulations between the photographic negative and the ultimate surface in the design to be transferred. These methods or processes are therefore wanting in perfect nicety, clearness, or sharpness of contours, shades, and other details.

My invention consists first, in a novel mode of producing the grain or "hatching" (required for the production of high and deep etchings); and secondly, in a mode of producing this graining or hatching in the plate itself, so that it is in intimate contact with the surface, design, or negative, or the picture itself, and is, so to speak, amalgamated or combined with it, and so that the photographic plates, made for the above mentioned purposes, may be treated in any of the well known methods, and used for the production of the ordinary photographic negatives.

For the production of typographic or other like photographic plates (negatives and positives) a transparent grained or hatched plate is required, and for its production I preferably use bichromatized gelatine. A polished glass plate is covered on one side with chrom. gelatine, to which is added more or less of chrom. kalium (bichromate of potash) according as a coarser or finer grain is required. The plate thus prepared is dried at a temperature of, say, 30° to 70° C., or 86° to 158° Fah. lower or higher, according to the grain required, whereby a very fine grained or stippled surface is produced in the film of chrom. gelatine. The plate is then freely exposed to light during some (say) five to ten minutes, more or less, according to circumstances, and is then well washed and dried in the usual manner. After this the grained surface produced is inked with printer's ink or suitable composition, and then varnished with negative varnish.

In producing hatched typographic positive or negative plates, I employ similar photographic matrices, types or cliches, having thereon the desired hatchings or grainings. As already indicated, the degree of temperature varies with the character of grain required, and also somewhat with the quality of gelatine; a little practice will enable the operator to regulate the temperature.

The second part of my invention relates to the production of typographic or such like dry-plates.

For this purpose I take gelatine, collodion, emulsion, pellicule, or other similar dry plates, and expose them behind a matrix plate, having a grained or stippled surface prepared according to my invention, or any other transparent mother-plates, types, or matrices in a copying frame, before a ground or semi-translucent roughened glass plate, to either natural or artificial light, and then develop, fix, and wash the plate in any suitable known way. The exposed film or layer on the plate, after undergoing suitable drying, is well tanned or hardened, say, by means of a concentrated solution of alum, and then subjected to an alcohol bath, and covered over with a layer or film or collodion, or leather collodion, or collodion prepared with castor oil, and finally treated with an India-rubber, albumen, or other suitable isolating solution. The plate is then dried naturally or artificially, and is afterwards covered again with a layer of, or has applied to it, a sensitized solution, gelatine emulsion, or collodion, and dried or allowed to dry.

The plate is now ready for employment in the photographic art. After the required exposure and subsequent developing and fixing, the picture appears on a beautiful grained or stippled ground, presenting the predetermined quality of graining or hatching adapted for the picture, and it is thereby rendered particularly suitable for direct, high, or deep etching; the emulsion layer, proof, or film on the glass plate may be removed therefrom, if so desired, in manner similar to that now employed for a like purpose with the ordinary dry plates.

Trade marks, firm-styles, or names and other desired words, cyphers, numbers, or other indications, either by means of impressions from an india-rubber stamp, or in any other suitable manner, may be applied to the margins or other parts of the plates so produced between the first and second emulsion films or layers, which marks words, numbers, cyphers, &c., then appear after the exposure, development, and fixing of the cliche, type, or negative.

When the grained or hatched negative is desired to be produced of very large size, and with one sensitive layer for use in effecting the photo-mechanical transfer of direct photographic takings on to large metal plates, cylinders, rolls or drums for high or deep etching, I find the following modification to be well adapted to the purpose, and to give excellent results

A polished glass plate is covered with a very fine transparent or diaphanous paper, having upon it the grain or hatching, produced by printing or otherwise, in such a manner that by cutting the said paper along the margins of the glass plate such paper may ultimately be removed. This paper, stretched or distended on the glass plate, is isolated by the application of a suitable solution, such, for instance, as raw collodion or chrom.-alum-gelatine, or india-rubber, and after the drying of the solution the paper is treated with a sensitive solution of collodion, or gelatine emulsion, in the usual well-known way.

After photographic exposure, development, fixing, washing and drying, a second very pure transparent or diaphanous paper is pressed on to the finished negative, so that it adheres to that negative. The whole combined preparation, forming now one sheet or leaf, is then properly dried and separated, dividing it around the edge or margin. The negative or positive, being covered on both sides by the transparent or diaphanous paper, can be copied from either side, without sacrificing its distinctness or sharpness of details, whilst it is moreover protected from injurious atmospheric influences.

Such a negative or positive sheet or film as has just been described, will be found extremely useful in and adapted to effect the repeated transfer of the photographic picture by photo-mechanical means to the surfaces of large plates, drums, rolls, cylinders, or other forms of metal for the purpose of high or deep etching being produced thereon for printing in colours, calico printing, or other use. If the purpose for which the sheet so prepared be that of printing in colours from designs or pictures, upon the surfaces of cylinders or other forms, such sheet is, whilst still affixed on the glass plate, carefully and evenly covered or spread over with a thin, isolating film of raw collodion, and then with a thin solution of gelatine, applied by means of a sponge, a broad flat brush, or other vehicle adapted to the purpose, and is then allowed to dry freely and thoroughly.

The gelatine solution just referred to has been found well adapted to this purpose when prepared by the admixture with the gelatine of one-third part of alcohol, and two per centum of alum; but these proportions may be varied.

This gelatine solution having been so applied, then that portion of the design or picture on the negative or sheet on which it is not desired that the colour shall appear, is covered or protected by the application of covering or blocking out ink or material. This application of blocking out or covering material is effected before the removal of the sheet from the glass plate or support.

After the covering or blocking out material has become properly dry, the sheet or film is removed from the glass plate or equivalent support, and is applied and secured to the surface to which its application is desired, such as to the surface of a cylinder.

After the surface, such as that of a cylinder or drum, has been prepared for the etching for the design for the first colour desired, the prepared sheet or leaf may be again used for the production of another similar design for the like surface of another cylinder or form, by stretching that prepared sheet or film on to a glass plate or equivalent surface, and securing it thereon, whilst the covering or blocking out material is being removed by sponging or otherwise with benzine, turpentine, or other suitable solvent, and then drying the sheet by means of blotting paper, or other suitable absorbent.

The design or picture is then again covered with covering colour or blocking out material in such a way that only the portions of the design desired for the next colour to be printed are left free or available for reproduction on the surface to be printed from or etched. The subsequent treatment will then be like that already described for the first colour surface.

The like manipulations may then be similarly repeated for any further colour portions to be similarly represented by reserved portions of the design or picture on the surface, such as a printing cylinder, or drum or other form.

The covering colour or reserving or blocking out matter should be so finely ground or reduced, and by admixture with benzine or other suitable solvent brought to such a consistency, that its most useful powers of attenuation may be secured.

In order to render such large surfaces of sheet so prepared of greater usefulness, it becomes necessary to afford means of securing them on the surface whereon the design or picture is to be reproduced wholly or in part.

The large negative or positive sheet of transparent material produced as described, is wound round or applied to the cylindrical or other contour of the surface desired to be etched in design, and such sheet having been so applied as tightly and evenly and flatly as possible by the use of suitable means of retention, not only enables a better result to be attained, but also permits of its re-use for a large number of times.

In referring to hatching or graining, it is to be understood that by such term being used, no restriction is intended as to the character of pattern or effect which is referred to, as these will vary greatly with the nature of the design or picture, and such effects are variously denominated as hatching, cross hatching, stippling, graining, mezzotinting, lining, sanding, and other effects of a like nature.

It is desired to be understood that no claim separately considered is made to the well-known process of making photographic dry plates or negative plates but that—

Having now particularly described, and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I do claim is—

1. The production of a grained or stippled surface upon a film or layer of chrome gelatine, or other similar substance substantially as and for the purposes firstly hereinbefore described.

2. The production of plates for photographic purposes wherein the sensitive film is combined with a grained, hatched, or engraved surface, substantially as and for the purposes hereinbefore secondly described.

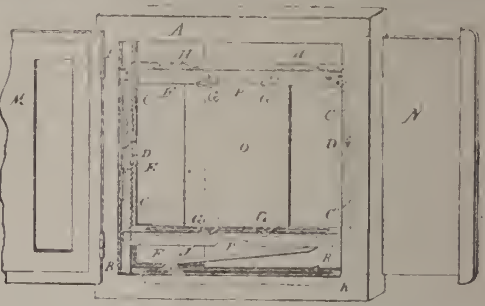
13,372. William Charles Hughes, Optician, Brewster House, 82, Mortimer Road, Kingsland Road, N. London, "An improved frame for rapidly changing the pictures in a magic lantern." Dated 9th October, 1884.

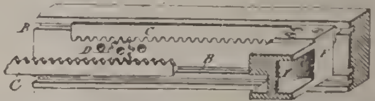
The apparatus in question somewhat resembles that invented by Mr. Cowan, and described on page 146 of our volume for 1884; but the movement of the double holder is effected by a wheel and rack, and a shutter actuated by the wheel serves to cover the lens while the change of picture is being made.

Patents Granted in America.

308,916. Solomon S. Benster, Toledo, Ohio. "Photograph camera-plate holder."—Filed April 19th, 1883. (No model.)

Claim.—1. The combination in a photographic camera-plate holder, of the frame having parallel grooves in the inner faces of the sides of said frame, racks having a reciprocating motion in said grooves, and pinions engaging with said racks, whereby a simultaneous reciprocating movement of said racks is obtained in opposite directions, and the horizontal bars secured to said racks, the parts being constructed, arranged, and operating substantially as and for the purposes described.





2. The combination, in a plate-holder, of the horizontal bars secured to vertical racks, which are provided with means, substantially as described, for giving such racks a simultaneous reciprocating movement in opposite directions, such horizontal bars being provided with adjustable rubber keys or stops, which have heads or shoulders, the parts being constructed, arranged, and operating substantially as and for the purposes specified.

TESTING GELATINE.

BY CAPTAIN ABNEY, R.E., F.R.S.*

Gelatine plate makers are fully aware that the quality of gelatine varies very considerably as regards the tendency to frill. It has often been thought that this tendency is simply dependent on the amount of water which the gelatine will take up; and no doubt, to a certain extent, this view is correct, but it is by no means universally true. When a gelatine lies on a plate the drying proceeds of course according to the temperature and dryness of the air with which it is surrounded; but it appears that different gelatines, under the same conditions, will dry in different times, and that the mere fact of drying puts a stress on the gelatine more in the plane of the plate than vertically to it. Under these circumstances, gelatines dried under the same conditions, as films on a glass surface, will expand more or less in the direction of the surface of the plate; and we may expect that the more a gelatine expands laterally, the more tendency there will be to wrinkle, blister, and frill. To test this, a series of plates were coated with different gelatines, five grains of each being spread evenly on ¼ plates, and then dried in a drying cupboard. The films were then stripped off the plates, cut off, and measured accurately.

One set of the measured gelatines was placed in water of 60° F., and allowed to swell for twelve hours. Another set was placed in water to which 6 drops of ammonia were added for every 2 ounces, which is about the strength of alkali in a developer. Another set was placed in a solution of potassium mono-carbonate, and another in sodium mono-carbonate, and in these and the ammoniacal solution the gelatines were allowed to soak for one hour. The different kinds of gelatine were then placed without tension on glass plates, and again carefully measured. The following table shows the results obtained, the figures giving the linear expansion, taking the dried gelatine as unity :—

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* Read before the Photographic Society of Great Britain.

	Water.	Ammonia.	Sodium or Potassium Mono-carbonate.
Nelson's No. 1	1·2	1·39	1·29
Autotype ...	1·094	1·23	1·21
Heinrich's	1·08	1·22	1·15
Simeon's ...	1·05	1·14	1·09
Batty's ...	1·32	1·50	1·42
X Opaque, Nelson's	1·19	1·40	1·30
Cross & Blackwell's	1·09	1·24	1·17
Amber ...	1·43	1·60	1·51

The result of this table is somewhat curious. It shows that ammonia promotes frilling, whilst the mono-carbonates, though they cause a greater expansion than water alone, yet give a decidedly less inclination to frill than does the ammonia. This I have found in practice to be the case, so on this account, if on no other, the mono-carbonates are superior to ammonia in the developer. It is not hard either, from this table, to pick out which are the soft and which the hard gelatines, the expansion being greater the softer the quality.

The amount of water absorbed by some of these gelatines per 50 grains has already been published by me, and they are as follows :—

	Ash per cent.	Water absorbed per 50 grains.
Nelson's No. 1 Photographic	2 nearly	5½ dr.
Heinrich's	2% ,,	4 ,,
Simeon's	2 ,,	5 ,,
Amber	1% ,,	4 ,,

Gelatine is altered if any quantity of ammonia is added to it, more particularly when warm. As far as I can see, the tendency to frill is about the same as it is when it has not been so treated. There is no doubt that it is more sponge-like in its qualities—that is, much more permeable by the developer.

Though deviating a little from the title of the paper, I wish to draw your attention to an easy method of coating plates with gelatine emulsion, making it flow like collodion. I have seen it stated that on plates with a substratum of silicate it flows well. My own experience is the reverse. I have found that, as a rule, with silicate and albumen the emulsion drags excessively, as it does with silicate alone. There have been cases in which the plates have flowed well, but that was quite an exception. (I would put in a parenthesis that there is no necessity to wash the substratum after it has been applied. I did so at first, but have found it needless, the slight excess of potash or soda having no appreciable effect on development. I have once or twice thought that it promoted a little blue fog at the back of the film, but I don't think it is the case.) Gelatine substratum I have found always drag most tremendously. A little dodge gets over all this difficulty. A piece of swandown calico is wrapped round a squeegee and slightly damped. Just before coating the plate, the muffled squeegee is drawn a couple of times over the surface to be coated, and the emulsion immediately flowed over. It will be found to run evenly and rapidly. With a plate-coating machine of course this dodge is unnecessary.

A SCAMPER ACROSS A CONTINENT WITH A CAMERA.

Being a continuation of "With the British Association."[*]

BY R. G. BROOK.

In continuation of my paper given at our last meeting, you will remember that I left you at the entrance of Lake Superior.

During our sail up the lake, the day was very gloomy, especially so as we passed Silver Island and Thunder Cape. The latter is a basaltic cliff, 1,350 feet high, on whose summit is the crater of an extinct volcano. I should have exposed a plate or two here and at Port Arthur, but the weather was unfavourable, it being stormy and gloomy, with rain falling all the time. I had not a favourable opportunity of exposing another plate until we reached the Rocky Mountains at Kicking-Horse Pass, the present (September 13th, 1884) terminus of the Canadian and Pacific Railway.

I may mention here a circumstance that occurred during the journey from Port Arthur. We arrived at Winnipeg at four o'clock a.m., at which time we were all abed, of course. Previous to having my berth made up, I had taken out of my Gladstone bag what I required at the time, and passed the bag, along with my stick, umbrella, and camera stand, into the next car, to give more room in my berth. I had been given to understand that this train was a special one for the members of the British Association, so never thought for a moment that any cars were going to be taken away; but, on arriving at Winnipeg, the car containing my baggage mentioned had quietly been taken off, and my things had gone off, much to my disgust and annoyance, as my ruby lamp was in the bag, and how I was to manage without my camera stand I was at a loss to know.

However, on arriving at Kicking-Horse Pass, and having my attention directed to a pretty waterfall in the forest, on the mountain side, I exposed one plate, steadying my camera on a rail. This view was taken on the plate I had exposed at Sault Marie Rapids, as, after travelling so far, I had forgotten having previously exposed this particular plate—the fault of trusting too much to one's memory. The mistake was unfortunate, as, from the appearance of the negative, both views would have been good. I could not ascertain that these falls were known by any name, so I named them the "Kicking-Horse Falls," as their descending waters flow into Kicking-Horse Lake, and thence to the Pacific Ocean. It may interest you to know that this Pass is so called from an accident that happened to Dr. Cheadle, by his horse kicking here when he was crossing "The Rockies" some twenty years ago.

The variety of scenery here about, puzzled me how to dispose of my plates to the best advantage. One could readily use a few dozen plates in this wildly-romantic locality without exhausting the views, whereas I had only three double slides, and could not see any facilities for changing here.

I next took a view of the Lake, and the snow-capped mountains beyond, which I managed by placing my camera on the stump of a tree.

The railway is being constructed from here to the Pacific, and a construction train, consisting of a number of trucks, carrying workmen and materials, was about to go down the line some eight miles, so I got upon one of the trucks to see what I might. The train moved very slowly, and stopped frequently, as the line was very steep and exceedingly rough. During stoppages I had opportunities of exposing two plates, placing my camera upon a box of bolts that was on the truck. As we were about entering a short tunnel, a messenger stopped the train, saying that an accident had just occurred immediately beyond the tunnel, which is a short one, through a portion of a mountain that could not conveniently be rounded. At the other side of this mountain lies a deep ravine, which was crossed by a strong wooden bridge, over which the train had to pass, and upon this bridge a large mass of rock had fallen, breaking it down, and bending the rails up like wire.

Two or three of our party, who had gone on before, narrowly escaped destruction, as, just as they were about to step on the bridge, the mighty mass of rock came crashing down, and one gentleman went part way down with a portion of the wreck, providentially escaping with a few bruises, but with no slight shock. I took a view of this tunnel from the side of the landslip, placing my camera upon the end of a piece of sleeper that lay there handy, and then scrambled over the broken bridge to take one of it.

My camera was fixed in only a very rickety position, and on turning to get a slide out of my case the wind carried my camera down the steep embankment; but luckily it was stopped before getting as far as the river below, a depth of some hundreds of feet, by a bush; a lucky circumstance, as, had its downward course not been arrested so, I should have had but little chance of ever recovering it. When I did get it again the ground glass was broken to bits, and some of the brass work was broken off, so this climax put a period to photographing at that time; therefore I commenced to return, enjoying the scenery and the walk back, though it was tough, up-hill work, a distance of eight miles, over wild, rugged land.

This place is in British Columbia, 5,500 feet above the sea-level, 120° west, and standing here I reflected that I had traversed one-third of the entire globe. The wild and majestic grandeur of the scenery here about made me forget my burden, though on arriving back at Kicking-Horse Pass I was "dead beat" and quite exhausted. However, I met a "good Samaritan" in the Rev. Harry Jones, of London. This gentleman had just procured a jug of hot water from a workman's hut, and now proceeded to brew a refreshing beverage from some good tea that he had brought with him, and with "the cup that cheers, but not inebriates," he came to the rescue. This was a treat indeed, as all the so-called "tea" that I had tasted since we quitted Toronto might have been merely an infusion of prairie grass or forest leaves. Talk about "Manna in the Wilderness," with the rev. gentleman's tea, and some biscuits I had, I made a very welcome and no less capital meal. My next anxiety was to repair my camera, as we were to have a number of Indians to meet us at Gleichen, and I wished particularly to get a photo of them. A few small screws would now have been invaluable, but "Necessity, the mother of Invention," prompted me to make wood pins answer, and having preserved from the wreck one piece of the ground glass, I resolved upon an attempt, even under such disadvantageous circumstances. But, having no lamp, I prevailed upon one of the car conductors to empty one of the linen presses in the car, and lock me in whilst I changed my plates in the gloomy recesses of this improvised "dark room," the inside measurement of which was 2 feet 6 inches square. In such an area, the poet's "ample room, and verge enough," would not be so applicable as his "cribb'd, cabin'd, and confin'd," but the limited accommodation sufficed.

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[*] Page 828, last volume.

We commenced our return journey the same evening, and on arriving at Gleichen we were to be met by the great Indian chief, Crowfoot, with his three wives, and a few others of the tribe. They were duly at the station, but the morning was very unfavourable for the work on hand, and I immediately requisitioned a piece of wood that was lying about handy, and getting a friend to steady my camera, I exposed two plates, and considering that I had to focus partly by guess-work, the plates have come out very well. A short time afterwards a number of other chiefs came riding up from the prairie, and with the aid of an old box to place my camera on, I took a drop-shutter exposure which, considering the little light we had, and other disadvantages I laboured under, has come out pretty well.

Before leaving here, and whilst the chief, Crowfoot, and his wives were being interviewed by the scientists, I took out my pocket scissors and cut a lock of hair from the head of one of Crowfoot's wives, as a memento of my visit. It is not exactly one of Beauty's curls, being straight and coarse, and could surely be no love-lock, even to the most romantic lover, if such an animal survives, for "the noble savage" has miserably degenerated, and more unlikely subjects to "inspire the tender passion," or to make the wigwam ring with strains of love, than the Indian women are, cannot be imagined. My next attempt with the camera was to have been at Medicine Hat, where 200 Indians were assembled by appointment at four o'clock, but they waited until five o'clock, and then, losing patience, departed. It was seven o'clock before we arrived, and I was, perhaps, more disappointed than the Indians, as this was a picture the like of which might never be to be had again.

During our short stay on the plains of Regina, near to the barracks, where the Dominion mounted police are stationed, Mr. Egan, the engineer of the Canadian and Pacific Railway, expressed a wish to have a photo of the train on the prairie, as it was the first time that they had ever had so many Pullman cars together, so far across the prairie, and I was anxious to oblige him. Whilst the rest of the party were inspecting the barracks, I perceived, a short distance off, some Indian wigwams, and, thinking that an Indian or two would render the picture more interesting, I prevailed upon two squaws to come down, and with the car conductors it certainly made the picture more lively. But one of the squaws turned away, "shied"—not that she was at all shy, but timid, imagining, perhaps, that the instrument was about to go off, so this unattractive specimen of human depravity is more unrecognisable in this photo than she otherwise would have been.

On arriving at Winnipeg, my first business was to recover my lost luggage, which I found all right at the station. Here I stayed for a couple of days' rest, and to repair my camera. To my great satisfaction I succeeded in obtaining some small screws at a gunsmith's shop, as well as a new ground glass at a store, and here also I got the two negatives of the train on the prairie developed at a photographer's. One gratifying remembrance of my journeyings is, that the professional photographers were always pleased and willing to allow me the use of their rooms, and to develop a plate or two for me free of charge.

Having resolved to go to Yellowstone Park, I did nothing more with my camera until I arrived there, afraid lest I should not have plates enough for the rest of my journey.

(*To be continued.*)

Correspondence.

LANTERN SLIDES AT THE EXHIBITION.

Sir,—Will you allow me to correct the misunderstanding which still exists on this subject?

Last year Mr. Gale exhibited on the table a certain number of slides. At the close of the Exhibition one of his slides had disappeared, and was not recovered.

It was in consequence of this that he requested this year that his box of slides should be kept in charge of the Secretary, and not left on the table. They were therefore also omitted from the catalogue, and for this omission the Executive of the Society are alone responsible.

The matter was fully discussed at the last meeting of the Council, and it was decided that the Hanging Committee were justified in acceding to Mr. Gale's request that the slides should be kept in charge of the Secretary; that the slides ought nevertheless to have been described in the catalogue; but that they were not thereby disqualified from competition for the medal.—I am, sir, yours faithfully,

W. F. Donkin,
Hon. Sec. Photographic Society of Great Britain.

A SOCIETY JOURNAL ON PHOTOGRAPHY.

Sir,—You generally keep us *au courant* as to new processes in photography; but you seem to be out of it altogether this time, as in *Vanity Fair* of December 20th, page 397, it is stated that it is only necessary to put the exposed plate before a red lamp on going to bed, and on awaking in the morning you will find it sufficiently developed. It seems necessary to buy the apparatus at a certain shop; but a two-guinea set and four lessons seem to be considered enough to make a photographer; anyhow, this is the view of the person to whom *Vanity Fair* has intrusted the task of inventing an altogether new photographic method.—Your obedient servant, R. G.

REPRODUCTION OF SHAKESPEARIAN RECORDS.

Sir,—Among the "Notes" in last week's Photographic News is a reference to the photographing of certain documents in Shakespeare's birth-place at Stratford-on-Avon. As the writer's remarks are calculated to convey an erroneous impression of the matter, may we ask the favour of space for a few words on the subject? Dr. Ingleby has *not* given up the attempt to autotype the documents in question, as will be apparent from the following facts. The record committee of the town council, having made arrangements by which we, being on the spot, and having special facilities for such work, are at the present time carrying out, with perfect success and satisfaction, the reproduction of the documents alluded to. We may also mention the fact, that those for Mr. Halliwell Phillips were similarly photographed by us some months ago quite successfully.—We are, sir, yours obediently, C. W. Smartt and Son.

Proceedings of Societies.

Photographic Society of Great Britain.

A technical meeting was held in the small room attached to the Gallery, 5a, Pall Mall East, on Tuesday, the 23rd of December, Colonel **Stuart Wortley** in the chair.

Mr. **Sebastian Davis** exhibited a 50-candle power Sugg's gas burner—a kind of double argand with two concentric circles of flame—and suggested that perhaps it might be useful as a source of light for the lantern; indeed, as regards colour and penetrating power, he was inclined to prefer the gas-burner in question to a paraffin lamp, but it undoubtedly produced more heat than a paraffin lamp of equal illuminating powers. There appears to be no gain by making the gas burner with a larger number of concentric circles than two, but a suitable argand burner seems to have this advantage over the usual paraffin lamp—viz., that no trace of the outline of the flame is visible on the screen. Mr. Davis also remarked that he had tried the W form of wick made by Wood, of Cheapside, and he suggested that when two wicks are used, it might be well to set them at a slight angle, something like a letter V, the point being towards the condenser; but he found that the makers of lanterns were very slow to make new or experimental patterns.

Mr. W. Bedford referred to the possibility of using the light direct—that is to say, without a condenser—but, of course, a large illuminant and a diffusing screen would be essential in such a case. Occasionally enlargements on paper are made in this way, but much light is lost.

The Chairman thought that the gas burner did not give quite so satisfactory a light as that obtained with a paraffin lamp, but certainly there is the advantage of having no smell of paraffin. Still, it should not be forgotten that when the paraffin lamp produces a smell it is generally the fault of the user; as, when a lamp is kept clean and free from oil on the outside, it is a rare thing for any unpleasant smell to arise.

Mr. Debenham remarked that theoretically the radiant should be a point, and the greater the optical perfection of the condensers, so much the greater is the need for approximating practice to theory in this respect. One must not, however, forget that even with the imperfect condensers in general use, it is desirable to reduce the size of the radiant as much as practicable. Mr. Debenham also pointed out that any lantern which was not so constructed as to afford facilities for adjusting the position of the light in relation to the condenser, must necessarily be faulty.

The Chairman here suggested that the discussion on the lantern might be adjourned until a more careful comparison could be made between the gas-burner and the paraffin lamp.

Mr. Beard exhibited a clip for attaching the camera to a rail or fence, and said that by using such an arrangement it would often be possible to leave the stand at home.

Mr. Henry Smith then made some remarks respecting his Lantern Slide Club (see page 813 of our vol. for 1884), and explained that he intended it to be rather a private association than a branch of any existing society.

Some excellent prints on gelatino-chloride paper, by Mr. Louis England, were then handed round, and they illustrated the great variety of tone obtainable with the material in question. The finished prints had been squeegeed down on glass to give them a smooth surface.

A discussion on the best methods of coating paper with emulsion now took place; Capt. Abney and Mr. Cowan describing methods which they had found to answer well in actual practice. A full description of these methods, together with diagrams, will be found on page 1.

A discussion as to the relative advantages of thick and thin films of emulsion in making transparencies now took place, Mr. Moncrief remarking that there is often an advantage in working with a thin film of bromide emulsion.

Mr. Debenham appeared to think that much more depends on proper exposure and development than on the thickness of the film.

The Chairman pointed out that considerable degradation of tone often results when a thick film is used, owing to the yellow tint of the gelatine.

In connection with this subject, Mr. W. Brooks remarked that when he has occasion to make a transparency from an exceptionally thin negative, he finds it advantageous to expose through a thickness of red glass, giving, of course, a proportionally longer exposure.

The Chairman then announced that arrangements had been made for the Society to exhibit a representative collection of apparatus and specimens of process at the Inventions Exhibition, but it is only desirable to include such objects as have a scientific or historical interest—in fact, just those things which would not find their way into the Exhibition under the ordinary rules. He also said that persons having specimens or apparatus of interest should communicate with Captain Abney or himself at the Science and Art Department, South Kensington.

Hyde Amateur Photographic Society.

This Society held their ordinary meeting in the Mechanics Institution on Wednesday evening, the 24th ult.

The business of the meeting was to adopt a code of rules; a lively discussion ensued on several questions.

After the rules had been framed, the President, Mr. F. W. Cheetham, exhibited a new lamp he had constructed. The plan was to throw all the light upon the work downwards, so that no glare would fall upon the eyes of the operator; the lamp was fitted with several colours of glass, and was shown to be an improvement.

The usual votes of thanks brought a very pleasant and instructive evening to a close.

St. Helen's Association of Science, Literature, and Art.

Photographic Section.

A meeting of this Section was held December 17th, at the Association Rooms, 4, Salisbury Street; Mr. Heather in the chair. After the ordinary business of the Section was disposed of—

The Chairman showed a number of positives, of a brick-red colour by transmitted light, which he was at a loss to account for, as the emulsion was prepared in the usual way.

Mr. J. F. Houghton said Mr. Taylor had a similar experience, which he attributed to the use of grape sugar.

The Chairman said he did not use it in this emulsion, though possibly some may have got in. A number of the unexposed plates were then distributed amongst members for experimental purposes.

Mr. D. Thomason showed about sixty views of Scotch and English scenery.

Mr. Brook then read the concluding part of his paper on "Photographic Experiences with the British Association in America."

After passing a vote of thanks, to which Mr. Brook briefly replied, the meeting adjourned to an upper room, where Mr. Thomason's views were projected on the screen by the aid of Mr. Sherlock's lantern.

The meeting then closed.

Talk in the Studio.

A Lecture by Mr. Burton.—Mr. W. K. Burton will lecture about "The Future of Photographic Printing," on Friday, the 9th inst., at the Balloon Society, Westminster Aquarium. The lecture commences at 8 p.m.

Photographic Exhibition at Nottingham.—It has been arranged by the authorities of the Nottingham Castle Museum, to hold an Exhibition of Photography in one of the galleries of the Museum during February, and those who intend to exhibit should at once give notice to Mr. G. Harry Wallis, at the Museum. Pictures will be received on the 14th, 15th, 16th, and 17th of the month, and the Committee propose to pay for the carriage of the packages.

Lime Light Explosion in a Theatre.—A large quantity of gas stored on the stage for lime-light effects exploded at the Theatre Royal, Leamington, on Christmas Eve, during the performance of the pantomime of *Dick Whittington*, by Mr. Horner's company. A number of the windows of the building were shattered, and although it caused a scare among the audience, the performance was proceeded with after a managerial explanation.

Paris International Exhibition, 1885.—It is the intention of the Minister of Commerce to have exhibited a collection of teaching material and specimens of results from French schools. The Educational Section in group V (classes 38 to 44) will comprise plans, models, &c., of schools and other institutions, teaching appliances, gymnastics, military exercises and equipments, &c., printing and books, stationery, office furniture, photography, and musical instruments. In the scientific *annexe* will be included geology, ethnography, hygienic discoveries, instruments and apparatus for medicine, surgery, astronomy, geography, weights and measures, and money of different nations. The artistic *annexe* is to comprise paintings, sculpture, architectural models and designs, reproductions of ancient and modern monuments, paintings on enamel, porcelain, medals, &c., and industrial arts. The London offices are at 1, Castle Street, Holborn, where applications for the remaining available space, and all communications from British exhibitors, should be addressed to Mr. Edmund Johnson.

Substitute for Glass Negatives.—Ever since the introduction of the collodion process, experimenters have busied themselves in seeking for a more portable and less fragile support, for the sensitive film, than glass. Ordinary gelatine bromide paper, even when waxed, shows the grain of the paper, and is thus hardly suitable for negatives of small dimensions. The readers are aware, no doubt, that excessive pressure will produce a similar result, this being exemplified in Woodbury's photo-filigrane process. The *Photographische Notizen* refers to a new paper recently introduced by a Japanese, which is said to be very strong and so transparent, that it can be employed for glazing windows instead of glass panes. The paper is prepared from the fibre of a Japanese water plant.

Marking the Right Side of Lantern Slides.—At a recent meeting of the Photographic Club, the question of marking lantern slides, so as to ensure their always being shown in the lantern the right way was considered, and it was agreed that the Club marking should be as follows:—"That each slide shall bear on its face either two white patches, one on each upper corner, or a distinct white line on the face, along the upper edge." By the face of the slide is meant that side which, when held next the eye, shows the picture, or any reading, the right way.

The World's Platinum.—The platinum diggings of Russia are near Bogoslowsk, Miask, Newjausk, Nischnei Tagilsk, in the Ural Mountains. They were discovered in 1824; and at six places—in 1868, 1869, and 1870—from 494,000, 367,000, and 263,000 tons of sand, 6,675, 7,770, and 6,455 pounds of raw platinum were obtained respectively. The metal contains always some other substances; thus Le Piay found, in a sample from Nischnei Tagilsk, 75·1 platinum, 1·1 palladium, 3·5 rhodium, 2·6 iridium, 6 osmiridium, 2·3 osmium, 4 gold, 1 copper, and 8·1 iron. The raw metal is almost entirely sold to England and Paris, at a price of about £14 per pound of pure metal. It is there refined before it can be worked up into manufactured articles.—*The American Druggist.*

Humours of Photographic Sitters.—"Fancy pictures! Lord help us, they are all 'fancy.' It's a nuisance, that's what it is," said a young operator, "having to get some new gimcrack for sitters without brains, and I'm dead tired of it! Take babies with one shoe in their mouth, for instance, all bundled up in clothes, so that they are nothing but dry goods, or no clothes at all. There's the wash basin style—baby supposed to be in its bath, or it must have one bare foot. Anything to make trouble, I say." "But older people do not act in that way, do they?" "Don't they? Just look at the old negatives we have. One fellow standing on the shoulders of another. We took six brothers here in town that way once—all middle-aged men, or nearly so. Then some fellow comes in who wants to show a silk-facing to his coat—overcoat at that. And badges! Lord! we have them from the size of a five-cent. piece up to a dinner-plate. And uniforms! Well! when you see the picture of a soldier with three rows of brass buttons on his waist, a sword dangling at his side, and a fur helmet on as big as a bushel-basket, you can just be sure he never smelt powder or marched anywhere except on a pavement. Girls, too, that want to look like actresses, and roll their eyes up and clasped their hands. We have one lady-customer who has been photographed in twenty-five different styles—they just wear me out with their nonsense."—*Detroit Free Press.*

Photographic Club.—The subject for discussion at the next meeting, on Wednesday, will be "On the New Rapid Papers for Development.

To Correspondents.

⁂ We cannot undertake to return rejected communications.

E. H. M.—The difficulty only occurs with a few samples of asphalt, and one remedy is to smear the film over with a trace of thin lithographic varnish before developing with benzole, and time should be allowed for the varnish to slightly act on the film. Retransfer ink is not very suitable for inking in, and you will find that an ordinary printing ink (either lithographic or typographic) will adhere better.

J. W.—If you read the present number of the News attentively, you will arrive at a solution of what is now so incomprehensible to you.

G. John Sutton.—1. Equal parts of carbonate of potash and water. 2. One part of sodium sulphite and four parts of water. 3. One part of carbonate of soda with one and three-quarter parts of water.

Jas. Goulborn.—It will not altogether prevent decomposition, but will certainly do very much to retard it. Other reactions besides mere oxidation take place.

Dover.—The cost of provisionally protecting for six months is £1 for stamp, and a few shillings for incidental expenses. Any stationer will obtain you a set of forms, or you can write to Evison and Bridge, Law Stationers, Chancery, Lane London, for them, and the stamp can be obtained to order at any post office.

Tulloch Ard.—The slides you mention are, we believe, wet collodion positives; and, judging from the appearance, we are inclined to think that the transparencies are made very thin in the first instance, and are then intensified by Eder's method with lead. After thorough washing, immerse the transparency in—

Distilled water	100 parts
Red prussiate of potash (ferricyanide) ...	6 ,,
Nitrate of lead	4 ,,

When it has become yellowish-white all over, wash well and, place in a mixture of liquid sulphide of ammonium 1 part, and water 4 parts. Wash.

F. S. B.—You gave permission for its use in the News, only on condition that it was inserted before Christmas; but it was impracticable to insert it so soon.

Thos. Coan.—We have no recollection of the matter.

C. H. Evans.—The address of Mr. Woodbury has been forwarded to you by post, and he will doubtless give you all information.

H. Vermeesch Adel.—1. Your experience is quite new to us, and as the solutions remain clear on mixing, we should conclude that but little chloride is present. Neither in the case of gelatine nor collodion do we know of any likely means of preventing precipitation, excepting by the use of a large excess of ammonia; and if this were present you would at once recognize the fact by the smell. 2. We think not, but have never made special experiments in the direction indicated.

3.—Sulphuric acid	6 fluid ounce
Dried nitre	3½ ounces
Water	1 fluid ounce
Dry cotton wool	60 grains

Mix the acid and water cautiously, and stir in the nitre with a glass rod. When the temperature of the mixture has fallen to 150° F. add the cotton-wool, previously pulled out in small tufts and allow it to remain in the mixture for ten minutes. Thoroughly wash in the ordinary way.

Quandary.—1. To test for hyposulphite, soak some cuttings of the mount in just enough water to cover them, and after filtering the liquid, add it to a solution of iodide of starch, made so dilute as to only have the faintest tinge of blue. A discharge of the colour indicates hyposulphite. To make the iodide of starch solution, boil a dozen grains of starch in an ounce of water, and when cold, add sufficient of a solution of iodine in water to strike a bright blue colour. Dilute this considerably before using it as a test. 2. One of the purest forms of starch obtainable, is the best quality of arrowroot.

F. W. W. B.—1. If the article was labelled correctly, it is chloride of calcium, and not the preparation known as chloride of lime. It is best to order "bleaching powder" when this latter is required. 2. You can obtain it from the Autotype Company. 3. The quality known as Nelson's opaque will answer very well.

Amateur.—1. In such a case you cannot do better than use a simple syphon-trough, such as is represented on page 551 of our last volume. 2. Let it remain in action about twelve hours. 3. None whatever, but it is as well to varnish the zinc with Brunswick black, or some other similar varnish.

H. W. B.—There is probably hyposulphite in the cardboard; see answer to "Quandary."

Rustic.—1. The name is unknown as that of a maker, and gives no indication whatever of the quality of the lens. 2. If it is an ordinary portrait lens, you certainly cannot include a wide angle with it; but why not fix it on the camera, and let the result answer for itself. 3. How do you suppose that we can tell without seeing the instruments; but in this case also a simple trial will give you the information you want. 4. There is no low-priced lens which will do what you require.

John Baird.—You misunderstand, as thorough fixing and washing before intensification is of especial importance. The presence of a trace of hyposulphite is fatal.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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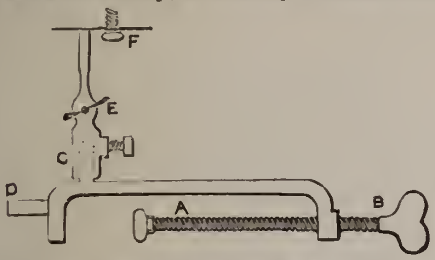
A CLIP FOR ATTACHING THE CAMERA TO FENCE OR POST.

At a recent meeting of the Photographic Society of Great Britain Mr. Beard exhibited a very simple and well-designed clip, by which a small camera can be conveniently and expeditiously attached to a stile, fence, or other object, and by the use of which the photographic tourist may often dispense with the necessity of taking out the inconvenient and difficult-to-be-disguised tripod.

B A is a screw-cramp, which may be brass, but should be made, by preference, of malleable cast-iron. Upon the screw-cramp B A there are two studs, as shown at D and C, while upon either of these can be fitted a socket-piece E F, provided with a hinge at E, and a small table, F, upon which table the camera is fixed by the thumb-screw.



The object of providing the two similar studs C and D is obvious, as circumstances may give the worker little or no choice as to whether C or D will be directed outwards.

If intended for a small camera, Mr. Beard's clip may be made very light; in fact, it need not weigh so much as the lightest tripod now constructed; but we would suggest that there is a direct advantage in making the span or gape of the screw-cramp as much as nine inches, for under these circumstances it can be fastened upon the top or side of the ordinary garden or boundary wall.

Many cases suggest themselves in which such a clip as that of Mr. Beard may be of service. A passenger in a railway carriage may keep his camera ready fixed on the frame of the window, so that at any moment he can slue the apparatus round to the right point of the horizon, by turning the socket round on the stud C. Similarly a rider in a road-carriage or cab may keep his apparatus ready for immediate use; or the passenger on the top of an omnibus may attach the camera to the rail in front of him. The indoor photographer or the amateur portraitist will have but little difficulty in finding articles of furniture to serve as convenient supports; while for views taken from the window of a building—let us suppose the hotel at which a tourist is staying—the clamp of Mr. Beard is all that could be wished. In connection with this use of the apparatus, it may be mentioned that very curious pictures may sometimes be taken from the top of a high building by looking directly downwards with the camera, especially when an instantaneous view of a crowded thoroughfare is taken.

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THE INTERNATIONAL EXHIBITION AT NEW ORLEANS.

The photographic exhibits are gathered together in the Music Hall, but it is scarcely necessary to remark that very many objects of no inconsiderable interest to the members of the photographic fraternity are to be found in other departments of the World's Fair.

At this early stage one cannot say very much, as comparatively few exhibits are fully arranged; it being expected that several weeks must elapse before there is even a general aspect of order and final arrangement; but it is satisfactory to find the photographic arrangements well ahead in comparison with the rest.

The Music Hall, which is very centrally located, has three extremely convenient and well-lighted galleries, and of these, two—that on the south and that on the west—are devoted to photography, while the north gallery contains illustrations of the various methods of reproducing the work of the artist or the draughtsman.

Among those whose work deserves especial mention may be mentioned Guerin, of St. Louis, and Gutekunst, of Philadelphia; the panoramic pictures exhibited by the last-named gentleman far surpassing anything which he has previously exhibited in this line. As our readers probably know, Mr. Gutekunst's are made from several negatives, but printed on a single sheet of paper, the joins being disguised by so managing the printing that there is a slight loss of sharpness at the line of junction. So effectual is Mr. Gutekunst's method, that one has to look very closely to find any trace of a join.

Taking the picture exhibits all round, the various branches of photographic work are well represented, the show of enlargements and photo-mechanical work being good; but, as far as we know at present, carbon printing is unrepresented. Apparatus is shown in abundance, but there is not yet very much calculated to be novel to the readers of the News. Among those few Englishmen whose work is to be found at New Orleans, may be mentioned Mr. F. York and Mr. H. P. Robinson, but some more arrivals of English work are expected, and as the arrangements become more complete, we shall have more to say.

◆

ON THE CHOICE OF LENSES FOR PORTRAITURE.

"That head was taken with a portrait lens twelve inches diameter," remarked a friend of ours one day, pointing to a head about 12 by 10 inches at the Photographic Exhibition Pall Mall. The size of the negatives from which the picture was printed may have been 15 by 12; certainly, it was not larger. It naturally struck us to ask what the object could be in using so abnormally large a lens for a plate by no means huge. Our friend's information on the point was not very precise. He could not even be certain that the exact diameter of the lens was twelve inches; he had not seen it himself, but had been told about it, and knew that the owner of this colossal instrument perceived, in the pictures produced by its means, qualities which were not be got by a lens of less diameter.

The picture referred to was an excellent one, certainly, but displayed no qualities which ought not have been got with a lens of the rapid rectilinear or symmetrical type. However, it is well that the owner of the lens finds it to have special good points, because, if we are rightly informed, it cost a fabulous sum, and yet is used with a stop of such diameter that it is no rapider than a lens of the rapid landscape type.

The subject of the great lens to which we have referred suggests a few remarks on portrait lenses, in which it will be our endeavour to point out what is in reality the advantages of portrait combinations, for a certain class of work, as compared with other lenses, and what of the qualities specially attributed to them exist merely in the imagination of the attributor.

To start with, we will make a statement which covers almost all the ground in the matter. *The portrait lens used full aperture is rapider than any other form of lens. When it is stopped down so as to have the same angular aperture as a landscape lens it is not at all rapider than this latter, and is inferior to it in several respects.*

The portrait lens was the outcome of the working of slower processes than those of to-day. It was a great boon to photographers at the time when it was produced, as was anything which enabled exposures to be reduced by even a small percentage. It was a marvellous performance, too, because, in spite of the greatly enlarged aperture, the definition given through a small angle is as perfect as that by very much slower lenses. It must be borne in mind, however, that, in a portrait lens, definition of the highest degree of perfection exists only through a *very* small angle. Beyond this there is always loss of defining power, either through roundness of field, or through astigmation. The increase of aperture has led to increase in roundness of field, and also to decrease in depth of focus. In fact, by increasing our aperture we have gained only rapidity. Definition we have left intact *through a very small angle*; whilst we have had a loss to a greater or less degree of all the other good qualities of a lens.

"But," it will be said, "we have only to stop our portrait lens down to the same angular aperture as the landscape lenses, and we shall have recovered the qualities that were lost by increasing the aperture."

This is by no means entirely true. Certainly we shall, by the stopping down, recover the depth of focus lost; but flatness of field or marginal definition we cannot entirely recover.

There is a general idea, however, that some mysterious quality is to be found in the image given by a portrait lens which is not to be found in the image thrown by any other kind of lens, and which is particularly advantageous in the case of a portrait. No one to whom we have spoken on the subject has ever been able at all to describe what this quality is, or to definitely point it out; but we have heard the terms "roundness of image," "penetration," "brilliancy," &c., used in connection with it; the last word being used not in connection with the actual amount of light passing through the lens, but being intended to describe some quality supposed to be visible in the image.

The truth of the matter is, that no such quality exists. The only quality in which the portrait lens excels others is in rapidity. When rapidity is required, by all means let it be used; but when extra rapidity is not required, it cannot be too well understood that a lens having a smaller maximum aperture will give a better result in several particulars than the portrait lens will, even when the latter is stopped down.

In London studios it is probable that for foggy weather the portrait lens will have for long to be used full aperture. We know, however, of studios in provincial towns where no apparatus longer than about $\frac{f}{10}$ is ever used, but where a portrait lens is continually employed, whilst a rapid symmetrical or rapid rectilinear lies ready at hand. The idea of this magical something, which the portrait lens is supposed to possess, prevents the operator from disdiscarding the first mentioned.

For anything larger than whole plate it is seldom that an aperture larger than No. 4, U.S. ($\frac{f}{8}$) is used, and this is an aperture which can at the present time be had with the rapid landscape lenses.

Finally, it seems to us that the following would make an excellent selection of lenses for portrait work. A group or D lens, of about 15 inch focus, for all pictures smaller than 10 by 8; a rapid landscape lens, of 20 or 24 inch focus, for plates 10 by 8 and upwards; and in exceptional cases, where very large plates are to be taken direct, a similar lens of still longer focus.

For London studios there might be added for use, in very dull weather, an ordinary rapidity portrait lens of 12 or 13 inches equivalent focus, to be used for cabinets or smaller pictures. A single achromatic lens would be found to very fairly replace the rapid landscape lenses of long focus mentioned above.

Of course, restriction in the length of the studio might necessitate the use of shorter focus lenses than those we have mentioned.

* * *

NORTHAMPTON EXHIBITION.

Fourth Notice.

"Studies of Yachts racing in the Solent, taken from a Sailing Boat" (1328), by G. West and Son, are as wonderful as ever, and could not fail to take the silver medal awarded for instantaneous marine pictures. "Clouds, Morning and Evening," (330), are part of a very large series of cloud effects by B. Wyles, and are all more or less effective, but many of them are marred by over-printing, and will be viewed by the uninitiated as very wonderful moonlight pictures. J. G. Horsey sends some very fine landscapes, and 386, "A Farm in Surrey," is very beautiful and full of sunshine. The wonderful breaking waves at Bognor, by W. P. Marsh, are here, and have received a bronze medal. J. Terras, besides his very successful genre pictures, has sent some very fine interiors of Falkland House, Fife. E. Dunmore's landscapes exhibit artistic feeling of the highest order; "The Return Journey" (394) being a picture made out of the slightest materials—only a country lane and a rude country cart—but a most perfect result for all that; indeed, just one of those rustic scenes that Gainsborough so loved to paint. A frame of small but very perfect landscapes in the Lake District by J. A. Green (402) must not be overlooked. This gentleman sends also some large landscapes (417), "Great Gable, Wastdale Head," being most delicate and full of atmosphere; and to a study of birch trees (433) a bronze medal has been awarded.

"Four Scotch Views" (405), by E. Smithells, are well chosen. Rev. J. B. Hare has some small landscape studies that maintain this gentleman's high reputation. "Cattle at Noontide" (422), by J. G. Sinclair, is a very sunny landscape, but as a composition is slightly marred by the heaviness at the left hand of the picture. The studies in Brittany by Thos. G. Whaite are too well known to need description here, and to the series have been awarded a bronze medal.

"The Waters' Meet, Lynmouth" (436), by T. P. Dorman, is an extremely well-selected little landscape.

The instantaneous views of London from the top of an omnibus, by W. Cobb, are here, and have taken the silver medal for the best instantaneous pictures, not marine; but these also are too well known to need description. "A Wreck on the Pier" (438) is a very dramatic picture; it is low in colour, but is a wonderful rendering of a most difficult scene, and is the work of M. Auty, who sends besides some marine studies—"The Ferry," "Tynemouth Bar," and Shields Harbour"—all of which are extremely artistic. The homely interiors by J. Terras strongly resemble in treatment the work of Adam Diston, and exhibit great artistic feeling. Of these we prefer 442, a cottage interior with woman spinning.

"In an Artist's Studio" (419), by E. Dunmore, is quite a little picture, admirable in every way, and has carried off the silver medal for interiors. The small studies by G. Hadley are most artistic, and have deservedly won the medal awarded to the series, for both the cottage interiors and the very natural groups of fishermen are equally worthy of praise. He has also some instantaneous studies, in no way behind the others.

Mr. H. Maufield, like Mr. Pringle, seems to have worked in every part of the world, and no matter whether in South Africa, Madiera, Italy, or Switzerland, the work is that of a most finished artist; and an old door-way, printed in platinum, is one of the finest pictures in the Exhibition. The interior of St. John's Church, Malta, recently reproduced in the News, is here, as well as some other extremely good work by A. G. Tagliaferro.

W. England has sent some fine carbon enlargements from his Alpine views, which have been hung a little too high for critical inspection; but they are extremely effective, notwithstanding.

The platinum prints have all been hung together in a well-lit corridor, and undoubtedly gain by separation from the warm-toned silver pictures. Some of the most effective pictures in this department are the snow scenes of G. Renwick. Some cabinet vignettes in platinum are among the best examples of portraiture by this method of printing we have yet seen. Some effective copies of pictures are sent by F. Hollier, who also sends examples of the application of photography to decorative work, and certainly those sent in are in no way behind the work of last year.

The beautiful little landscapes by H. B. Berkeley are here, and to 567, "The Thames at Pangbourne," has been awarded the silver medal for small landscapes. It is an upright picture, and warmer in tone than the others sent by this gentleman, and we cannot help regarding it as one of the most perfect landscape studies ever produced. A very large series of reproductions are sent by R. Schuster; they are called photo-etchings, but no particulars have been sent with them. We are inclined to think they are produced by a modification of the collotypic process. At any rate, they are very beautiful, and have received a bronze medal. England Brothers send some interesting examples of platinum printing on linen. The School of Military Engineering exhibit some effective landscapes printed in platinum.

On the table are some very successful lantern slides. The Swiss views of England Bros. are very clear and perfect, as are also those sent by F. York and Son; and the examples of different tones to be obtained on gelatino-chloride plates, by Alex. Cowan, are most instructive. To the series of slides sent by P. H. Fincham has been awarded a bronze medal; they are very uniform in excellence, and are very bright on the screen.

In conclusion, we must say that the Exhibition deserves to be a success, for it reflects the greatest credit on the committee of management, who have done everything possible to make it popular as well as instructive. Every Thursday evening they have an excellent string band, and an exhibition of lantern slides in one of the lower rooms. The Exhibition closes on Thursday, January 12th.

HOW TO PHOTOGRAPH MICROSCOPIC OBJECTS.

BY I. H. JENNINGS.

Lesson XII.—Preparing Crystallizations for Photomicrography.

Most chemical crystals are mounted in balsam, as they are usually viewed by polarised light; but where this is inapplicable, or when the crystals are soluble in balsam, this medium must not be employed, and the crystals must be simply evaporated from an aqueous or alcoholic solution on a clean glass slide, and covered with a circle of thin glass. The majority of chemical salts are soluble in water, and when typical crystals are not required, the addition of a little gelatine to the water will usually produce larger, and in some cases more beautiful forms. However, as the genuine typical forms will be generally required in a photograph, it is best to use nothing but distilled water, or pure alcohol, in making up the solutions. To obtain typical crystals, the solutions should not be concentrated, but normal, and the evaporation of the salt should not be accelerated by too much heat. As a general rule, the most perfectly formed crystals are obtained by very slow evaporation in a cool place. Many salts, if evaporated in a hot room, or over a lamp, give nothing but a confused mass of amorphous forms. It is often better, instead of applying heat to a drop of the solution on a glass slide, to make a hot solution in a test-tube, and evaporate a few drops slowly on the glass slip. Arborescent crystals, no matter how beautiful in themselves, are a great nuisance when the student wishes to prepare the typical forms for photography, and they may be avoided by allowing the solution to crystallize out slowly. Potassium bichromate, if crystallized rapidly, either over the lamp, or from a hot solution, usually gives arborescent forms; but when evaporated in the cold, the characteristic prismatic crystals are obtained. All salts crystallized from an alcoholic solution should, as a general rule, be evaporated in the cold. As an example of this, magnesium platino-cyanide, when evaporated from an alcoholic solution rapidly, gives only an amorphous red mass. To obtain the prismatic crystals arranged in rosettes, the solution must be evaporated slowly in a cool room free from draughts.

White arsenic, $As_2 O_3$, may be obtained either from its aqueous solution, or by sublimation. The latter mode gives more brilliant and regular crystals, but is more troublesome. A small portion of arsenic should be put in a short test-tube about one inch long, and a glass slide laid over the top. On applying heat, the crystals will form on the sides of the tube and on the slide. By a little careful manipulation with the spirit lamp, the bulk of the crystals may be driven from the sides of the tube and made to crystallize on the glass slip. They should be covered with a circle of thin glass—no balsam must be used, or they become too transparent to photograph. The cuts (next page), photographed from slides of ·001 grain, and ·002 grain of arsenic, show the general form of the crystals.

Strychnine is very insoluble in water, so it should be crystallized from its dilute alcoholic solution. The form of the crystals is the octohedron, or square prism—usually the latter. As it dissolves in balsam it should be mounted dry. With a solution of picric acid strychnine yields hook-like crystals, which may easily be photographed with a low power.

Brucia must be crystallized from alcohol. The crystals are oblique rhombic prisms. It dissolves in balsam rather rapidly, so should be either set up dry or in castor oil.

Atropine, caffeine, and narcotine crystallize in needles. The former must be mounted dry. Morphia, and morphia chloride, sulphate, and acetate may be crystallized either from water or alcohol, and mounted in balsam.

Quinine sulphate gives a profusion of silky needles from a dilute alcoholic solution. Owing to their delicacy they are difficult to preserve, but may be mounted in dilute balsam and benzole.

CRYSTALS OF ARSENIC, FROM A DEPOSIT OF ·002 GRAIN.

CRYSTALS OF ARSENIC, FROM A DEPOSIT OF ·001 GRAIN.

Sulphur must be dissolved in carbon bisulphide. The best crystals are obtained in winter; but at all times of the year the solution must be evaporated in a room quite free from draughts, and as cool as possible. These crystals must be photographed by reflected light with a low power. Salicin is a very favourite microscopic object; but the splendid discs usually seen on slides are only modifications of the typical acicular crystals. The real forms are best obtained from a dilute aqueous solution, which may be hot. If a little gelatine be added to the solution, delicate discs form on crystallization, which are seen to consist of needles radiating from a common centre. Fusion of the dry salt gives only coarse discs, but if a concentrated aqueous solution be made, and evaporated over a lamp until fusion just commences, very delicate discs of a larger size may be obtained. One method of obtaining fine discs is to put a solution of salicin in gelatine on a glass slip. Warm the slip over the lamp for a few moments, and then pour the solution off; enough will be left on the slide to form a thin film. The film is then pricked in several places with a fine needle, and immediately crystallization commences from each prick as a centre, and goes on all over the slide. The whole is at once covered with balsam and benzol, and a thin glass square gently pressed on. If not covered at once, the crystals become opaque.

Santonin and phloridzin are crystallized from an alcoholic solution, and may be preserved in balsam.

Here our Lessons in "Photo-micrography" are brought to a close. The student must once more be reminded that skill in manipulation of the microscope will not by itself produce the best results. There must be not only expertness in each photographic operation, but an intelligent understanding of the *why* of each process. Photography as a science must be studied by itself, and for itself; for it is only when an intelligent understanding, both of microscopy and photography, is gained, that photo-micrography becomes worth pursuing.

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FRENCH CORRESPONDENCE.

Phototypes and Photographic Aqua-Tints—Colour Sensitometer—Experiments on the Sensitometer—Photographic Copyright—Poitevin Monument.

Phototypes and Aqua-Tints.—I have, on several occasions drawn the attention of my readers to various phototypographic processes which, for some years past, represent the results obtained by diligent workers in that direction, among whom may be cited—Ives of Philadelphia, Meisenbach of Munich, Angerer and Göschl of Vienna, Petit of Paris, &c. I spoke recently of a French process used by Boussod, Valadon, et Cie., late Goupil. The prints were indeed remarkably fine, but typographic reproductions of photographs do not give good results unless great care is taken in the printing, and this prevents the possibility of interspersing them with the ordinary type and printing at one time. In the studios at Asnières, this difficult method has been replaced by another process, the printing of which may be entrusted to any good printer, and may be struck off at the same time as the text. This process, as worked by M. Manzi, resembles ordinary phototypes by the best method, inasmuch as a lined or granular surface intervenes to divide the high-lights from the shadows of the original. I have been examining at the office of MM. Boussod, Valadon, et Cie., the numerous specimens of this kind of photo-engraving, and I never thought to have seen it reach such perfection; they are infinitely preferable to the previous work, presenting a granular aspect, brought out by this house. None of the work of the artist disappears in reproductions by M. Manzi's process. There are prints on view of considerable size and of great beauty. I should not be surprised if all the work of this firm was not carried on by this method, as it gives so much life to the reproduced picture, and brings it out in such strong relief. To obtain this vigour, and preserve the brightness of the high-lights, recourse is had to two or three printings, by which the effect of a drawing in two or three tints is produced. The flatness of a monochrome is thus broken up. As I am quite incapable of moderating my enthusiasm excited by these prints, I can only recommend anyone doubting my veracity to inform himself at the publishers, and see if I may not be excused. M. Manzi has also invented a photographic aqua-tint process giving charming effects. The price of execution is from twopence the square centimetre, and the process is very rapid, and can be done in one day, and the printing is carried on the same way as copper-plate engraving. Comparing its price with that of wood-engraving, the latter costs here, for anything like good work, from 1s. to 1s. 8d. the square centimetre, according to the subject; inferior work comes to about 3½d. or 4d. This aqua-tint process gives less depth of tone than the phototypes, but very great transparency in the shadows, without taking away from the vigour of the original. I may just mention that the price of the photogravures is 1 fr. per square centimetre, and a plate can be had in from a fortnight to three weeks' time. I should never stop writing on this subject were it not that a question of colour has come up to feed my ambition, so great is it.

Colour Sensitometer.—It becomes more than ever indispensable, in comparing various sensitive films with a view of determining their relative actinic properties, to see how they are affected by light of various colours. Up to now one has been content with indicating the sensitometric degree of the rapidity of variously prepared plates; but it is certain that if isochromatic plates had been tried with other emulsions, the lengthened scale of colours reproduced by the former would have been obliged to have been taken into account. I constructed a colour-scale having twenty-one divisions, representing the seven distinct colours of the spectrum in three degrees of transparency. It is made of coloured glass, and is of the same size as Warnerke's sensitometer, so that two successive experiments can be made, one to give the degree of rapidity, and the other the scale of coloured rays more or less definitely reproduced. On making the trial with Tailfer and Clayton's isochromatic and Britannia plates, equal rapidity and scale of coloured rays of equal length were obtained: while Monckhoven's, and plates by other makers, resist the luminous action under the yellow, orange, and red, show but little of the green, and display strong impressions under the violet, indigo blue, and greenish blue. The original I have made may be imitated; it is not absolutely necessary to have a standard of sensitiveness to colour.

Sensitometer Experiments.—I operated in an identical manner with Warnerke's phosphorescent plate and a stearine candle. My last trials were with a stearine candle of the brand known as *l'étoile.* It was placed exactly fifty centimetres away from the sensitive plate, and the base of the wick is kept in the same position. The exposure lasted exactly half-a-minute, the candle being allowed to burn several minutes, so as to arrive at the degree of normal combustion. It was repeated several times with plates of the same kind, and the results all agreed. I am therefore assured that, for all practical purposes, Siemens' unit lamp, and other complications, are unnecessary. A good candle of known diameter is all that is wanted. I have tried all kinds, and the best give equal results. I learn that Mr. Warnerke is about to establish a new form of sensitometer, which he will guarantee invariable. I congratulate him upon it, and will certainly make trials of it as soon as I can procure one of the new type.

Photographic Copyright at the Berne Congress.—The Berne Congress, while occupying itself with International literary and artistic copyrights, neglected, in the first instance, to take any heed of that of photography, and it is only in the final protocol that a word is said on the subject. It is really curious how long it takes people to understand the difference between photography, engraving, and lithography.

The Poitevin Monument.—The agreement with the contractor for the Poitevin monument is settled, and the work is about to be commenced at St. Calais, where it will be unveiled next September. The subscriptions, as I foretold, reached the sum of 10,000 francs, a large sum considering that the name of Poitevin is not popularly known. The Minister of Fine Arts granted 1,000 francs.

Leon Vidal.

PHOTO-LITHOGRAPHY AND PHOTO-ZINCOGRAPHY.

BY MAJOR J. WATERHOUSE, B.S.C.,
Assistant Surveyor-General of India.

Chapter XVIII.—Photo-Lithography in Half-Tones.

In the earliest days of photo-lithography constant efforts were made to apply it to the reproduction of photographs from nature and other subjects showing gradation of tone. Many of these efforts were more or less successful, but none were so thoroughly satisfactory as to be brought into extensive use for ordinary commercial work. At the Paris Exhibition of 1868, several excellent examples were shown by various English and Continental exhibitors. The introduction of the Woodburytype and photo-collotype processes, in which the delicacy of the photographic gradation of tone is perfectly preserved, drew attention away from photo-lithography, and lessened the necessity for processes in which the gradation must be broken up, and the beauty of the picture more or less damaged. Consequently, of late years, little attention has been paid to photo-lithography in half tones, though it has many conveniences and advantages to recommend it; but within the last year or two the demand for cheap photographic illustrations has led to a reconsideration of the subject, principally with reference to the production of half-tone blocks to be printed from type, and several methods of block printing in half-tones have been brought forward. Many of these methode are also applicable to photo-lithography, and therefore it seems desirable to show what has already been done in this way, and to indicate the direction in which further progress may be made.

The prime difficulty in the reproduction of half-tone subjects by photo-lithography is the necessity for breaking up the continuous photographic image into a more or less strongly granular one. The same necessity exists in the photo-collotype and heliogravure processes; but in these the grain is so fine as to be almost imperceptible, and consequently the gradation of shade in such prints is practically continuous. In the collotype processes the amount of ink taken up by the images is in exact proportion to the action of light, whereby the lighter shades absorb water and refuse ink, while the darker shades take up ink in proportion as they are unabsorbent of water, and thus the image is really formed of different thicknesses of ink, the slight grain tending to preserve the proper gradation. In the same way, in a heliogravure plate, the gradation of shade is represented by hollows of varying depth, and the printed image is formed by different thicknesses of ink corresponding to the different depths of the plate. The object of the grain is not to break up the image, but simply to roughen the surfaces of the hollows, so that the ink may not be wiped out of them when cleaning the plate during the printing, but will be retained in just the proper quantity.

In the case of the photo-lithographic image in half-tone, it is quite different. There is no selective taking up of ink, the roller giving it off equally all over the image, and unless the latter is properly broken up to allow each part to print with its proper vigour and effect, the whole will soon become a black smudge.

In ordinary lithography the appearance of half tone and gradation of shade is obtained by graining the stone, and so giving it a rough surface, which breaks up the strokes of the crayon, the draughtsman getting the effect of dark or light shades by more or less pressure of the crayon on the stone, by which the little hollows forming the grain are, to a greater or less extent, filled up. Thus, although the ink roller, in passing over the drawing, leaves a layer of ink of uniform thickness and blackness all over it, the effect of pale ink in the lights is produced by the comparatively large amount of white in these parts, and the smallness and separation of the black particles of ink. In the darker parts the particles are larger and closer together, and produce various gradations of shade, while in the deepest shadows the particles of ink almost or quite run together and print quite black. If the drawing and printing are properly conducted, the result is a wonderful combination of softness of gradation and brilliancy of light and shade, though on close examination the breaking up produced by the grain of the stone is apparent throughout. In another method the drawing is made with lithographic crayon on paper specially prepared to show a grain, which may be varied in coarseness or character at pleasure.

To be able, therefore, to print a photographic image on stone, it must be broken up in the same way into a collection of particles small, and separated in the lights, and becoming progressively closer and larger as the depth of shade increases. These particles must be clear and distinct, not so large as to destroy the fine photographic details, and at the same time not so small as to be liable to run together and print too dark. The general effect of the grain must be uniform, but it should not be disagreeably prominent or monotonous in its regularity.

Besides the mere mechanical difficulties of breaking up the delicate continuous gradation of the photograph into the broken grain of the crayon drawing, there are other considerations which tend to produce unsatisfactory results. In the first place, the lights and shades of even the best photographs from nature are not always all that can be desired from an artistic point of view, when translated into the heavy black and white of a lithograph. Even when a fair result has been ob tained from a suitable subject, the greatest skill and care are required to enable such delicate work to be printed in anything like large numbers. Notwithstanding these defects, a really good method of photo-lithography in half-tone would have many advantages over other photo-mechanical processes in quickness, cheapness, and certainty; the subject. therefore, is well worthy of attention.

With these preliminary remarks, we may proceed to consider the various methods by which it has been proposed to attain this object. They may be classified under four general heads, as follows:—

1st. Those in which the photographic image itself is grained on the stone.

2nd. Those in which no special arrangement is made for graining.

3rd. Those in which a screen, or medium bearing a grain, is interposed between the negative and the sensitive surface, whether on stone, metal, or paper. The grain may be a network, like fine wire-gauze, crape, muslin, lace, net, or other tissues, or photographic impressions of the same, enlarged or reduced. Or it may be an impression from a plate engraved with a net-work formed of dots or cross-lines; or a stipple of dots or points of various sizes, as in a crayon or aquatint grain. This impression may be printed on a thin, transparent medium, such as collodion or gelatine, or it may be transferred or printed on to the sensitive surface before the negative is placed in contact with it, or on to the surface of the negative itself. The negative or sensitive surface may be brushed or dusted over with some granular powder, which will form a fine grain, without interfering too much with the action of light.

4th. These methods, in which advantage is taken of the natural vermicular wrinkling or reticulation that is formed on gelatine printing surfaces, such as are used in photo-collotype printing, and can be increased or diminished at will, according to the thickness of the film and the temperature at which it is dried. This grain almost disappears in the deep shadows, but becomes progressively coarser and more strongly marked from the shadows to the lights, and, as we have seen before, this is just what is wanted. All that is necessary is to prepare a collotype printing film giving the requisite grain; to print the subject on this film, from a reversed negative; then to carefully pull a print from it for transfer to stone or zinc. Having made the transfer, a skilful draughtsman can easily open up lights and deepen shadows. Lettering, &c., may be added, and the subject printed at once from the stone. The ink-photo process, now being so successfully worked by Messrs. Sprague and Company, of which many admirable examples have been given as supplement to the NEWS, is apparently of this kind. The only objection to it is that the grain may become unduly prominent, and destroy fine detail, though the general effect is good.

As we shall see further on, the collotype grain may also be applied, and perhaps with better results, in the manner of the processes categorised under the 3rd class.

I. The first method, in which the image on the stone is grained, is chiefly applicable to the asphaltum processes. In chapter xv. we have already seen that Messrs. Barreswil and Davanne obtained grain by dissolving asphaltum in ether, and were able to produce satisfactory prints in half-tones. A more certain method is that described by L. Schrank, in the *Correspondenz* for 1871 (NEWS, vol. xv. p. 368) in which the grain is produced by developing an asphaltum image on a grained stone, and then carefully opening the film of asphaltum by rubbing it with moist sand, pumice-stone, or cuttle-fish powder, so as to lay bare the grain of the stone. In the shadows, where the layer of asphalt is comparatively thick, few points of the grained surface will break through; but in the thinner portions of the image more points of the surface will be laid bare in proportion to the thinness of the film. When the image is considered sufficiently grained it is etched, by which the gum and acid penetrate into the little spaces which have been opened out, and prevent the ink taking on them. A grained image is thus produced similar to a chalk drawing. The writer has seen some very satisfactory results produced in this manner, some years ago, by Messrs. Reiffenstein and Roesch, of Vienna.

At the Paris Exhibition of 1868, some very fine photo-lithographs, in half-tones, were exhibited by M. Marie, of Paris. His exact way of working is not known, but it seems likely that it was based on the use of grained asphaltum images. The peculiarity of his process was that the results were obtained by separate printings for the shadows, middle tints, and lighter tints. The results were very effective, and practically, perhaps, the best half-tone photo-lithographs that have ever been produced.

Good results in half-tone, by transfer on stone, are said to have been obtained by Mr. Pouncy's process. He developed the bitumen image on paper coated with gum, transferred it to a grained stone, and then grained it.

Grained images in bitumen could, however, easily be obtained by printing under the grained negatives, to be described further on. They might be either direct on the stone or zinc, or transferred from a paper or tissue, prepared in the way suggested by M. Despaquis (chap. xv). The latter mode of working, if feasible, would appear to have some advantages over the collochromate methods in sharpness and delicacy of detail.

II. Under the second heading we may include those collochromate processes in which no special arrangement is made for giving a grain to the image, or it is produced simply by the roughness of the transfer paper and the abrasion of the sponge in washing.

The simplest of these methods is Poitevin's, already described in chapter xii. The image being entirely on the colloid surface, the process is more nearly allied to collotype than to photo-lithography proper. The images are easily worn out, and do not yield long impressions.

(*To be continued.*)

DIARY OF A DEBUTANT.*

SEPTEMBER 27th.—Forgot to put diaphragm in. Then took two of doctor and chief officer; but, on going to develop, found there were no plates in the holder. Took two more of same, and found one plate broken. Next took a group. Arranged the people very nicely, &c., but forgot to pull slide out of holder. Next took two couples, and left holders on my table. On coming up after lunch, found that some inquisitive person had opened one of the slides and let in the light. I then went down to develop. The image seemed to come out very fairly; then put negative in hypo bath, and it gradually grew darker from the edge, until only a slight shadow remained in centre, which would not come out. According to instruction, I then washed thoroughly, rubbing gently with my fingers. Door, panels, &c., were distinctly visible before, but when I'd washed thoroughly, never a sign of a picture was there at all. Cleaner piece of glass was never put into a gentleman's spectacles. The second one showed no sign of a picture, but remained a melancholy black from the beginning. I was determined not to be beaten, so took two more of the doctor, and have brought out some sort of a picture, but don't think they're right—they look too filmy to be correct. I tried to take a print from one, but the glass must have been damp, the paper stuck to it, I could get no impression.

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* *Photographic Times.*

September 30th.—This morning I tried again, and a picture appeared on the blue paper; but the moment I put it in water, the blue immediately left the paper, and it shortly appeared as white as the opposite side. 11 A.M.—Have just tried a second blue print. Before washing, the picture was a fair one, but, like the last, the paper became entirely clean when washed in the basin. 5 P.M.—The same thing had happened again. This time I thought possibly the print should be washed in the dark-room; but the photo., which appeared a very fair one, was entirely washed off. I then tried with the other paper. Some of it had evidently seen the light. I had to mix two baths for it, and produced fairly satisfactory results. I can't for the life of me think what is up with that blue paper. I've followed instructions, I think.

October 1st.—There's something the matter with the blue paper or the manipulation, I feel confident. I've tried it again, and the colouring leaves it directly it touches the water, coming off in a yellow sediment. This shuts me up until further instructions are received.

October 5th.—Developed two more negatives yesterday, and tried several experiments with the blue paper this morning. Among other things, I scraped one of the negatives considerably in one corner, and then tried to print on blue paper, leaving in a good sun for about an hour. The result was the same as in previous cases, viz., the whole sheet washed as white as your shirt-front, except the scratched portion, where the paper became a deep blue. This confirms my supposition that the negatives are not right; there's too much of that thick glutinous stuff on them.

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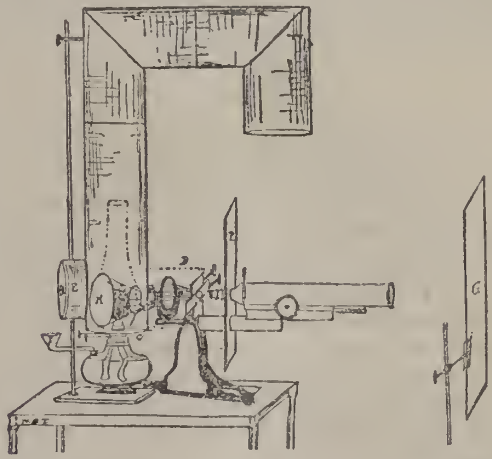
THE MICROSCOPE FOR CLASS-ROOM DEMONSTRATION.

BY W. G. THOMPSON, M.D.

The following adaptation of the use of the microscope as a sort of magic-lantern for class demonstration has been found so extremely useful, cheap, and practical, that it is illustrated here.

A large common kerosene "duplex" lamp is the illuminator. Superfluous light is cut off by a piece of six-inch stove-pipe, which fits over the lamp-chimney, and rests upon a horizontal collar, *C*, of stove-pipe metal. The collar prevents the pipe from shutting down too far upon the lamp, which would cause the kerosene to become dangerously hot. The lamp is filled at *F* with a curved glass funnel; and the two flat wicks, an inch and a-half broad, are turned by their separate keys outside of the pipe. The pipe has two elbows, which conduct heat and smoke away, and completely cut off the light from the top of the flame These elbows may be rotated into any convenient position. Opposite the lamp-chimney a third short elbow, *E*, is inserted, closed by a movable cap. Through this elbow the chimney can be removed, the wicks trimmed, and a concave glass or tin reflector, *M*, four inches and a-half in diameter, may be placed behind the flame. The flat of the wicks should be parallel to this mirror. Opposite the mirror, and directly in front of the flame, a plano-convex lens, *X*, two inches in diameter, is inserted in a hole in a pipe. The light reflected from the mirror, *M*, passes through this lens, and falls upon the reflector of the microscope, whence it is made to illuminate the object upon the glass slide in the ordinary way. The object is magnified by a one-fifth inch or one-half inch objective; the eye-piece of the microscope is removed; and the image is projected upon a ground-glass screen, *G*, a foot and a-half square, which is placed from one to four feet in front of the microscope. The screen is supported by a perpendicular iron rod and cork-lined clamp, such as is in use in every chemical laboratory, to hold glass retorts, tubes, &c. The iron rod rests upon the floor, occupies very little space, and can be moved to any convenient focussing distance. A similar stand supports the horizonal elbow of the stove-pipe. The tube of the microscope should be blackened inside as in micro-photography. The microscope is handled in every way as usual in respect to stage movement, fine adjustment, &c.

The great difficulty with the apparatus consists in trying to prevent the reflection of superfluous light. To obviate this, a pasteboard box, *B*, six by six by eight inches, is readily cut to fit closely over the plano-convex lens, and the back of the microscope stage, thus enclosing the microscope reflector, and allowing it room to be focussed properly when the lid of the box is removed. It is also advisable to fit a sheet of pasteboard, *P*, tightly over the microscope tube at right angles to it, in order to cut off the rays which escape around the object illuminated, pass along the axis of vision outside of the tube, and tend to blur the image on the screen.



B, outline of paper box to enclose mirror; *C*, collar to support stove-pipe; *E*, elbow through which chimney may be removed; *F*, funnel for filling lamp; *G*, ground-glass screen; *M*, reflector inside of stove-pipe (posterior surface); *P*, paste-board screen; *X*, hole in stove-pipe where lens is inserted.

Dr. J. West Roosevelt (to whom the larger part of the ingenuity of this apparatus is due) and the writer have for some time made constant use of it for instructing students. Physiological, histological, pathological, and botanical specimens may be clearly shown. A number of students can look on at once. The slides are rapidly changed, and students and instructor may always be sure that they are discussing the same particular cell; which, unfortunately, is not the case when a beginner in the use of the microscope looks through the instrument alone. The apparatus may readily be constructed by any one for about five dollars; it is easily portable, and always ready for use in any darkened room. It is possible to throw the light from the lens *X* directly upon the object without the intervention of the microscope reflector, but the reflector facilitates focussing. Objectives of wide aperture are preferable. With some lenses, the use of the eye-piece adds distinctness, but in most cases it cuts out too much light. An Abbe illuminator may be inserted. The image on the screen *G* is seen most distinctly upon the farther side; and some objects become clearer if the screen be moistened with water, or covered with a thin coat of transparent varnish laid over the ground surface. The image may also be received upon white glazed paper, but this is less clear.

For demonstration on a larger scale, an oxy-hydrogen light can of course be used, or some form of electric light. The arc-light is not sufficiently steady, and the incandescent light requires a great deal of storage-room for batteries. The light above described shines with thirty-six candle power, is clear and steady, and serves every ordinary purpose; the circulation in the frog's foot, varieties of epithelium, injected lung tissue, tubercle, plant-cells, &c., may all be clearly shown. The colours of stained or injected specimens come out distinctly.

The principle of this apparatus is by no means new; but its application is made so easily within the reach of any one who owns a microscope, that it is especially recommended to instructors in schools and colleges.—*Science.*

Notes.

The most interesting portion of Major Waterhouse's exhaustive articles on photo-lithography have been reserved for the end, and in our issue of this week we commence the eighteenth chapter, which deals with photo-lithography in half tone.

It seems that Mr. Tonndorf, of St. Louis, and Messrs. Kuhn Bros., of the same city, are about to have a legal contest to determine who is the true inventor and legal patentee of the postage stamp portrait. Our readers will remember that on page 712 of our last volume we gave examples of stamp portraits as Mr. Tonndorf makes them; but considering that they were commonly made and sold in England more than twenty years ago, it surprises us a little to hear of a contest as to originality in this matter.

At Lambeth Police Court this week an unhappy woman who was forced to charge her husband with assaulting her, owned to the magistrate that for some time past she had been supporting him and her three children out of her earnings derived from "soliciting orders for photographs and other things." It may be supposed that the "other things" were the chief source of income, for anything more pecarious than "soliciting orders for photographs"—by which was meant, we presume, getting subscribers to portrait clubs—it is difficult to imagine. The canvasser for a portrait club occupies much the same position as the traveller on commission in coals or wine did in the days of Mr. Micawber.

As an excuse for bad work, one may in some cases plead that it was done by an amateur; but this is hardly so in photography, as some of the best pictures—if not the very best—are made by non-professional photographers. Still, now and then a bad photograph is widely distributed, or even published, with the remark that the picture is by Mr. ——, an amateur. This is rather cruel to the producer, and more especially so when the subject is a well-known one, and one of which good photographs have been widely distributed.

Of the making of elaborate apparatus, and the designing of complicated methods of checking omnibus and tramcar conductors, there is literally no end. A tolerably extensive and very varied exhibition might be made by collecting the numerous inventions for the above purposes which have been tried and found wanting during the past twenty or thirty years. Comic journalists have found the successive dodges—the bell-punch, the automatic money box, the coloured ticket tapes, the travelling detective, the clicking machine, and what not—as good as an annuity. But meanwhile, it would seem the conductors have persistently pilfered on, and Omnibus and Tram Company directors are still without the infallible check they desire.

It would be unwise, therefore, to be too sanguine about the new "conductor's horror" which it is said an ingenious mechanician has invented, and of which it seems photography—that "general servant" of art and commerce—is a leading feature. The inventor is chary as to details, but the main novelty about his detective apparatus—which is to be fixed at the end of the 'bus, just under the driver's box—is that it will contain a camera, by means of which negatives of the interior of the vehicle will be obtained every time a stop and a fresh start sets the apparatus at work. It is evidently thought that by this means a series of photographic registers of the "insides" at the various stages of the journey will be obtained. But even granting this were possible, it has yet to be explained how the photographic likenesses of the passengers can be made to furnish the information how far they mean to travel. Fares do not, as a rule, put on a "twopenny," or a "threepenny," or a "beyond-the-above-distances" expression when they enter a 'bus.

An elaborate comparison of the various negatives of the state of the omnibus interior ought, to be sure, to assist a scrutineer in arriving, by a process of exhaustion, at a knowledge of when the stout old gentleman with the bulbous nose got in, or the thin lady with the umbrageous umbrella got out; but the process would be a complicated one, at least; and it is to be feared that, unless some important details are being kept back, this photographic check will have to be returned to its inventor, with the significant initials "N. E." upon it—"No Effect."

The Stanley show of bicycles and tricycles will be held this year in a temporary building near Blackfriars Bridge on the Thames Embankment, and it opens on the 28th instant. As a means of outing with the camera, the tricycle takes an increasingly important position.

"It is all very well," said Mr. Norman Lockyer, when lecturing at the Society of Arts on Wednesday evening last, "for the clock of the future to indicate up to twenty-four o'clock, but striking up to twenty-four will never do." "Try to imagine," said the lecturer, "the mental strain on a man who goes home in the evening, and while troubled by uncertainty as to the exact locality of the keyhole, is trying to make out whether the clock inside is striking twenty-three or twenty-four!"

Photo-gravure is rapidly rising in favour. Mr. Millais' well-known picture of "Cinderella," which appeared in the Grosvenor Gallery, has been reproduced by this method, and the painter is so pleased with it that he hopes "in the future, whenever his work is translated into black and white, photo-gravure shall be the process."

Chloride, or bromo-chloride emulsion paper, for making prints by development, affords abundant subject for talk at such social meetings as those of the Club, or the London and Provincial Association.

Among the prints recently shown, those of Mr. J. B. B. Wellington show as wide a range of tone as any we have seen, his specimens showing a complete scale of tints from red to a purplish black.

The formula of Mr. Wellington will be found on page 31 in the report of the London and Provincial Association, and in giving it, the author assumed his hearers to have a general knowledge of the manipulations incidental to making and washing an emulsion. Those readers who may wish to try Mr. Wellington's formula will find information as to making an emulsion on page 595 of our last volume, formula for Edwards' oxalate developer on p. 157 of the same, and some account as to the best method of coating paper, on page 2 of our present volume.

The clever Italian to whose artistic doings on the Stock Exchange, the Corn Exchange, and other well-known City centres, we drew attention in a recent issue, has brought his enterprise to a conclusion with a completeness which does credit to his business faculties. His collection of the caricature portraits of the city celebrities, after being on view for some time, was brought to the hammer a week or two ago, and realised good prices. A smart stroke was the publication of a half-a-crown catalogue, illustrated with thumb-nail reproductions in photo-zincography of all the pictures. The production of this catalogue constituted an admission ticket to the auction room, and only those so provided were allowed to enter. As the room—by no means a small one—was crowded, the profit from the sale of catalogues alone must have been considerable. Although many of the persons whose peculiarities were faithfully reproduced by the artist were very wrath at being caricatured, others were pleased rather than the reverse, and many commissions for portraits on a more substantial scale have resulted. On the whole, the artist has made a good thing by his speculation.

With the new year *Anthony's Photographic Bulletin* will appear fortnightly, and, as we have already stated, Prof. C. F. Chandler, of Columbia College, will take the editorial chair lately occupied by Mr. H. T. Anthony. Dr. Arthur B. Elliott will be sub-editor.

At Harvard college, photography is used to take registers of every change in the electrical condition of the atmosphere, and it is said that the records obtained wil be of material service in making reliable weather forecasts.

The relative advantages of collotype and wood-engraving have been compared by Herr Gaillard, who has recently issued an illustrated edition of "*Goethe's italienische Reise.*"

"The wood-blocks cost much, but the printing is cheap; while the collotype plates involve very little expense in making, but printing from them is an expensive process," says Herr Gaillard. Hence collotype steps in very advantageously for small editions.

A scrutiny of a large collection of the photographs of members of the Salvation Army, possessed by a photographer who has a large *clientele* among that body, reveals a fact worthy the attention of Mr. Francis Galton. This fact is the strong likeness which exists between nearly every one. Each has that peculiar gleam in the eye which denotes the enthusiast; the shape of the faces, especially those of the females, has a wonderful similarity; while everybody has a sort of pattern smile hovering about the mouth, of which most probably the sitter is unconscious. It is quite possible, could the subject be fully enquired into, that photography would conclusively prove that the tactics adopted by the Salvation Army affect only those whose mental powers are unequally proportioned to their emotional tendencies. If this be so, some light might be thrown on the problem, that exercises the minds of so many orthodox religious men, how, to use the phrase of the day, "to reach the masses,"—a problem which the Salvationists hold they have solved.

Patent Intelligence.

Patent Granted in America.

309,736. John H. Parsons, Wheeling, W. Va. "Photographic printing-frame." Filed June 19, 1884.—(No model.)

Claim.—1. The combination, with a photographic printing faame, of side clamps having oblique slots, and secured thereto by means of set-screws, and provided with down-turned flanges at their upper edges adapted to hold a longitudinally movable vignetting-plate.

2. The combination, with the longitudinal clamping-plates, of the vignetting-plate with flanged sides adapted to move longitudinally under the clamping plates.

3. The combination, with the vignetting frame having an inclined rim, of the similarly shaped hood hinged to the vignetting frame, whereby the angle of said frame may be adjusted.

4. The combination with the vignetting frame of springs extending from the centre to each end of the frame, and cross wires whereby the vignetting plate may be adjusted and held.

ENLARGING ON GELATINO-ARGENTIC BROMIDE PAPER.

BY F. C. BEACH.[*]

It has been claimed by some that very complete and perfect apparatus is necessary; to be sure, it is advisable. I know, however, of one instance where a very successful enlargement was made with the roughest tools, such as a common soap box to hold the lamp, shielded at the top with a long length of an old stovepipe, a piece of ground glass placed in front of a negative, and a Harrison C lens, such as I have here. The enlargement was made nearly life-size, with an exposure of twenty minutes. The development was carried on in a common wash-tub, and the print, after being fixed, was washed over night by soaking in the bath-tub.

It will thus be seen that in trying the experiment of enlarging, the amateur need not go to much expense for apparatus, provided he has a good negative, a good lens, and well-coated paper to work with.

The most suitable lenses for enlarging are what are known as portrait or short focus lenses, or any good objectives such as are used for lantern work. View lenses can be used to good effect, but with them a longer exposure is generally required.

The light (said to be equal to from 28 to 30-candle power) emitted from a Moehring-Harvard kerosene round-wick burner, obtainable at any large lamp store, I regard as excellent, as it gives a whiter flame than many other kinds of burners, which, experience shows, is desirable in order to obtain the best effects. I speak of this light specially, as I learn that it has been carefully tried when used in making enlargements without the aid of a condenser.

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[*] Read before the New York Society of Amateur Photographers, at their meeting of December 9th, 1884.

I propose to show you this evening two methods of enlarging on gelatine paper—namely, the slow and the rapid process, and to illustrate these with three different kinds of apparatus.

The slow method involves the use of the most simple apparatus, which is generally at hand and within the means of the amateur.

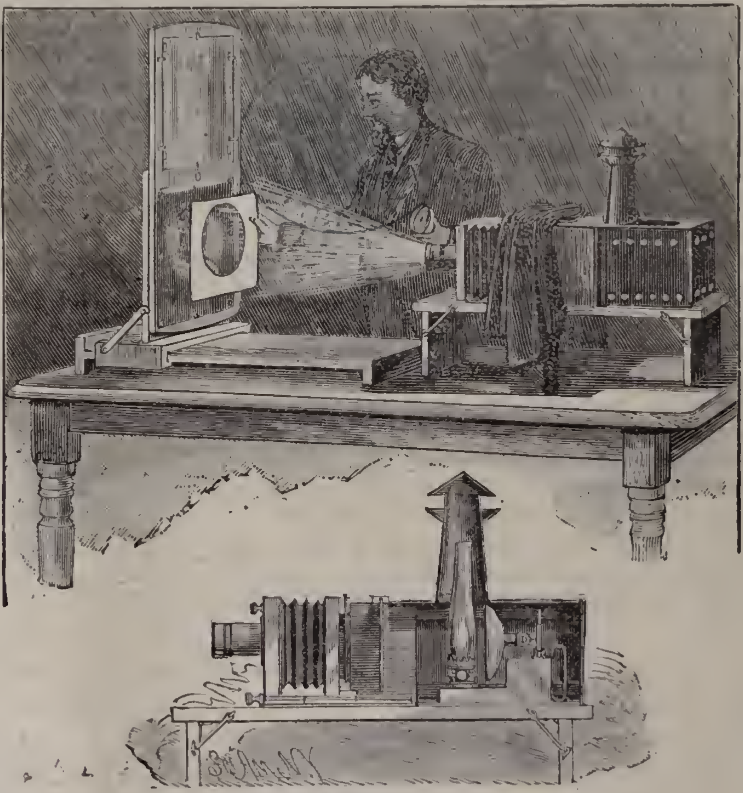
The camera and lens which he uses, attached to a box of wood or metal arranged to exclude the light of a lamp held therein, are the principal instruments required, the wall of any room answering for a screen to hold the paper.

The ground-glass frame of the camera is replaced by a frame which holds the negative to be enlarged, and a piece of ground glass is suspended or held between the negative and the lamp, for the purpose of diffusing the light and equally illuminating the negative. A reflector, secured behind the lamp in the box, is also advisable.

The light being intercepted by a pane of ground glass substitute, is considerably weakened in its actinic power while passing through the negative and lens, hence a long exposure is required; with a negative clear in the shadows and showing considerable contrast, I usually give from ten to twenty minutes. Much depends on the size of the enlargement; if it is to be made life-size, a long exposure will be necessary; if one-third life-size, the shorter time will be right.

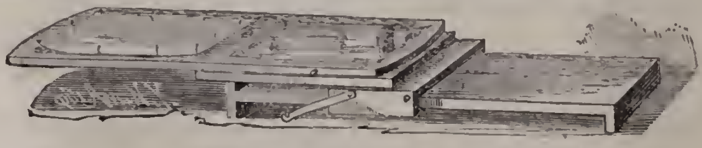
Because of the weak light thrown upon the screen, I found it was sometimes difficult to obtain an accurate focus by reflection of the image on a white card; hence, I discovered that the use of a ground glass, in place of the white card aided very materially in obtaining a correct focus, arranged so that the operator could stand and view the image as it was transmitted through the glass.

I have constructed a special focussing-board embodying this feature. You will notice I have a horizontal board which rests upon a table, sliding upon this is a hinged frame, which supports at its upper end a pivoted board revolving wheel, like in a vertical plane. The board is made twice the length of the frame, and at one end is inserted, flush with its face, a sheet of ground glass.



BEACH'S ENLARGING APPARATUS

The operation is exceedingly simple. To focus, the ground-glass end of the board is turned down, and the whole is moved backward or forward from behind until the image appears sharp, when the board is revolved or reversed until the solid end is down. The paper is next put in place, and the enlargement proceeded with. The paper, being in the same plane as that occupied by the ground glass, is always in focus.



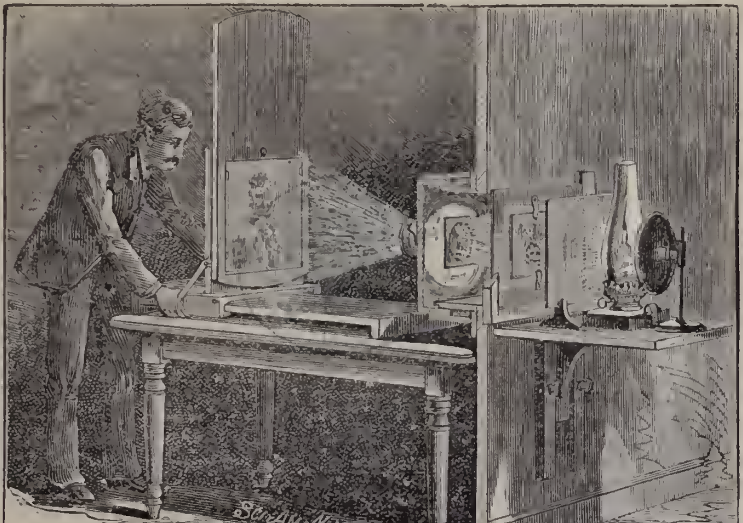
THE REVOLVING GROUND GLASS AND PAPER HOLDER.

On another table I have fixed a stand, which supports the camera (an ordinary 4 by 5 mahogany camera). The folding bed has been removed to permit the close approach of the lamp to the rear of the camera. On a frame, made to take the place of the ground glass, is the negative film, side toward the lens. Behind the negative is suspended the ground glass, and close to the latter is the lamp enclosed in a metal box, arranged with shielded openings, to allow free access of air. I have an excessively tall chimney to the box, in order to promote a strong current of air and prevent the lamp from smoking. I found the chimney invaluable where a long exposure was necessary, and would suggest to Mr. Carbutt and other makers of developing lamps, that a tall, telescopic chimney, arranged to be easily attached, would add immensely to their utility, and avoid the annoyance so frequently met with of a smoky lamp while in the midst of the development of a valuable negative. Behind the lamp, in the box, is arranged a reflector. The rear frame of the camera is secured to the wood side pieces of the stand by two metal buttons; the forward part of the camera can, therefore, be moved away from, or toward, the negative, and it is this movement which controls the size of the enlargement. If it be desired to make a small enlargement, the lens is drawn away from the negative or slid forward; if the reverse, the lens is pushed back nearer the nearer the negative.

I omitted to say that the upright focussing-board can be folded down horizontally for convenience in packing, or to put on and take off the sheet of sensitive paper. Having described the working of the apparatus, I will proceed to make an enlargement with it. I have a peculiar vignetting device, which consists of a stand with a long, slender wire bent at right angles, and suspended upon its horizontal portion is a vignetting banner. The least motion given to the stand sets the wire in a rapid vibratory motion, which produces the vignetting effect during the exposure. I have a sheet of Morgan and Kidd's argentic bromide gelatine paper, which I will pin to the board. I now remove the rest-cap from the lens, which, as you saw, enabled me to place the paper in position before exposure, and will expose for twelve minutes. The size of the head on the negative is about half an inch. We will enlarge it.

Regarding the development of gelatine enlargements, some little skill is required, in view of the fact that the print is to be looked at by white light. It is oftentimes deceptive, but, as a general rule, it is better to carry the development up a trifle further than would appear right for the red light, in order that the picture may look strong and vigorous by white light. Allowance should also be made for the darkening of shadows, or black portions, by the fixing bath. Careful and cleanly manipulation is important, and the experience of a few preliminary trials necessary in order to acquire success. Practice with small sheets, until the right time of exposure is obtained, is advisable. The developer which I recommend and employ is that used by Morgan and Kidd, and consists in making two saturated solutions, one of sulphate of iron, and one of oxalate of potash. To the iron is added a few drops of sulphuric acid, and the neutral oxalate is acidified with sulphuric acid until blue litmus paper turns red, after which are added 1 ounce of loaf-sugar to each 16 ounces of solution. The function of the sugar appears to be to give deeper and blacker tones. If the exposure has been right, I add 1 ounce of the iron to 6 ounces of oxalate, and also 9 minims of a 60-grain solution of bromide of potassium. If the development hangs back, I increase the quantity of iron until it is in the proportion of 1 part to 4 of oxalate. After development, the print is slightly washed by soaking in changing water, and then fixed in a fresh hypo bath—1 ounce of hypo to 6 of water. This usually occupies four minutes' time. The print is next well washed by soaking in water for two or three hours. Should the whites have a tinge of yellow colour, this may be removed by soaking for a few minutes in a bath of sulphuric acid 1 dram, water 80 ounces. The temperature of all the solutions should be about 60° F.

Through the kindness of Mr. H. V. Parsell, I have for use here to-night a series of large rubber trays adapted to take in a sheet 18 by 22; each is marked "Developer," "Water," "Hypo," which you see is an excellent plan. The enlargement I have made I will develop along with that to be made by the rapid method as illustrated by Mr. T. C. Roche's improved enlarging camera-box, which requires the use of a condenser. Mr. Roche's camera is quite unique for the purpose of enlarging; it has a bellows attached to the front of the lamp-box, and is worked from the rear by a sliding bar underneath the bottom, which, you will notice, adjusts the distance between the negative and lens. The interior of the lamp-box is provided with a single condenser, with the convex portion toward the light, and in front of the condenser is placed the negative held in a frame. A red pane of glass is inserted at one side of the box, to permit the use of the light for developing. A hinged or lid cover at the top of the box allows easy access for the purpose of adjusting the position of the condenser and negative. Mr. Roche will operate the instrument, and has brought a sample of his new gelatine-albumen paper to show its ease of working and freedom from fog.



APPARATUS WORKING ACROSS A PARTITION.

Lastly, I desire to call your attention to the third arrangement of apparatus for enlarging. It consists in the use of two rooms, the dark room and an outer room.

A square aperture is cut through the partition of the dark room, and in it is inserted, in this case, a box open at both ends. The end projecting into the outer room is fitted with vertical grooves, arranged to hold frames adapted to retain in position different sized negatives. On a shelf in front of, and close to, the negative, is placed a double 6½-inch achromatic condenser, and behind that, at the proper focal distance, is located the light.

In the dark room I have arranged a sliding-box, which takes the place of a camera-bellows, on which is fixed the lens (in this case a Rapid Rect. Dalmeyer, 8 by 10), 13 inches focus. By sliding the box in or out, the size of the image on the screen is increased or diminished.

It is important that the light be near the centre of the condenser, and in line with the centre of the lens. Upon the front of the camera are slides arranged to accommodate different sized lenses.

Prior to the insertion of the negative, the light should be arranged in such a position behind the condenser as will cause the cone of light coming from the condenser to just cover the rear of the lens, allowing the rays to cross each other at the diaphragmed centre of the lens-tube.

MEASURING THE ABSOLUTE SENSITIVENESS OF PHOTOGRAPHIC DRY PLATES.

BY WILLIAM H. PICKERING.*

WITHIN the last few years the subject of dry plate photography has increased very rapidly, not only in general popularity, but also in importance in regard to its application to other departments of science. Numerous plate manufacturers have sprung up in this country as well as abroad, and each naturally claims all the good qualities for his own plates. It therefore seemed desirable that some tests should be made which would determine definitely the validity of these claims, and that they should be made in such a manner that other persons using instruments similarly constructed would be able to obtain the same results.

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* A communication to the American Academy.

Perhaps the most important tests needed are in regard to the sensitiveness of the plates. Most plate makers use the wet plate as their standard, giving the sensitiveness of the dry plates at from two to sixty times greater; but as wet plates vary quite as much as dry ones, depending on the collodion, condition of the bath, &c., this system is very unsatisfactory. Another method employed largely in England, depends on the use of the Warnerke sensitometer. In this instrument the light from a tablet coated with luminous paint just after being exposed to a magnesium light, is permitted to shine through a coloured transparent film of graduated density upon the plate to be tested. Each degree on the film has a number, and, after a given exposure, the last number photographed on the plate represents the sensitiveness on an empirical scale. There are two or three objections to this instrument. In the first place, the light-giving power of the luminous tablet is liable to variations, and, if left in a warm, moist place, it rapidly deteriorates. Again, it has been shown by Captain Abney that plates sensitized by iodides, bromides, and chlorides, which may be equally sensitive to white light, are not equally affected by the light emitted by the paint; the bromides being much the most rapidly darkened, the chlorides next, and the iodides least of all. The instrument is therefore applicable only to testing plates sensitized with the same salts.

In this investigation it was first shown that the plates most sensitive for one coloured light were not necessarily the most so for light of another colour. Therefore, it was evident that the sun must be used as the ultimate source of light, and it was concluded to employ the light reflected from the sky near the zenith as the direct source. But as this would vary in brilliancy from day to day, it was necessary to use some method which would avoid the employment of an absolute standard of light. It is evident that we may escape the use of this troublesome standard, if we can obtain some material which has a perfectly uniform sensitiveness, for we may then state the sensitiveness of our plates in terms of this substance, regardless of the brilliancy of our source. The first material tried was white filter paper, salted, and sensitized in a standard solution of silver nitrate. This was afterwards replaced by powdered silver chloride, chemically pure—which was found to be much more sensitive than that made from the commercial chemicals. This powder is spread out in a thin layer, in a long paper cell, on a strip of glass. The cell measures one centimeter broad by ten in length. Over this is laid a sheet of tissue paper, and above that a narrow strip of black paper, so arranged as to cover the chloride for its full length, and half its breadth. These two pieces of paper are pasted on to the under side of a narrow strip of glass which is placed on top of the paper cell. The apparatus in which the exposures are made consists of a box a little over a meter in length, closed at the top by a board, in which is a circular aperture 15·8 cm. in diameter. Over this board may be placed a cover, in the centre of which is a hole ·05 cm. in diameter, which therefore lets through ·00001 as much light as the full aperture. The silver chloride is placed at a distance of just one meter from the larger aperture, and over it is placed the photographic scale, which might be made of tinted gelatines, or, as in the present case, constructed of long strips of tissue paper, of varying widths, and arranged like a flight of steps, so that the light passing through one side of the scale traverses nine strips of paper, while that through the other side traverses only one strip. Each strip cuts off about one-sixth of the light passing through it, so that, taking the middle strip as unity, the strips on either side taken in order will transmit approximately—

1	2	3	4	5	6	7	8	9
2·0	1·65	1·4	1·2	1·0	·85	·7	·6	·5

The instrument is now pointed towards the zenith for about eight minutes, on a day when there is a bright blue sky. On taking the apparatus into the dark room, and viewing the impression by gas-light, it will be found that the markings, which are quite clear at one end, have entirely faded out by the time the middle division is reached. The last division clearly marked is noted. Five strips cut from sensitized glass plates, ten centimetres long and two and a half in width, are now placed side by side under the scale, in the place of the chloride. By this means we can test, if we wish, five different kinds of plates at once. The cover of the sensitometer containing the ·05 cm. hole is put on, and the plates exposed to sky light for a time varying anywhere between twenty seconds and three minutes, depending on the sensitiveness of the plates. The instrument is then removed to the dark room, and the plates developed by immersing them all at once in a solution consisting of four parts potassium oxalate, and one part ferrous sulphate. After ten minutes they are removed, fixed, and dried. Their readings are then noted, and compared with those obtained with the silver chloride. The chloride experiment is again performed as soon as the plates have been removed, and the first result confirmed. With some plates it is necessary to make two or three trials before the right exposure can be found, but if the image disappears anywhere between the second and eighth divisions, a satisfactory result may be obtained.

The plates were also tested using gas-light instead of daylight. In this case an argand burner was employed, burning 5 cub. ft. of gas per hour. A diaphragm 1 cm. in diameter was placed close to the glass chimney, and the chloride was placed at 10 cm. distance, and exposed to the light coming from the brightest part of the flame for ten hours. This produced an impression as far as the third division of the scale. The plates were exposed in the sensitometer as usual, except that it was found convenient in several cases to use a larger stop, measuring ·316 cm. in diameter.

Two or three interesting investigations naturally suggest themselves:—To determine, for instance, the relative actinism of blue sky, haze, and clouds; also, the relative exposures proper to give at different hours of the day, at different seasons of the year, and in different countries. A somewhat prolonged research would indicate what effect the presence of sun-spots had on solar radiation,—whether it was increased or diminished.

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THE SUN'S ENERGY.

BY PROFESSOR S. P. LANGLEY.*

Did the reader ever consider that next to the mystery of gravitation, which draws all things on the surface down, comes that mystery—not seen to be one because so familiar—of the occult force in the sunbeams which lifts things *up?* The incomprehensible energy of the sunbeam brought the carbon out of the air, put it together in the weed or the plant, and lifted each tree-trunk above the soil. The soil did not lift it, any more than the soil in Broadway lifted the spire of Trinity. Men brought stones there in waggons to build the church, and the sun brought the materials in its own way, and built up alike the slender shaft that sustains the grass blade and the column of the pine. If the tree or the spire fell, it would require a certain amount of work of men or horses or engines to set it up again. So much actual work, at least, the sun did in the original building; and if we consider the number of trees in the forest, we see that this alone is something great. But, besides this, the sun locked up in each tree a store of energy thousands of times greater than that which was spent in merely lifting the trunk from the ground, as we may see by unlocking it again, when we burn the tree under the boiler of an engine, for it will develop a power equal to the lifting of thousands of its kind, if we choose to employ it in this way. This is so true, that the tree may fall, and turn to coal in the soil, and still keep this energy imprisoned in it—keep it for millions of years till the black lump under the furnace gives out, in the whirling spindles of the factory, or the turning wheel of the steam-boat, the energy gathered in the sunshine of the primeval world.

The most active rays in building up plant-life are said to be the yellow and orange, though nature's fondness for green everywhere is probably justified by some special utility. At any rate, the action of these solar rays is to decompose the products of combustion, to set free the oxygen, and to fix the carbon in the plant. Perhaps these words do not convey a definite meaning to the reader; but it is to be hoped they will, for the statement they imply is wonderful enough. Swift's philosopher at Laputa, who had a project for extracting sunbeams out of cucumbers, was wiser than his author knew; for cucumbers, like other vegetables, are now found to be really in large part put together by sunbeams, and sunbeams, or what is scarcely distinguishable from such, could, with our present scientific knowledge, be extracted from cucumbers again, only the process would be too expensive to pay. The sunbeam, however, does what our wisest chemistry cannot do : it takes the burned-out ashes, and makes them into green wood again ; it takes the close and breathed-out air and makes it sweet and fit to breathe, by means of the plant, whose food is the same as our poison. With the aid of sunlight, a lily would thrive on the deadly atmosphere of the "black hole of Calcutta ;" for this bane to us, we repeat, is vital air to the plant, which breathes it in through all its pores, bringing it into contact with the chlorophyl, its green blood, which is to it what the red blood is to us, doing almost everything, however, by means of the sun ray ; for if this be lacking, the oxygen is no longer set free, or the carbon retained, and the plant dies. This too brief statement must answer instead of a fuller description of how the sun's energy builds up the vegetable world.

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* Extracted from one of a series of articles on "The New Astronomy," now appearing in the *Century Magazine*.

But the ox, the sheep, and the lamb, feed on the vegetable, and we, in turn, on them (and on vegetables too) ; so that, though we might eat our own meals in darkness and still live, the meals themselves are provided literally at the sun's expense, virtue having gone out of him to furnish each morsel we put in our mouths. But while he thus prepares the material for our own bodies, and while it is plain that without him we could not exist any more than the plant, the processes by which he acts grow more intricate and more obscure in our own higher organism, so that science, as yet, only half guesses how the sun makes us. But the making is done in some way by the sun, and so almost exclusively is every process of life.

It is not generally understood, I think, how literally true this is of every object in the organic world. All the power derived from coal, and all the power derived from human muscles, comes originally from the sun, in just as literal a sense ; for the paper on which the reader's eye rests was not only made primarily from material grown by the sun, but was stitched together by derived sun-power, and by this, also, each page was printed, so that the amount of this solar radiation expended for printing each number of this magazine could be stated with approximate accuracy in figures. To make even the reader's hand which holds this page, or the eye which sees it, energy, again, went out from the sun ; and in saying this, I am to be understood in the plain and common meaning of the words.

Did the reader ever happen to be in a great cotton-mill, where many hundreds of operatives watched many thousands of spindles ? Nothing is visible to cause the multiplied movement, the engine being, perhaps, away in altogether another building. Wandering from room to room, where everything is in motion derived from some unseen source, he may be arrested in his walk by a sudden cessation of the hum and bustle—at once on the floor below, and on that above, and all around him. The simultaneousness of this stoppage at points far apart when the steam is turned off, strikes one with a sense of the intimate dependence of every complex process going on upon some remote invisible motor. The cessation is not, however, absolutely instantaneous, for the great fly-wheel, in which a trifling part of the motor power is stored, makes one or two turns more, till the energy in this, also, is exhausted, and all is still. The coal-beds and the forests are to the sun what the fly-wheel is to the engine ; all their power comes from him ; they retain a little of it in store, but very little by comparison with the original ; and were the change we have already spoken of to come over the sun's circulation—were the solar engine disconnected from us—we could go on, perhaps, a short time at the cost of this store ; but when this was over it would be over with us, and all would be still here too.

Since, then, we are the children of the sun, and our bodies a product of its rays, as much as the ephemeral insects that its heat hatches from the soil, it is a worthy problem to learn how things earthly depend upon this material ruler of our days.

We, the human race, are warming ourselves at this great fire which called our bodies into being, and when it goes out we shall go too. What is it ? How long has it been ? How long will it last ? How shall we use it ?

To look across the space of over ninety million miles, and to try to learn from that distance the nature of the solar heat, and how it is kept up, seemed to the astronomers of the last century a hopeless task. The difficulty was avoided rather than met by the doctrine that the sun was pure fire, and shone because "it was its nature to." In the middle ages, such an idea was universal, and along with it, and as a logical sequence of it, the belief was long prevalent that it was possible to make another such flame here, in the form of a lamp which should burn for ever, and radiate light endlessly without exhaustion. With the philosopher's stone, which is to transmute lead into gold, this perpetual lamp formed a prime object of research for the alchemist and student of magic.

We recall the use which Scott has made of the belief in this product of "gramarye" in the "Lay of the Last Minstrel," where it is sought to open the grave of the great wizard in Melrose Abbey. It is midnight when the stone which covers it is heaved away, and Michael's undying lamp, buried with him long ago, shines out from the open tomb and illuminates the darkness of the chancel.

> "I would you had been there to see
> The light break forth so gloriously ;
> That lamp shall burn unquenchably
> Until the eternal doom shall be,"

says the poet. Now we are at liberty to enjoy the fiction as a fiction ; but if we admit that the art which could make such a lamp would, indeed, be a black art, which did not work under nature's laws, but against them, then we ought to see that, as the whole conception is derived from the early notion of a miraculous constitution of the sun, the idea of an eternal self-sustained sun is no more permitted to us than that of an eternal self-sustained lamp. We must look for the cause of the sun's heat in nature's laws, and we know those laws chiefly by what we see here.

Before examining the source of the sun's heat, let us look a little more into its amount. To find the exact amount of heat which it sends out is a very difficult problem, especially if we are to use all the refinements of the latest methods in determining it. The underlying principle, however, is embodied in an old method which gives, it is true, rather crude results, but by so simple a treatment that the reader can follow it readily—especially if unembarrassed with details, in which most of the actual trouble lies. We must warn him in advance that he is going to be confronted with a kind of enormous sum in multiplication, for whose general accuracy he may, however, trust to us if he pleases. We have not attempted exact accuracy, because it is more convenient for him that we should deal with round numbers

The apparatus which we shall need for the attack of this great problem is surprisingly simple, and moderate in size. Let us begin by finding how much sun-heat falls in a small known area. To do this, we take a flat shallow vessel, which is to be filled with water. The amount it contains is usually a hundred cubic centimeters (a centimeter being nearly four-tenths of an inch). We shall have a precise idea of its limited capacity. Into this vessel we dip a thermometer, so as to read the temperature of the water, seal all up so that the water shall not run out, and expose it so that the heat at noon falls perpendicularly on it. Now all the sun's rays do not reach this vessel, for some are absorbed by our atmosphere ; and all the heat which falls on it does not stay there, as the water loses part of it by the contact of the air with the box outside, and in other ways. When allowance is made for these losses, we find that the sun's heat, if all retained, would have raised the temperature of a cubic centimeter of water nearly three degrees of the centigrade thermometer in one minute—a most insignificant result, apparently, as a measure of what we have been told is the almost infinite heat of the sun ! But if we think so, we are forgetting the power of numbers, of which we are about to have an illustration as striking in its way as that which Archimedes once gave with the grains of sand.

We are going to use our little unit of heat in the same way, for (to calculate in round figures and in English measure) we find that we can set over nine hundred of these small cubes side by side in a square foot, and, as there are 28,000,000 feet in a square mile, that the latter would contain 25,000,000,000 of the cubes, placed side by side, touching each other, like a mosaic pavement. We find, also, by weighing our little cup, that we should need to fill and empty it almost exactly a million times to exhaust a tank containing a ton of water. The sun-heat falling on one square mile corresponds, then, to over seven hundred and fifty tons of water raised every minute from the freezing-point to boiling, which, already is becoming a respectable amount.

But there are 49,000,000 square miles in the cross-section of the earth exposed to the sun's rays, which it would therefore need 1,225,000,000,000,000,000 of our little dies to cover one deep ; and therefore in each minute the sun's heat falling on the earth would raise to boiling 37,000,000,000 tons of water.

We may express this in other ways, as by the quantity of ice it would melt ; and as the heat required to melt a given weight of ice is $\frac{79}{100}$ of that required to bring as much water from the freezing to the boiling-point, and as the whole surface of the earth, including the night side, is four times the cross-section exposed to the sun, we find, by taking 526,000 minutes to a year, that the sun's rays would melt in the year a coating of ice over the whole earth more than 160 feet thick.

(*To be continued.*)

Correspondence.

LANTERN SLIDE EXCHANGE CLUB.

Sir,—I thought I would let you know that I have received a sufficient number of responses to warrant me in starting the Club; but I should like to get a few more, so that we may have more slides, that I may drop one or two of those who have promised to join, but who, by their want of promptitude in replying and responding to the initial steps, show clearly at the outset that they will be troublesome and unpunctual as the Club goes on; and want of promptitude in carrying out the periodical exchanges would obviously cause great worry and inconvenience to the other members of the Club, as all will depend upon strict punctuality.

Finding that it was the wish of the majority, I have abandoned the idea of purchasing new slides as a *sine-qua-non*, and the basis of the Club, as last arranged, is, that there shall be no entrance fee, but that in lieu thereof each member shall throw into the Club fifty good slides, either home-made (named), or any good slides he may have already in hand. The slides will be passed on direct from one member to another in a sequence I will draw up as soon as the list is filled. Thus, A. will send to B., B. will send to C., C. will send to D., and so on all through, and the slides will pass one step further every week (on Tuesdays) until each member's own particular set reaches him again after going all the complete round. This arrangement will reduce the cost, so that an annual subscription of 2s. 6d. will probably be enough.

Any others wishing to join can do so by writing to me to that effect, saying who they are, as under the altered arrangement it is necessary to have some check upon the *bona-fides* of the members.

I hope none will join but those who are prepared to act *promptly and punctually* in the exchanges, and to return immediate replies to communications. It is hardly fair to one who is performing an honorary office to have his work doubled by the listlessness of members who have to be written to two or three times before a reply is to be obtained from them, or else do not reply for several days. —Yours faithfully, H. Smith.

River Cottage, Hornsey, N., 6th January, 1885.

WINTER PHOTOGRAPHY.

Sir,—The recent articles on this subject remind me of several successful trips among frost and snow before I had taken to gelatine plates.

Mr. Renwick is mistaken in supposing that the wet plate process was unsuitable for frost work. I have taken many winter pictures by its means, and had as small a proportion of failures as during the summer. My first experience in this direction was one cold November morning, when I and my wet plate kit were set down (almost before daylight) at Kerne Bridge Station on the Wye. I carried the apparatus down the river bank, through a most unpromising fog, to Goodrich Ferry, and as the sun seemed inclined to break through the mist, I unpacked and set up my tent (of Washington-Wilson pattern), and soon found that both bath and developer were full of floating needles of ice. The ferry hut was close by, and a thin curl of blue smoke gave signs of habitation. The ferryman, who was getting breakfast ready, supplied a jug of hot water, which, applied to the bath and developer (outward application), raised it to a suitable temperature.

The first picture was looking down the river through the mist, with the ferry boat in the foreground; then a view across the meadows, the wheel marks of a cart breaking up the expanse of frosted grass. The sun now gave more brilliancy to the scene, and the peep up the grassy lane, once the high road to Monmouth, was like a vista of fairyland; this made another picture, a solitary track of footsteps showing where the ferryman had come down to his morning's work. Then the gate, hung round with nature's jewels, was photographed; and lastly, when a good deal of the frost had melted, a peep up the river, with the ferryman under a fine oak, on his way to fill his pitcher with water; all five negatives being successful. Since that time I have often photographed in severe weather when the bath was partially ice; but always took with me a portable spirit lamp, which was kept alight in the tent, and over it a small saucepan of boiling water. The picture of a frozen river was taken in this way: the camera was placed on solid ice in the middle of the stream.

Mr. Renwick is right when he says platinotype is suitable for winter scenes. I have for the last four years made Christmas cards from frost subjects by this process to send my friends; suitable words are added by double printing. I enclose some of these, also some of the Goodrich scenes; all are from wet-plate negatives.—Yours, &c.,

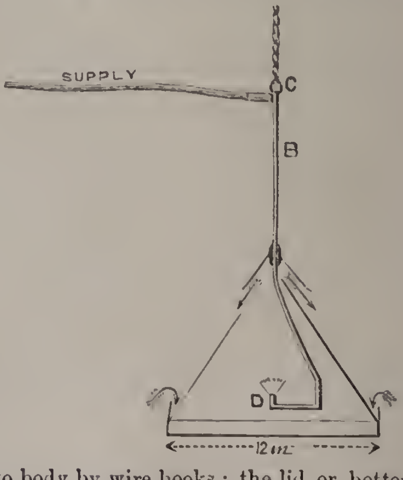
Alfred Watkins.

[The charming little pictures enclosed by Mr. Watkins fully bear out all that he says.—Ed. P.N.].

DEVELOPING LAMPS.

Dear Sir,—I send you herewith a rough sketch of my developing lamp, as shown at the Hyde Photographic Society's meeting, which I think will be of service to some readers of your paper.

The body of the lamp is made of tin plate, and is in the form of a cone, with a lid at the bottom (A) hinged and held up to body by wire hooks; the lid or bottom is cut out so as to allow a circular coloured glass or paper to be placed in the same. For my own use, I have three sheets of yellow glass for very slow plates; amber for medium, such as wet plates, Cowan's plates for transparencies, &c.; and ruby for rapid plates.



Around the bottom of the cone are placed six air-holes $\frac{3}{8}$th-inch diameter, over which are tin covers with the opening placed upwards, so as to guard against the reflection of actinic light downwards. A ventilator is arranged on the top of the lamp in the usual manner, and the gas is carried down the tube B, through the top of the ventilator, to the burner D. The brass tube is made long (say, 18 to 20 inches), so that the gas, in passing down, keeps the tube cool. An elbow is provided on the top of the tube, to which is fastened the supply pipe. A ring is screwed into the elbow to allow of a cord being fastened to it; by this cord the lamp is suspended "bird-cage fashion" to a pulley in the ceiling over the developing sink.

The advantages of such a lamp can be seen at a glance; the light is shaded from the eyes, and is reflected by the bright tin down on to the work, thus making the development more comfortable. Fred. W. Cheetham.

LANTERN SLIDES AT THE EXHIBITION.

Sir,—Mr. Donkin's explanations as to Mr. Gale's slides are far from satisfactory to me. Others may think that the excuse offered for not placing Mr. Gale's slides upon the table is a fair one; but I do not. It is specious, but untenable.

One would have thought that from the experience of the previous year the Society would have stipulated that the slides for exhibition should be arranged in frames. This, with ordinary care, would have have allowed of their being removed from the frames for the purpose of exhibition on the screen, and being restored to their frames without any risk of theft. That even this very ordinary care was wanting in the organization of the Society is exemplified by the fact that my frame of slides was mutilated by the disappearance of one slide and the breakage of another the very first time they were exhibited.

Mr. Donkin is, however, perfectly aware, from the official letters which I have written to his Society, that my charges against the Society of illegal action go very much beyond either the keeping Mr. Gale's slides out of the catalogues, or the still more serious—what shall I call it for politeness' sake?—error of judgment in not showing them on the table.

Custom demands that all goods sent for competition be not only entered in the official catalogues, but exhibited to public view. Custom not only makes law, but over-rules any law which apparently justifies a course opposed to custom.

I contend that the Society have, by their own action, disqualified Mr. Gale's slides, and insist that on these grounds alone the award must be quashed; nor will I rest until either it is quashed or their action is vindicated.

It was not competent for the council to decide that the hanging committee were justified in acceding to Mr. Gale's request that the slides should be kept in charge of the Secretary, and they have most completely stultified themselves by so doing.

But why does Mr. Donkin not reply to my other and graver charges? First, why were the slides not submitted to the award of the judges at the proper time—as demanded by custom and common sense—before the opening of the Exhibition? Secondly, is it true, as I have stated, and again affirm, that these particular slides were never seen by the whole of the judges?—Yours, &c.,

George Smith.

Proceedings of Societies.

South London Photographic Society.

The annual lantern meeting of this Society took place on Thursday evening, the 1st inst., at the House of the Society of Arts, John Street, Adelphi. The large hall was filled with the members and their friends, and it was noticeable that a greater proportion of ladies were present than on former occasions. The chair was occupied by the President, Mr. W. Ackland.

The Chairman, in opening the proceedings, expressed his pleasure at seeing such a large meeting to witness the display of lantern slides sent in by the members. His fears were that more slides had arrived than they could possibly get through with; certainly there was sufficient to occupy a pleasant evening in viewing objects of interest on the screen. Some of the transparencies, he said, were very fine indeed, and many were as good as could be met with anywhere. Mr. Bridge was prepared to enliven the proceedings with a little music. He thanked the members for attending in such force, and hoped they would enjoy the entertainment.

Mr. F. A. Bridge (Hon. Sec. and Treasurer) said the majority of slides to be shown he had not seen before that evening, and hoped the audience would forgive him if there was any error in the description. The list of exhibitors comprised the names of Messrs. W. M. Ayres, F. Beasley, Jun., W. Cobb and Son, J. C. Cohen, Hugh F. McConnelly, A. Cowan, E. Dunmore, J. Gale, F. Howard, C. J. Hussey, Junr., A. King, J. Nesbit, A. Pilkington, C. Poirson, Poulton and Son, G. Smith, J. B. B. Wellington, W. Wheeler, Dr. T. Charters White, C. Ray Woods, Wratten and Wainwright, and F. York and Sons.

Mr. Davenport, assisted by Messrs. York and Hussey, manipulated the lantern, which gave a disc about twenty-two feet in diameter; Mr. Bridge officiating at the desk. They commenced with a collodio bromide series, made by Mr. Nesbit from Mr. H. T. McConnelly's negatives; these were followed by Mr. J. B. B. Wellington's gelatino-bromide series of Burnham Beeches, the varied colours of which proved interesting. Mr. Dunmore's series comprised collodio-bromide and gelatino-chloride; some of the subjects were remarkably picturesque, and elicited much praise.

Mr. Nesbit's series on collodio-bromide from gelatine negatives were very fine, especially his "Latimer Oak," High Barnet. Mr. Cowan's series illustrated variety of colour obtainable with gelatino-chloride. Mr. Howard's wet collodion series were well received; the "Weary Flock in Summer Heat," and "The Nave, Wells Cathedral," being especially fine. Mr. King's transparencies and negatives were on gelatino-bromide plates, and Mr. Cohen's Norwegian scenery was very interesting. Mr. Smith's Woodbury series of Altcazar, from Mr. Good's negatives, were much applauded. The fact of the negatives narrowly escaping destruction in the recent earthquake added a still greater interest.

Messrs. Cobb exhibited several instantaneous street views of London, and Messrs. York two series illustrating their subjects "The Lifeboat" and "Christmas Carols," the readings of which were effectively rendered by Mr. Bridge. Mr. Hussey's slides, although excellent as photographs, were somewhat marred by colouring. In Mr. Pilkington's series, "The Swans at Snaresbrook" obtained much applause.

The collection of microscopic slides exhibited by Dr. White were explained by that gentleman, after which followed a miscellaneous series by Messrs. Wheeler, Ayres, and Gale; the latter gentleman's "Elms' Grateful Shade," and "Cattle at Eventide," were much admired. Mr. Beasley's "Clouds and Sea," Wratten and Wainwright's "University Boat Race," and Mr. Woods' "Swiss Views," were all applauded.

Over three hundred slides having passed through the lantern, and there being nearly a hundred more to show, it was decided, considering the lateness of the hour, to bring the entertainment to a close. During the evening Messrs. Bridge and Page favoured the company with music.

The usual votes of thanks were passed, and it was announced that on Thursday, February 5th, Messrs. Morgan and Kidd will demonstrate the method of working their new paper for printing positives; and March 5th, Mr. Shadbolt will read a paper on "Experiences in Balloon Photography."

London and Provincial Photographic Association.

The usual weekly meeting was held on Thursday, the 1st inst., Mr. S. C. Salmon in the chair.

A demonstration was given of the "patent polychrome" process of colouring photographs, by a representative of Mr. W. B. Anderson, the patentee. It was claimed that the process rendered the print more permanent, and artistic effects could be obtained with comparatively little labour by anyone possessing a little taste. An ordinary albumen print was first mounted on an opal plate with a solution of gelatine, and allowed to dry; the plate was then heated, and bees'-wax rubbed over the surface of the print until it became quite transparent, the superfluous wax rubbed off, and, when cool, the print was polished with a silk handkerchief or other suitable material; it was then ready for being painted in oil colours. From this stage the picture, a cabinet-sized portrait, being timed, was finished in twenty minutes. It was stated that by rendering the surface of the print quite smooth with the wax previous to the application of the colours, that they would not be absorbed, but would remain and dry on the surface and retain their brilliancy.

Mr. W. H. Prestwich drew attention to the particulars given in the current issue of the *Scientific American* of a process introduced in London, called after its inventor the "Hoeschotype," for the photographic reproduction of coloured pictures.

Mr. A. HADDON passed round a negative that had been left in the washing water from forty-eight to sixty hours; a reticulation of the film had taken place; this, in parts, had curiously followed the lines of the picture.

Mr. J. B. B. WELLINGTON showed some prints from an emulsion paper prepared by himself; the exposure given was five minutes at a distance of nine inches from an ordinary gas burner. The prints were developed with Edwards' ferrous oxalate, to which twenty grains of bromide to each ounce had been added. Mr. Wellington gave the formula:—

No. 1.—	Silver nitrate	100 grains
	Citric acid	100 „
	Water	3 ounces
No. 2.—	Chloride sodium	20 grains
	Bromide potassium	40 „
	Citric acid	100 „
	Nelson's No. 1 gelatine	40 „
	Water	3 ounces

Mixed at a temperature of 150°, and the bulk of 200 grains of Heinrich's gelatine added. By toning in a borate or acetate bath, any tone from a red to a brown can be obtained.

Mr. COBB showed two plates from the same batch, that had been exposed to two of Mr. Warnerke's sensitometers, one plate showing several numbers more than the other.

Mr. A. COWAN explained that only one of the sensitometers was a standard; the other was of an earlier make, and had been used only for experimental purposes previous to a standard being fixed.

Mr. Frank Bishop and Mr. J. E. Butler were elected members of the Association.

Talk in the Studio.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next meeting of this Society will be held on Tuesday next, January 13th, at 8 p.m., at the Gallery, 5A, Pall Mall East, when a paper, with demonstration, "On the New Rapid Printing Paper," will be read by Mr. Leon Warnerke.

AN EXHIBITION AT KOENIGSBERG.—In May next a general exhibition is to be opened in Koenigsberg, and photography is to be well represented.

FIRE IN BERLIN.—Rosenthal's extensive frame and album works in Berlin have been almost completely destroyed by fire.

THE LIGHT OF THE MOON.—How much brighter is sun than moon? Can anybody tell? What shall be the standard of measurement? Sir William Thompson has lately printed a note which conveys some curious data bearing on these questions. During the meeting of the British Association at York in 1881, he observed the moon when it was nearly full, and at about midnight. He found the light to be equal to that of a candle at a distance of two hundred and thirty centimetres. Making no account of the loss of moonlight in transmission through the earth's atmosphere, he computed that twenty-seven thousand million million candles must be spread over the moon's earthward hemisphere, painted black, to send us as much light as we receive from her. Probably forty thousand million million candles would be required to allow for absorption. Sir William carried his computations a little farther, and figured, that, if the face of the moon which we see were painted black, and covered with candles standing packed in square order, touching one another, all burning normally, the light received at the earth would be about the same in quantity (as estimated by our eyes) as it really is.—*Science.*

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting, on January 14, will be "Stereoscopic Work.

To Correspondents.

⁂ We cannot undertake to return rejected communications.

AMATEUR.—Your suggestion is a good one, but the first thing is to find them. In this matter the assistance of yourself and of any of our readers will be esteemed.

A. P.—It can be had from the Siemens' Patent Gas Co., 40, Queen Victoria Street, E.C.

J. HUBERT.—A white enamelled paper suitable for the purpose can be had at Corfield's in Bride Street, E.C.

R. D. B.—Draw the lines with white of egg beaten up with its own bulk of water, and when dry, breathe on the surface. The surface will now become sufficiently tacky to hold the gold leaf; when quite dry, brush off the excess.

O. EVANS.—The second that you mention, No. 3.

FRED TURNER.—Not having seen it, we cannot judge; but if not as represented, you had better take steps to recover your money.

THOS. WHEELER.—In the YEAR-BOOK for 1876, p. 126.

G. W. G.—We agree with you that it would not be much use to advertise, and think that your best way would be to make enquiries at the artists' colour and material warehouses, as, for example, Winsor and Newton, in Rathbone Place, or Newman, in Soho Square. Let us know how your new scheme progresses.

COLONEL A——.—A solution of chloride of gold containing the compound in the proportion of one grain to each drachm is intended, this being a very usual strength to make it. The writer evidently does not intend to recommend the making up of only one drachm at a time.

H. M.—1. It can be so used very well, and the only disadvantage is, that if you take no other lens, you are limited to a narrow angle of view. 2. No makers surpass those whom you mention, and we do not think they are equalled by any others. See leader in this week's NEWS. 3. Neither; both are only very rough approximations. 4. Yes, if it is well made. 5. We do not quite understand what you allude to.

BEGINNER.—You will find it all in the YEAR-BOOK.

ALECK BETTS.—1. You had better take it to someone who is accustomed to making or repairing scientific instruments; or, why not pack it up and send it by Parcels Post to the maker? 2. Thank you for the suggestion.

A. G.—It is correctly given in the current YEAR-BOOK.

C. J. E.—Makers of commercial plates do not, as a rule, give particulars, and we do not know.

T. LILLY.—It can be had from Messrs. Hopkin and Williams, Cross Street, Hatton Garden, London.

OXIDE.—Probably you can obtain compensation unless the usual stipulation as to non-responsibility was made; but before acting, get an opinion from a lawyer.

W. J. E.—We know of no one who will undertake to give you the instruction you require. Perhaps your best way would be to advertise.

OUT-DOOR.—Cover the diaphragm slit with an elastic band; two, if one is not sufficient.

L. F. ARMANTS.—1. The apparatus is evidently a collection of odds and ends, mostly quite out of date, and we advise you to discard it and buy a new camera and lens—not necessarily a very expensive one. 2. Consult the advertisement columns. 3. See the YEAR-BOOK.

F. D.—Mr. Beach's sulphurous acid developer is excellent; you will find details on page 485 of our last volume, also in the YEAR-BOOK.

JOHN GERARD.—If we can get the information, you shall be communicated with by post.

T. W. O.—1. Your list is a little difficult to deal with, but we may mention that on a recent occasion we took those which you indicate by the number 92, and had no occasion to regret doing so. 2. Thin glass, by all means. 3. The wisdom of taking plates of two rapidities appears to us to be very doubtful. 4. No. 12.

THOMAS ERWIN.—If unable to supply the article promptly, they should write and inform you of the cause of delay, especially as you have sent the money.

F. E. STYLES.—Do not think of constructing a glass room so small as only eight by nine feet; you will have great difficulty in doing anything more than half-length figures. Your calculations as to the field which may be included by the widest angle lenses made are all very well on paper, but if you attempt to carry your theory into practice, you will be wofully disappointed.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1376.—*January* 16, 1885.

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THE NEW PRINTING PROCESS.

In photographic matters the usual course of events is that a discovery or invention is made by a photographer, professional or amateur: that it is published either through the medium of a society, or of the photographic press; is taken up experimentally by other photographers, who publish their results and improvements; and is eventually adopted by one or more commercial firms, who bring the practical details of manufacture to perfection, and reap the money benefit. And what is now occurring is likely to be no exception to the rule. To illustrate this we may refer to a sentence from a series of articles on "Gelatino-Bromide Paper for Positive Printing," which series was commenced on page 721 of our volume for 1883, and finished on page 20 of the volume for 1884.

Within the last few weeks, and almost simultaneously, several commercial firms have brought out new printing papers, the peculiarity of which is that a short exposure only is necessary, that the prints are afterwards developed, then are toned exactly as silver prints on albumenized paper are.

It is not by any means our intention to suggest that the commercial papers recently introduced to the notice of the photographic fraternity are not novelties. Still, we desire to point out that every principle involved in the making of a developed image on gelatino-chloride has already been discussed and explained, not only in editorial articles, but in the papers of our contributors; and viewing the matter by the light of what has already been done and written, we think we are not far from the mark when we say that these papers are coated with a gelatine emulsion, the haloid in which is either chloride of silver, a mixture of chloride and bromide, or possibly bromide alone. Mr. J. B. B. Wellington has been able to get practically identical results with all of these three emulsions, the peculiar red colour of the developed print which makes it amemable to toning being, in fact, not so much due to the nature of the silver haloid in the emulsion, as to the manner of adjusting the exposure and the development. When we give an exposure very much longer than is necessary to produce a fully-exposed picture with the strongest developer which the print will stand, and develop with a weak and very much restrained developer, we get an image of a warm colour, whether the emulsion be a chloride or a bromide.

The advent of the new papers in commerce has produced quite an excitement in the photographic world, demonstrations of the working of them having been given in all parts, not only of London, but of the country. A lecture given by Mr. W. K. Burton at the Westminster Aquarium last Friday, on "The Future of Photographic Printing," was chiefly taken up by a demonstration of the process.

We have ourselves experimented pretty freely on the papers offered to the public, and have taken every opportunity of questioning such of our friends as have worked the process, on their experiences of it. We may therefore, we think, with advantage to our readers, sum up what appear to us to be the advantages and the drawbacks of the papers, and to what particular purposes they are likely to be generally applicable, premising our remarks with the statement that nothing can be taken as *final* which results from experiments, however carefully made, which have extended over only a few weeks.

The cardinal advantage of the process is, of course, the short space of time necessary for exposure, a few minutes at six or eight inches from an ordinary fish-tail gas burner being sufficient, an exposure almost as short as can be given by hand being long enough with good diffused daylight.

The next advantage is amenability to toning. It must be borne in mind that the production of prints by a brief exposure, and subsequent development, is by no means a new thing—was, in fact, done at least forty years ago. The novelty is in getting an image which may be toned to any of a great range of colours, precisely as a print on albumenized paper is toned.

Mr. Burton, in his lecture at the Aquarium already referred to, gave it as his opinion that, though nothing definite could be said in the matter, the chances were that the prints on the new papers would be far more permanent than those on albumenized paper. We think that he is probably right here. There is little doubt that the fading of albumenized prints is connected with the organic salt which is produced by the contact of the albumen with free silver nitrate. In a gelatine emulsion—produced always with excess of soluble haloid—there is no such organic salt produced, unless we admit that the sensitive medium is itself a chemical combination of a bromide or chloride of silver with gelatine.

Still another advantage is this. In any process where we have exposure followed by development, there is the possibility, in adjustment of the one to the other, of compensating for certain defects—notably over- and under-density—in the negatives from which we print.

There are certainly, however, drawbacks in the process, as well as advantages. Development always involves skilful labour. The development of the prints by the new process is by no means more easy than development of gelatine plates. Indeed, the action is so exceedingly rapid towards the finish, that the greatest nicety is necessary to remove the print from the solution at precisely the right moment. Then, to get the best surface on the finished print, it is necessary to squeegee on to glass, and when the prints are dry, to strip them. This is a troublesome process, and has to be followed by a still more troublesome one of mounting, without which the high gloss got by stripping from the glass will be ruined. The surface of the print, if it be allowed to dry in the ordinary way, is far from a good one, and the image has a most unpleasant "sunk-in" appearance.

A yet more serious drawback the process has as yet shown in our hands. We have found it very difficult to get perfectly pure whites, particularly in the case of vignettes. It is but fair to say that this defect may be due not to the process, but to our working of it; still we may mention that in the samples of the prints by the process sent out by at least one firm producing the paper, we have seen several prints with distinctly degraded whites.

And now for the probable cases in which the application of the process may be useful.

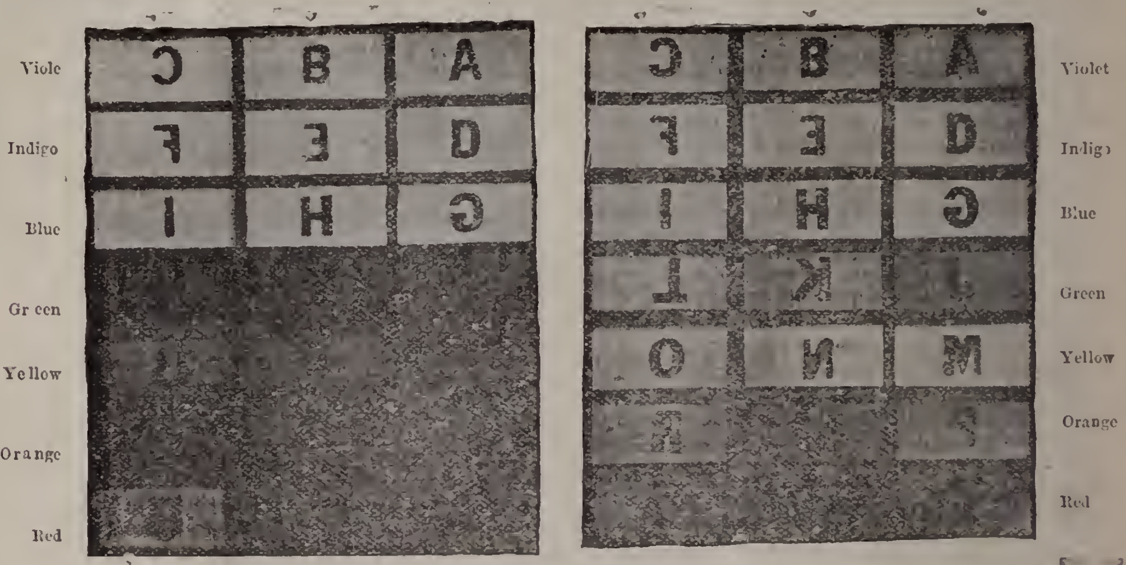
In the first place, of course we have the case in which one or more proofs are required in a hurry; here the new paper will be invaluable, as the working of it does not depend on day light. Then, again, when a photographer requires to issue a large number of prints in a very short space of time, the paper will be most convenient. The rate of production may perhaps not be so rapid as by the Woodburytype process.

We should not be surprised if the amateur should be the greatest user of the new paper. Printing is generally his greatest difficulty. He is usually employed in business during the day, when printing on albumenized paper could be carried on. When he has a holiday, he likes to employ it in taking negatives. To him the possibility of making prints of an evening will be the greatest conceivable boon. He will be able to work by lamp or gas-light in winter.

We do not in this place quote any of the formulæ previously given in the News, as thoroughly practical directions for making the development paper are to be found in Mr. Wellington's article on page 36, and these directions embody the latest experiences of an exceptionally skilled and successful worker.

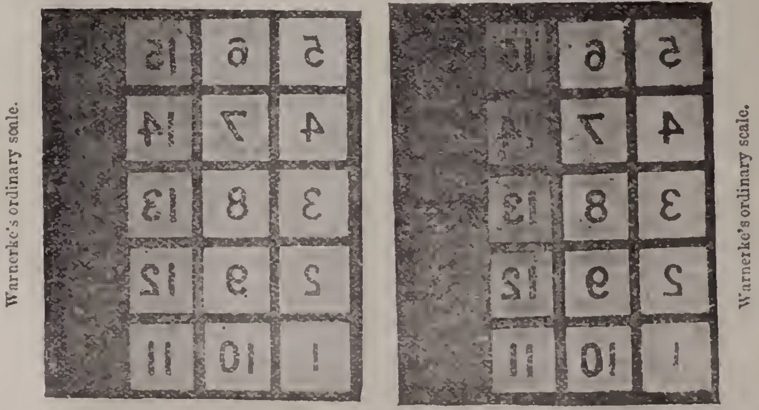
EXPERIMENTS WITH VIDAL'S COLOUR SENSITOMETER.

M. Vidal, in his letter which appears in our issue of last week (p. 21), describes a colour sensitometer made on the same lines as the instrument of Warnerke, but with a series of three grades of density in each of the seven colours of the spectrum. The idea is an excellent one, and by means the sensitiveness of plates for the variously coloured rays may be tested without resorting to delicate spectrum experiments.



MONCKHOVEN'S EMULSION. ISOCHROMATIC PLATE OF CLAYTON AND TAILFER.

EXPERIMENTS WITH THE COLOUR SENSITOMETER OF LEON VIDAL.



ISOCHROMATIC PLATE. MONCKHOVEN'S PLATE.

M. Vidal has been good enough to send us his results, which we reproduce as Meisenbach blocks; it is needless to say that the exposure was equal in each case. The general sensitiveness of the two plates used was as nearly as possible the same: but the much greater range of the eosine plate (Clayton and Tailfer) is obvious at a glance. In order to make the comparison between the two plates complete, a reproduction of an ordinary sensitometer trial is also given

FRENCH CORRESPONDENCE.

Progress in 1885—Red Rays only Non-actinic—Controlling Rapidity of Sensitive Plates—Antwerp International Exhibition.

Forthcoming Progress.—As I am incapable of adding anything to the complete retrospective review published at the commencement of the last number of the Photographic News, I am limited to assert its accuracy, and express hopes as to the progress to come during the year. Without being a great prophet, I can foretell that now, since so many improvements have been made in instantaneous photography, much may be expected in that direction, particularly in two ways: firstly, by finding more active developers capable of bringing out the slightest traces of the action of light; and secondly, by the preparation of emulsions still more sensitive than those in present use With regard to the perfection now reached in photo-engraving, one can reckon on having more and more extensive application of it in its varied forms. When better known, and its advantages fully recognised, it will be used more largely in the illustration of books and periodicals; and, I am sure, will reach to the more artistic level of ceramic decoration, to which it has been scarcely at all applied.

Non-actinic Rays.—The question of dark room lighting has been the subject of many experiments of late, and I myself wished to take count of the facts observed by Mr. Debenham. At the outset I must say that I have not been able to succeed according to his indications. All kinds of green and yellow light, and mixtures of the two colours, gave me a distinct luminous impression on any sensitive plates. It is true that the action on ordinary bromide of silver emulsion is weak if the source of light be tolerably distant, as shown well in my colour sensitometer; but if isochromatic emulsions be used, the rays must be distinctly red. If a perfectly monochromatic yellow light were at one's disposal, one would have nothing to fear for gelatine plates; but the ordinary flames, in spite of green or yellow glass, are polychromatic, and contain blue and violet, as may be seen with the help of the spectroscope.

Standard for Determining Rapidity of Plates.—The idea of a definite understanding relative to an adopted controlling method for the rapidity of various sensitive fims is spreading through several photographic societies. I cannot foretell which solutions will be accepted, but, for my own part, I suggest the following:—The scale should be constructed similar to Mr. Warnerke's—that is to say, formed of a succession of films more and more opaque superposed on a plate of glass. To execute the scale, simply consists in the formation of a negative, to serve for counter prints on gelatine plates of a known degree by the help of a constant source of light lasting a certain length of time, developing with ferrous oxalate, the proportion of oxalate of potash to sulphate of iron being always the same. By this simple method a certain number of scales will be made, and afterwards compared one with another to throw out those not identical with the standard scale. The scale constructed—what is its cost? Monckhoven quarter-plate cost four francs (3s. 2½d.) the dozen, and by doubling the cost of a single one for the expense of developer, it comes to about sevenpence without mounting the print or manufacturing expenses, which might bring it up to eighteenpence or two shillings. For the source of light I advise a good stearine candle, the base of the flame corresponding to the height of the centre of the scale, placed at the distance of 50 centimetres. The exposure ought to be half a minute exactly, after letting the candle burn five minutes. Under such easy conditions a practical method will be obtained for controlling the varied rapidities, and comparing them with one another, at a very trifling cost.

Antwerp International Exhibition.—About forty French photographers have given in their names to exhibit in the photographic section of the forthcoming International Exhibition at Antwerp. I think Messrs. Boussod, Valadon, and Co.'s photo-gravures will excite a great deal of attention and admiration.

Leon Vidal.

IVES' ISOCHROMATIC PROCESS WITH CHLOROPHYL.

BY DR. H. W. VOGEL.

In the Year-Book for 1885, page 111, I find an interesting article of Mr. Ives, Philadelphia, on his isochromatic process with chlorophyl. In this article Mr. Ives mentions also my researches in this matter, and says:—"Dr. Vogel was undoubtedly the first to suggest the use of dyes for increasing the colour sensitiveness of silver bromide; but he was not the first by several years to publish a practical, useful process," &c., &c. I beg to remark, as to this assertion of Mr. Ives, that, eleven years ago, I did not confine myself to make only suggestions or spectrum photographs, but that I showed by experiment, already described in my first paper, published in the *Photographische Mittheilungen*, 1873, and in the Photographic News, 1874, that my new process of making bromide of silver sensitive to the so-called non-actinic rays was of real practical value. I reproduce here the lines in question from my paper of 1873:—"I took a picture of a blue ribbon on yellow ground. With an ordinary bromo-iodized plate I got a white ribbon on a dark ground. On a bromide of silver plate, stained with coralline, I could not hope to get anything, because blue and yellow rays acted on this plate with the same energy. Therefore I put in front of the lens a yellow glass, which let pass the yellow rays, but absorbed the blue ones, and now I obtained with sufficient exposure a dark ribbon on a light ground."

I think this picture, taken in 1873, in the described manner, was the first isochromatic photograph taken. It may be possible that chlorophyl (first proposed by Becquerel, 1875, for increasing the sensitiveness of the bromide of silver for red rays) may give better results than coralline. But, surely, the chlorophyl process is *not* the first isochromatic process published?

Even the *modus operandi* of Mr. Ives is not new. Mr. Ives soaks bromide of silver plates in chlorophyl solution. Exactly the same method of preparation I employed in 1876 (*Photographische Mittheilungen*, xii, page 286), and I recommended it for all dyes which are affected by free acid in collodion.

But if anybody would ask why my first isochromatic process was not acknowledged sooner, I answer that I had exactly the same experiences in 1874 as Mr. Ives in 1879. Nobody would believe me. My late friend Monckhoven, Carey Lea, Lockyer—in short, all leading men in photography and spectrum analysis—doubted my assertion; they repeated my experiments in a wrong way, and without success, and I have had to do very much to defend my position. In the meantime the photographic processes have made important progress, so that now many processes are easily worked out by any amateur which could be performed ten years ago only by experienced investigators. On the other hand, new and more powerful optical sensitizers are discovered, and in this way the improved isochromatic processes have now more practical success than that first published eleven years ago.

HOW TO MAKE THE NEW RAPID PRINTING PAPER FOR DEVELOPMENT.

BY J. B. B. WELLINGTON.

Whenever there is any great photographic discovery—or, in this case, I should say improvement, as it is not the first time that paper has been coated with sensitive emulsion—if it is likely to prove of value to the every day photographer, it is sure to secure a large amount of attention; and that this is the case is shown at the various photographic societies in London. At one society Messrs. Marion and Co., the first in the field with the new printing paper, gave a demonstration of the process—that is, of developing, toning, and fixing; and at another an evening was occupied in a discussion, when several members who had tried the new paper now in the market, gave their experience and spoke very highly of it, and said that it would supersede the much-abused "albumenized paper" altogether; and I certainly think it will, at any rate, to a large extent. Not only shall we have a paper that is unlikely to fade, (at least Father Time alone will prove this), but we shall not be dependant on the weather, as printing can be carried on equally well by gas light, a few minutes' exposure being sufficient, yielding a print for brilliancy and tone equal to that of a silver print. The formula I am about to describe is the only one I have experimented with, which I fortunately hit upon in the first batch of emulsion I had made for a rapid printing paper.

I may say that I have experimented now for the last twelve months with gelatino-bromide plates for lantern slides, and with these I could get any range of colour, including ruby, and we know that if we have a red image to start with, we can tone that image to almost any pleasing colour. But in the case of the slow bromide plates the objection was, that the image appeared red by transmitted light, but of a dull green fog appearance by reflected light, it being what is termed dichroic—in fact, it had every appearance of a wet plate; however, I cannot say if this would be the case if the emulsion had been on paper. I, however, thought that by adding a proportion of chloride to the bromide I should get over this objection, and this proved to be the case, for on trying the first batch of paper I had coated, to my great satisfaction the image appeared red by reflected light, and when toned and fixed equalled in brilliancy that of a silver print.

On making further experiments I think it is essential to have a proportion of chloride in the emulsion, as when it is present a less exposure, less restrainer, and likewise a shorter time in development is required to secure a red tone, and the image appears better by reflected light. I trust the following working directions will enable our readers to succeed, even those who have never made an emulsion.

First make up the following solutions:—

No. 1.—	Silver nitrate	100 grains
	Citric acid	100 ,,
	Water	3 ounces
No. 2.—	Chloride sodium	20 grains
	Bromide potass.	40 ,,
	Citric acid	100 ,,
	Gelatine (Nelson's No. 1)	40 ,,
	Water	3 ounces

Raise the two solutions to a temperature of 150°, and pour No. 1 into No. 2 in a steady stream with constant stirring; of course this must be done in the dark-room, but plenty of yellow light may be used, as the emulsion is a very slow one. Now take 200 grains of Heinrich's gelatine which has already been allowed to swell in cold water, and add this to the hot emulsion, when it will readily dissolve. The jar containing the emulsion must be put on one side to set, which it will do in a few hours if stood in cold water, especially during this cold weather, but it is preferable to leave till the next morning, when it is ready to be squeezed through a piece of coarse canvas into cold water and washed for three or four hours in running water, after which it should be drained, and half an ounce of alcohol added, melted at a temperature of 140°, and then filtered through two thicknesses of a pocket handkerchief. It should then measure about 10 ozs., and is ready for coating the paper, which I found at first a very troublesome affair, but can now coat as easily as on glass, which I manage thus. The paper should be cut up into pieces, say half-plate size, and put into a dish of warm water to soak; in another dish of warm water several half-plates should be placed for the purpose of warming them, or they may be warmed before a fire and placed in a pile, which will retain their heat. One of the warm plates is then taken on a pneumatic holder and a piece of the wet paper slipped on to it, avoiding any air-bubbles; allow the surplus water to drain off for a few seconds, and pour on a pool of emulsion, which by this time should be about 110°; if hotter than this, it is liable to cause bubbles. It will be found to flow as easily as collodion. About two drachms of the emulsion is sufficient for a half-plate. It must now be allowed to set by being placed on a glass slab previously levelled, and when set, can either be stripped from the glass and hung up by one corner to dry, or allowed to dry on the glass support. I prefer the latter method, as the paper is less liable to cockle.

The necessary exposure behind a clear negative, which can only be found after a few trials, will be found to be about twelve or fifteen minutes, nine inches from a fish-tail burner; a slight trace of an image can be seen after exposure. The developer I have used in my experiments is Mr. B. J. Edwards' ferrous oxalate, with the addition of a bromide, either ammonium or potasium.

No. 1.

Oxalate potass.	2 ounces
Amm. chloride	40 grains
Water (distilled)	20 ounces

No. 2.

Ferrous sulphate	4 drachms
Citric acid	2 ,,
Water (distilled)	20 ounces

No. 3.

Amm. or patass. bromide	1 ounce
Water (to make)	3 ounces

Equal parts of Nos. 1 and 2 are taken, and 1 drachm of No. 3 added to each ounce of developer. The image appears in about one and a-half minutes, and if the exposure has been correct, development will be complete in five minutes, and of a red colour. After toning slightly and fixing, the print will be of a beautiful pink, and very pleasing.

I have since tried cutting down the exposure to three minutes, using only 20 minims of No. 3 solution; the image is still red after developing, and is perhaps of a more satisfactory colour when finished, besides the advantage in giving a shorter exposure; in this case the development will be complete in three minutes. Care must be taken not to over-develop, or the finished print will have a dead appearance. After developing, the prints should be rapidly rinsed in three or four changes of water, and placed in a strong solution of ordinary white alum for ten minutes, and again washed in several changes of water, then toned in the following bath:—

Acetate of soda	30 grains
Chloride of lime	3 ,,
Chloride gold	1 grain
Water (boiling)	6 ounces

Use this when cold, and tone till the prints assume a decided purple tint, as they lose a little in the fixing bath, but dry again much colder. Fix in hypo 2 ounces to 1 pint of water for ten minutes. They will not lose in colour if left even for half-hour if the bath is not acid.

After washing, the prints can have a gloss imparted to them by taking a piece of clean glass, and well polishing with French chalk; the wet print is laid on this face downwards, and the excess of water squeezed out by rubbing over the back with the fingers, and mopping up with blotting-paper. It must now be allowed to dry spontaneously; on no account must heat be applied. In a warm room they will dry in a few hours, when they will easily strip off with a glaze equalling an enamelled print.

I have already run this article to considerable length, but trust the formula will prove successful in the hands of those who will take the trouble to try it. In the few experiments I have made, I certainly prefer the results to albumenized paper, there being greater clearness and brilliancy in the shadows. Very fine results can be had on opal, which is easier to manipulate than paper. I do not give the above as a perfected formula; no doubt others may improve upon it, but as it stands it gives very pleasing results.

A Dictionary of Photography

ASPHALT OR BITUMEN (*continued*).—Bitumen dissolved in benzole or turpentine is the basis of most of the black varnishes employed for such purposes as backing glass positives, making safe edges to negatives intended for carbon printing, and blocking out skies. An excellent preparation of the kind is made as follows:—

Benzole	10 ounces
Oil of turpentine	1 ounce
Masticated rubber, heated until it fuses	100 grains

Dissolve, and add—

Crushed asphaltum	4 ounces

Agitate frequently until solution is complete.

An opaque varnish more or less similar to the above forms, as first pointed out in the Photographic News, the only backing for plates which is perfectly satisfactory when the conditions are such as to make the tendency to halation or blurring very considerable. A varnish of this kind is very easily applied to the back of the plate, and can be removed before development by a few strokes with a sharp and flexible table knife.

Very fine transparencies may be produced in Asphalt or Bitumen by varnishing one side of a sheet of talc or thin gelatine with a solution of the material in benzole, and exposing under a negative for a very long time through the transparent medium; after this, those portions of the bitumen which have not been made insoluble by the action of light are washed away, by means of benzole, or a mixture of benzole and oil of turpentine.

ASSAYING, an analytical operation for finding the proportion of gold or silver in an alloy. The nearest photographic process is Argentometry. *See* Argentometer.

ASTIGMATION.—*See* Lenses.

ATMOSPHERE.—Pictorial effects in landscape photography often depend materially on a slight turbidity or haziness of the air; but apart from this the photographer is very much dependent upon the state of the atmosphere, the effect of the solar light on the sensitive plate varying enormously according to the atmospheric conditions; density, clearness, temperature, colour, and humidity all influencing the actinic activity.

ATOM; ATOMIC WEIGHTS.—ἄτομος (*indivisible*). It is not necessary to say much about the atomic theory as propounded by Dalton and others, although it may be mentioned that it assumes the ultimate particles of all matter to be of definite weight and incapable of division; and it is obvious that if we assume the combination of two elementary bodies to take place by the juxtaposition of an equal number of atoms, the proportions representing the ratio in which they combine will also represent the relative weights of the ultimate atoms. Very often elementary bodies unite in several proportions, but the different proportions bear a very simple relation to each other, and according to the atomic theory, this is because the atoms are grouped together in a more or less symmetrical fashion—say two atoms of one element, with one, three, four, five, or six of the other.

Whatever may be the truth with regard to the atomic theory, chemists have furnished us with a series of numbers representing the proportions in which elements unite together, and these numbers are commonly called atomic weights or combining proportions. It will be therefore convenient to give in this place some account of the very complete system of notation and symbols by which chemical reactions are represented, this system being in reality the outcome of the atomic theoy.

Each element is represented by a symbol which is merely an abbreviation of its name, thus:—H stands for hydrogen, N for nitrogen, Ni for nickel, Na for sodium (*Natrium*), Cl for chlorine; but the symbols have a further meaning—they stand also for the proportions in which the elements unite together, and in ordinary cases these combining proportions are calculated out in relation to H (the symbol for hydrogen), which is assumed to be unity.

First, then, let us give a table of the elementary bodies with their symbols and combining weights, and then explain how the symbols are to represent reactions and to facilitate chemical calculations.

Element.	Symbol.	Atomic Weight.
Aluminium	Al	27
Antimony (*Stibium*)	Sb	122
Arsenic	As	75
Barium	Ba	137
Bismuth	Bi	210
Boron	Bo	11
Bromine	Br	80
Cadmium	Cd	112
Cæsium	Cs	133
Calcium	Ca	40
Carbon	C	12
Cerium	Ce	92
Chlorine	Cl	35·5
Chromium	Cr	52
Cobalt	Co	59
Copper (*Cuprum*)	Cu	63
Didymium	D	95
Erbium	E	112
Fluorine	F	19
Gallium	Ga	68
Glucinum	Gl	9
Gold (*Aurum*)	Au	197
Hydrogen	H	1
Indium	Iu	113
Iodine	I	127
Iridium	Ir	197
Iron (*Ferrum*)	Fe	56
Lanthanum	La	93
Lead (*Plumbum*)	Pb	207
Lithium	Li	7
Magnesium	Mg	24
Manganese	Mu	54
Mercury (*Hydrargyrum*)	Hg	200
Molybdenum	Mo	96
Nickel	Ni	59
Niobium	Nb	94
Nitrogen	N	14
Osmium	Os	199
Oxygen	O	16
Palladium	Pd	107
Phosphorus	P	31
Platinum	Pt	197
Potassium (*Kalium*)	K	39
Rhodium	Rh	104
Rubidium	Rb	85
Ruthenium	Ru	104
Selenium	Se	79
Silver (*Argentum*)	Ag	108
Silicon	Si	28
Sodium (*Natrium*)	Na	23
Strontium	Sr	87
Sulphur	S	32
Tantantalum	Ta	182
Tellurium	Te	128
Thallium	Tl	204
Thorium	Th	234
Tin (*Stannum*)	Sn	118
Titanium	Ti	50
Tungsten (*Wolfram*)	W	184
Uranium	U	119
Vanadium	V	51
Yttrium	Y	62
Zinc	Zn	65
Zirconium	Zr	89·5

When two symbols are simply written in juxtaposition, it signifies that the two bodies represented are combined; not only that they are combined, but that they are combined in the proportions represented by the numerical values of the symbols. Thus, CO indicates that C (standing for 12 of carbon) is united chemically with O (standing for 16 of oxygen). The compound of carbon and oxygen corresponding to the formula CO is known as carbon monoxide; but another combination of carbon and oxygen, containing twice as much oxygen in relation to the carbon, is known, the formula of this second compound being CO_2, and its usual name carbon dioxide. The small exponent figure multiplies the value of the symbol immediately preceding it; thus, O_2 is equal to 16 × 2 or 32.

It will thus be seen that—

28 parts of carbon monoxide contain 12 of carbon and 16 of oxygen.

44 parts of carbon dioxide contain 12 of carbon, and 32 (or 16 × 2) of oxygen.

Let us now analyse a more complex formula—$AgNO_3$, Silver Nitrate.

Ag	stands for	108	of	Silver
N	„	14	„	Nitrogen
O_3	„	48	„	Oxygen (16 × 3)
$AgNO_3$	„	170	„	Silver Nitrate.

We are now nearly in a position to understand such a chemical reaction as represents an ordinary case of so-called double-decomposition.

$$2AgNO_3 + ZnBr_2 = Zn\,(NO_3)_2 + 2\,AgBr$$

A large figure standing before a symbol or group multiplies everything until a stop, or algebraical sign, is reached; so $2AgNO_3$ stands for twice 170, or 340; while the sign of equality (=), the plus sign (+), and the minus sign (—) retain their usual significance. The quantity of zinc bromide entering into the reaction, and indicated by $ZnBr_2$, is 65 + 80 + 80, or 225, making a total of 565 entering into the reaction. In the second half of the equation we have the products of the reaction of silver nitrate and zinc bromide upon each other, namely zinc nitrate and silver bromide; these products have together the same weight as the substances originally reacting. $Zn\,(NO_3)_2$ means Zn=65 united with the group NO_3 taken twice — the group within the brackets being multiplied by the exponent figure just as if it were an element—making a total of 189, while the numerical value of 2AgBr is 376. The reaction with its numerical values may be expressed as follows:—

$$\underset{340}{2AgNO_3} + \underset{225}{ZnBr_2} = \underset{189}{Zn\,(NO_3)_2} + \underset{376}{2AgBr}$$

It is impossible in the space of a page or so to indicate any short rules by which a beginner may know what is to be the reaction between two given bodies, and any attempt to do this would do more harm than good; but a careful study of the above remarks and the table of atomic weights should enable him to calculate the proportions indicated by any given chemical equation. Let us take a very simple instance of a chemical calculation. When silver chloride, AgCl, is fused with carbonate of soda, the chlorine is removed, and the whole of the silver is obtained in a metallic state. How much silver can be obtained from 342 grains of silver chloride? In this case no equation is needed. AgCl consists of 108 parts of silver united with 35·5 of chlorine, forming 143·5 parts, so that every 143 parts (in a case of this kind one may perhaps disregard the fraction ·5) of silver chloride should yield 108 parts of silver. A sum in proportion now gives us the desired result.

$$143 : 108 :: 342 : x, \text{ or the number required}$$
$$x = 258$$

It must be distinctly understood that the so-called atomic weights of the elements must not be taken as absolute, but only as indicating proportions among themselves.

By molecular weight is understood the combining or reacting proportion of a compound or group of elements; thus 225 is the molecular weight of zinc bromide, and 143 the molecular weight of silver chloride.

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INSTANTANEOUS PHOTOGRAPHY.

BY W. COBB.*

The term instantaneous, as employed in photographic nomenclature, is elastic, and just as convenient as it is erroneous; in fact, it may be made to mean any space of time from the millionth part of a second upwards. A very convenient latitude this, and one not unfrequently turned to account. How often has the question been asked by our clients, when entering the studio, "Do you employ the instantaneous process?" and been, of course, answered in the affirmative. Provided the time of exposure has not exceeded a few seconds, they go away perfectly satisfied that their credulity has not been imposed upon, and often experience great delight in showing the results obtained as marvellous examples of instantaneous photography. "Where ignorance is bliss 'tis folly to be wise," and in matters of this kind I have not found the public over-exacting, unless its own immediate wants are interfered with; then, I am constrained to say, it is, indeed, a hard taskmaster. I need hardly say that I found no such latitude allowable when taking my so-called instantaneous views of London.

And here I am led to ask myself the question whether the highest degree of artistic excellence is compatible with the greatest rapidity of production. I must candidly confess I think not, for although bearing in mind the very charming studies of breaking waves, rolling clouds, and yachts scudding along in all their poetry of motion which have but recently been exhibited in Pall Mall and elsewhere—rich in artistic qualities and perfect in composition though they may be—still we are bound to admit that they are, to a certain extent, accidental results, and not to be placed in the same category as those carefully worked-out studies where the original design of the artist-photographer is abundantly evidenced in the careful selection of his models, the building up, little by little, the harmonious arrangement of every detail which ultimately stamps his finished pictures with his own individuality. Artistic feelings and refined sentiment—these are the works which elevate the minds both of the producer and the beholder, although it may be unconsciously, and leave an abiding impression; whereas the purely instantaneous may excite feelings of wonder and astonishment, may be viewed with admiration and delight, but they must of necessity lack the refining tendencies of the class of pictures just referred to.

The introduction of the modern dry plates has undoubtedly placed in the hands of the photographer a mighty power, but there is no denying the fact, great as it is, and even desirable, that this newly-acquired strength has contributed to our weakness to an extent both calamitous and humiliating. I am now, of course, speaking of results; the craze—the almost childish craze—which has been manifested for extreme rapidity, even where it was least necessary, has been the means in very many instances of bringing about retrogression where there ought to have been progression.

> "Oh! it is excellent
> To have a giant's strength; but it is tyrannous
> To use it like a giant."

I should like here to allude to a somewhat amusing circumstance which came under my own immediate notice not very long since. An officer of the Metropolitan Detective Force hailing from Scotland Yard, wrote asking me to name a time when I could make it convenient to see him upon certain business in a certain place in London. I did so, wondering what on earth could have so suddenly made me such an important personage. Imagine, however, my surprise and shall I say almost disgust, when he revealed to me the fact that some years since he had dabbled a little in photography, and that having recently seen some of my instantaneous street views, it had occurred to him that he could turn this great power to our mutual advantage; to his own by providing himself with a cheap camera and lens (of course quite a cheap one would answer his purpose) and some of my most rapid plates, with which he could, quite unobserved, saunter leisurely along through the streets of London and shoot away at any suspected persons or even suspicious looking people whom he thought might at any future time be wanted; to mine, of course, by purchasing (at a cheap rate, however) the most rapid plates I could provide him with. I think I am justified in stating that he afterwards had good reasons for believing that, instead of finding the philosopher's stone, he had accidentally stumbled upon a mare's nest.

It is gratifying to note that this unhealthy and demoralizing craze for extremely rapid plates is subsiding, and, what is even better, those who demand them have so far educated themselves as to know how to use them, and also acquired a proper discrimination as to when and where they should be employed. With these facts before us it is only reasonable to believe that the next few years will see photography raised to a far higher standard from an artistic as well as mechanical standpoint than it has yet realised, as I am firmly persuaded that the best results the present system of working is capable of producing, remain yet to be seen.

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* Abstract of a lecturette before the London and Provincial Photographic Association.

There are many what may fairly be called legitimate channels open for the employment of ultra rapid plates, where scenes and effects of a transient and evanescent character are sought to be reproduced; here the end sought after justifies the means employed for its reproduction; but I unhesitatingly affirm, and experience enables me speak somewhat authoritatively on this point, that it is a great mistake to press them into service for the ordinary work of the field or studio, as it must necessarily follow that plates of such exquisite sensitiveness are much more difficult to manage than slow ones—not by reason of any inherent defective qualities, but because of the very limited latitude allowable in their exposure; and it is not desirable that the mind should be in a constant state of tension on such a point when all its faculties are required to be exercised in other directions. My advice, therefore, is never to use extremely rapid plates when the exigencies of the case do not require them.

I shall always look back with a considerable amount of interest at my experiences in photographing the streets of London. They were sometimes instructive, sometimes entertaining, but frequently very discouraging, and I often wonder how I managed to summon to my aid sufficient moral courage to make the attempt; in truth, this was to me a great difficulty.

I well remember the first day—

> "'Twas just at the time the political air
> Was diffused throughout with the Fenian scare."

I was standing close to the Mansion House, when a very elongated and fully developed enforcer of law and order challenged me and demanded to know the contents of my black leather bag; very suggestive of mischief it must undoubtedly have appeared to him with its sides bulging out almost to bursting point. This was quite sufficient reason for my being almost immediately surrounded by a crowd of inquisitives, whose offensive curiosity was not so easily satisfied as the policeman himself appeared to be. But considering that I lack the portly and commanding exterior of some of our profession, the mild persuasive eloquence of some, or the unapproachable vehemence and daring of others, I escaped easily. On taking my seat, however, on the top of a 'bus almost immediately afterwards, I noticed that the scrutinising gaze of that guardian of the peace was still directed towards me, and was moreover making entries in his pocket-book, doubtless with a firm persuasion in his own mind that they would become eminently useful on some future occasion. Up to this time I am thankful to say I have eluded his vigilance.

At the end of the day I was the possessor of nearly a dozen 10 by 8 exposed plates, and was occupied in developing them until nearly midnight. But I must confess that a very discouraging percentage of failures was the result.

I am aware that it is not a usual practice for a lecturer to seek information from his audience upon the subject he is lecturing upon, but there is sometimes a charm in originality, and so I will just depart from the beaten track and state a difficulty which I have just met with and should like to be enlightened upon at some future time; it is this—I have occasionally prepared plates of presumably great rapidity, which, when exposed under such favourable conditions of light as to enable me to produce satisfactory results in, say, the thirtieth, or even fiftieth part of a second, have occupied an unreasonable time in developing—frequently from three-quarters of an hour to an hour. The same plates, when the conditions were so altered as to allow of their being exposed for a few seconds, developed in the usual time; in both cases the negative appeared to have received the proper amount of exposure, and differed only in colour. The question I would ask is—Are these results due to physical, chemical, or mechanical causes?

I regarded my first day's outing as a kind of preliminary canter, and I soon found that I was aiming at too much; nearly all the negatives turned out "moves" in consequence of my having exposed recklessly whilst the 'bus was in motion. And here I learned that although it was a comparatively easy matter to secure a successful negative of a steamer going at a rapid speed from the deck of another travelling in an opposite direction, it was useless to attempt a similar experiment from the top of an omnibus running at only half the rate along the streets of London, the jolting and vibratory motion of the latter rendering such an attempt utterly futile. My only chance of securing anything like satisfactory results was during the stopping of the 'bus when picking up or setting down a passenger, and even then it often happened that just at the very moment when the most favourable conditions presented themselves for exposing the plate, the vehicles and pedestrians nicely grouped and the lights and shadows properly balanced, the spring of the shutter was released simultaneously with the sudden starting of the 'bus, and then, to crown the pile of vexation, I had no dark-room to rush into for the purpose of giving vent to my feelings.

I secured several negatives by adopting a ruse which I found to answer most satisfactorily. Having previously noted the proper time for taking a view which I was anxious to secure, I arranged with a confederate to take up his position and await my arrival on a particular 'bus, and at a given signal from me to hail it; of course, it was part of his business to be just as clumsy in his movements as possible, to order to prolong the time of stopping to the fullest extent. On such occasions I found that the driver did not require the luxury of a dark-room for the purpose of shielding him during his ebullition of extreme animation.

My later productions were taken under far more favourable circumstances, and I positively luxuriated as I drove, or was driven along, wherever my fancy dictated, in my own carriage (for the time being), which carriage consisted of a covered van hired of a carman at the very moderate cost of 1s. 6d. per hour. Here I was very much less an object of marked attention than when, as very frequently happened, my appearance was signalled by the drivers and conductors of 'buses, who began to consider me fair game for their chaff and banter.

Some of my pictures are now before you, and I may say it is very gratifying to me to have received four medals from the various exhibitions where they have been sent.

Notes.

Those who wish to make the rapid paper for printing by development should read Mr. Wellington's article on page 36; it is brief, to the point, and the outcome of experiments which have enabled the author to produce good work.

The historical collection which is to be shown at the Inventions Exhibition by the Photographic Society of Great Britain will be of great service in showing beginners in the art many things which they might otherwise never have any opportunity of seeing.

Enough exhibits are already promised to make the basis of a representative collection, but it is to be hoped that our readers will co-operate by at once informing the Secretary of the Photographic Society as to what they can contribute. It is scarcely necessary to say that, unless in rare instances, duplicates will not be required, so those who offer must not feel hurt if their offers are declined.

One point is, we understand, to be rigidly insisted on, this being the non-admission of any articles now in commerce.

Next week we hope to say more regarding the matter, but in the meantime refer our readers to Mr. Donkin's letter, p. 44.

Photography did signal suit and service the other day. A friend travelling in France ran short of money, and had to telegraph to his friends for a remittance. The remittance arrived addressed to the Poste Restante of the town, and our friend applied in due course for the letter. Unfortunately, he reckoned without his host or without his postmaster. The latter required proof of his identity, and the applicant, by an unlucky accident, had neither address card nor envelope with his name upon it. Happy thought! telegraph home for a photograph. This was done, and the photograph posted to the official, who was at once convinced, and sent away the original rejoicing.

A reproduction of Mr. Duncan's photographic chess or draughts-board is given as our supplement this week. Mr. Duncan mounts the print with its face in optical contact with a slab of plate glass, and this plate may form the top of an ordinary chess-table.

We understand that Mr. Duncan is now preparing a photographic chess-board, which will include portraits of the best known chess players of the day.

The rumour is that according to precedent, the Lord Mayor should receive a baronetage in consequence of holding office during the coming of age of the Prince who will some day be heir to the throne.

An opera-glass as an aid in posing was much appreciated by the late Mr. H. T. Anthony, and in the December number of the *Bulletin* one finds some capital remarks on the subject by Mr. W. E. Partridge.

The opera-glass cuts off all those extraneous rays which tend to confuse and to mislead the photographer; and the eye has only the picture itself to view. A cone of paper can be used as a substitute for the opera glass, but is not altogether satisfactory.

Mr. Partridge also remarks that many practical men in the States find that there is a real advantage in so altering their apparatus that the image shows as upright to the eye. No doubt to the beginner an advantage, but not much gain to the experienced worker.

The announcement of the engagement of the Princess Beatrice was so unexpected that the illustrated papers were at their wits ends where to get a portrait of Prince Henri of Battenberg. All the London photographic dealers' stores were ransacked, but not one contained a photograph of the young man who had so suddenly achieved greatness. One paper even telegraphed to Germany, but did not get a picture in time for that week's issue. If the Prince had only taken some photographer into his confidence, what a nice little stroke of business could have been done.

To say any one pattern of dark-room lamp is the best would be rash; but Mr. Cheetham's dark-room lantern—figured and described in our last—is an excellent one. Any tinman will make it for a trifle.

Mr. Beard's clip for the camera, figured and described on page 17 of our last number, has furnished a text for several letters which are now before us; some enquire where it can be obtained.

The designer is one of those generous persons who give the world the benefit of their ideas, and it only remains for the makers of photographic apparatus to put it on the market.

The first letter that comes to hand runs thus:—"I worked hard all day on Saturday, and the result was that I had the apparatus made entirely of wrought iron, excepting the bend-piece, which is cut out of a piece of high steel; the studs and socket being halved-in and brazed. The whole thing weighs nine and three-quarter ounces."

"You have," continues our correspondent, "failed to mention one excellent use to which the clip can be put—that of supporting a small camera for copying. Fix the clip on the side of an upright post, and this will bring the face of the table in a vertical plane; the camera can then be screwed on so as to look downwards, the special advantages of this mode of working being that writings or prints may be kept flat by weights or a slab of glass, and the distance of the camera is so easy to adjust on the post."

Another reader says:—"I have been making a similar article for the past six months, its completion having been delayed by the breaking of the bolt holding down the head-stock of my lathe—this was about three months ago. I had just come to the conclusion that I should have the clamp sooner by getting somebody else to make it, when I saw Mr. Beard's device. It is better than mine, so now I want to know where to get it. It is just the thing for clamping to the side rail of a yacht, or to the boards—I forget their nautical name—where the side lights are fixed. The upright ought to be very short indeed."

Knowledge, in commenting upon the circumstance that a committee is at work to consider what changes may be necessary in our postage stamps, makes an excellent suggestion as regards the colours. They should be selected, as our contemporary points out, as much with reference to their distinctiveness by lamplight as by daylight.

Another point is raised in the same journal; we had best quote the words in this case: "Why should we go on falsifying history, by sending forth to the world the picture of a girl of nineteen, as the likeness of a lady who is a great-grandmother! When we hear of a semi-barbarian Emperor having it announced that he has set down to meat, and that now all other earthly rulers may go to dinner, we laugh at the savage and worse than childish conceit which prompts the proclamation. Do the officials who are responsible for the present Queen's head upon our stamps, appeal—or try to appeal—to a similar barmaid type of vanity in their Sovereign, by representing her of the same age as her own grandchildren?"

As a matter of statecraft, the extensive circulation or public display of portraits for gaining popularity has been understood and acted on from very early times; now-a-days the theatrical manager, the champion banjo player, the discoverer of the universally curative pills, the new candidate for a seat at the local board of the reform-needing township of Cess-cum-Poolton, and even the aspirants to the presidential chair of the great western republic, to say nothing of the Lord Mayor of London—all appreciate the superior value of the truth-telling photograph over and above any other means of making their features known. Why, then, should the postage stamp be behind the age? Those who will turn to page 712 of our last volume will see how blocks for printing postage stamps may be made altogether by photography.

A story is told of the new president of the Institute of Civil Engineers, which if not true, is certainly *ben trovato.*

"But, Mr. Bramwell," remonstrated the client, who had called for the opinion of the eminent consultist, "your fee is much heavier than formerly?" "Did you notice these letters?" was the answer of the newly-elected member of the Royal Society, pointing to 'F. R. S.;' their true meaning is 'fees raised since.'"

On a subsequent occasion, the same client was in consultation; this time the scientific adviser was no longer plain "Mr.," but Sir Frederick Bramwell. "Surely you cannot object," was the reply, when a protest was made against what now appeared an exorbitant fee; "everyone has to pay more for (k)night work."

Several piano saloons, for use, it is said, on the Midland Railway, are being built near Birmingham. These specially-constructed railway carriages are to be furnished with first-class instruments by the Company; but it is not yet announced on what terms passengers will be admitted to them, or whether the Company will supply a pianist as well as piano.

Those who have travelled far across the American Continent know how many means are provided "on the cars" for helping the passengers to pass their week of travelling as pleasantly as possible. All the "through" trains are now provided, it is said, with a photographic artist, who, as might be expected, drives a roaring trade *en route.* Many of the passengers are "taken" regularly every day, just as they are weighed and "barbered," *pour passer le temps*, and there is quite a lively exchange of cartes-de-visite amongst them on the last day of the trip.

Among the prizes offered by the Society of Arts in connection with the Inventions Exhibition is one for the best application of photography to a permanent printing process. The prize is a gold medal of the value of £20, and offered under the John Stock Trust, which Trust consists of a sum of £100, left to the Society in 1781, subject to the interest being applied for the promotion of art. Most of the successful photographic processes are likely to be represented in the photographic section of the Exhibition, so that there ought to be no difficulty in finding a worthy recipient of the late Mr. Stock's beneficence; but, unfortunately, there will be so many worthy to receive it that adjudication will be no easy task.

It is a New Orleans manager who can claim the credit of the latest development of theatrical enterprise. Every one taking a box, or a stall, or a dress circle seat, is promptly photographed whilst the seat is being booked; and when the party in question proceeds to occupy it in due course, he or she (as the case may be) receives, attached to the programme, a portrait printed from the negative taken under the above circumstances. It is, we need scarcely add, the statement of a jealous rival which asserts that, as a consequence of this novel arrangement, many members of the audience are seen to turn ghastly pale as they inspect their programme, and in many cases are observed to forthwith rush into the vestibule, and to go for the acting manager, or some one, with big sticks.

Nature purifies water by oxidation, disease-producing organic impurities rapidly becoming harmless if the water is sufficiently exposed to the air. König allowed the foul water from a slaughterhouse to flow a few times over a tinned iron netting, and found that it rapidly became sweet and fit to drink.

A correspondent in *Truth* returns to the charge anent the spirit of monopoly shown by the directors of the National Gallery in regard to photographing the pictures. He complains, and justly, that photographs of many of the best pictures are not to be obtained, while those that are to be had are poorer in quality and more expensive than those of any foreign gallery. The reason is, he alleges, that, as long as he can recollect, a monopoly has been possessed by an Italian photographer of the name of Morelli, in justice to whom, it must be said, that he has had to work under disadvantages. This is perfectly true, and Messrs. Braun were certainly wise in their generation when they insisted upon the permission to remove the pictures from the walls. But, as we have already pointed out, the price put upon their work by Messrs. Braun makes it prohibitive to persons of limited means. What is wanted are photographs of a moderate size, and a moderate price. But this would seem to be impossible while the present policy is adhered to by the authorities. *Truth's* correspondent puts a pertinent question when he asks: "If the collection of pictures in Trafalgar Square belongs to the nation, why are the trustees allowed to administer it as if it were their private property?"

"Meteorology for Photographers" is the title of a series of articles which will shortly be contributed to the NEWS by Mr. J. Vincent Elsden. Considering how much the photographer's operations are influenced by atmospheric conditions, it is surprising that more has not yet been done to systematically instruct photographers in meteorology as far as it bears on their work.

Patent Intelligence.

Application for Letters Patent.

424. Alexander Lamont Henderson, 9 and 10, Southampton Buildings, Holborn, for "Improved method of, and apparatus for, coating glass or other plates, paper, cardboard, or other material with liquefied gelatine or other fluids, particularly applicable for coating plates for use in photography."—*Complete Specification.*—Dated 12th January, 1885.

Patents Sealed.

1622. Alexander Crawford Lamb, of Reform Street, Dundee, in the county of Forfar, Hotel Proprietor, for "Improvements in photographic cameras."—Dated 17th January, 1884.

8. Frederic William Hart, of 8 and 9, Kingsland Green, London, in the county of Middlesex, Manufacturer of Scientific Apparatus, for "Improvements in portable photographic cameras."—Dated 1st January, 1884.

9026. Henry Gardner, 166, Fleet Street, London, Patent Agent, for "Improvements for producing from photographic negatives, blocks or plates suitable for typographic surface printing."—A communication to him from abroad by George Sutherland, Adelaide, South Australia, Journalist.—Dated 16th June, 1884.

Specification published during the week.

319. Samuel Dunseith McKellen, of 18, Brown Street, Manchester, Watch Manufacturer and Jeweller, for "Improvements in photographic cameras."—Dated 2nd January, 1884.

My invention is intended to dispense with the loose tripod head to which the camera legs are usually attached when the camera has to be erected for use. I make a recess or aperture in the base-board of the camera, and in this I insert the tripod-head, which I now call the "turn-table." This turn-table is constructed so that, when required, the legs may be connected with it by means of the usual pins, or by screwing or in any of the ways which are well known to the trade. The turn-table may be held in its place by many methods; but, by preference, I fix to its edge two rings or flanges, or I work the flanges on it when it is being made. These flanges project all round the turn-table, so that they overlap a little way on the base-board, one flange on each side of it, that is, one flange above the wood-work of the base-board, and one flange below it; or the flange may be worked on or attached to the upper and lower surfaces of the base-board, and the turn-table would then be clipped between the flanges; in either case the turn-table and base-board would revolve within and around each other respectively, being held in the same plane by the flanges. When the camera is erected, and the proper position obtained, it may be held in that position by any convenient mechanical arrangement; but I prefer to use a set screw, which draws the flanges together, thus binding them on the base-board or on the turn-table, as the case may be.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1st. In a photographic camera a recess or aperture (in base-board) to receive a turn-table or tripod head substantially as hereinbefore described.

2nd. In a photographic camera a turn-table or tripod-head inserted and revolving in said aperture or recess in camera base-board, substantially as hereinbefore described.

1814. Frederick William Hart, of 8 and 9, Kingsland Green, London, in the County of Middlesex, Manufacturer of Scientific Instruments, for "Improvements in portable folding tripod stands." Dated 21st Jan., 1884.

I construct a metal sleeve with two lugs cast or brazed thereon, to which are hinged two plates of such form that when folded down they shall be parallel with the axis of the sleeve and of same width apart as the internal portion of the sleeve between the lugs; these plates when turned up for use have a much greater parallel width apart—say one and three-fourths to double the width inside the sleeve between the lugs. Each leg of the stand consists of three rods, two forming the upper portion attached to a stand head by socketed pins, the third and lower half slides freely through the sleeve. Now if on making the upper two portions of the leg of the same width as the sleeve between the lugs their surfaces after fixing to the hinged plates would fold parallel each way; when downwards the space apart, corresponding to width of sleeve or thickness of central sliding leg; when turned up the surfaces will be only slightly apart. I now chamfer off the inner surfaces near the hinges for three or four inches, and of such form as shall correspond with the section of the central sliding leg; by this means I obtain the necessary gripping action on the central portion of the leg to fix it sufficiently firm for the weight the stand is intended to support; the said gripping is obtained by simply compressing the top ends to engage the pins of the stand head. When *great weight* is intended to be placed on a stand I place a strut brace near the top between the rods, and at about three-fourths down a narrow plate is pivoted to one rod, the other end has an ┌ slot, to engage the headed stud on the opposite rod; any needed amount of compression is regulated by the position given to the slot.

For greater portability than is obtained by the upper portions of the leg folding back on the lower sliding portion—in this case about half the length of the stand at its full height when in use—I then prefer to construct the legs of cylindrical form, with the exception of the portion to be chamfered. Such cylindrical portions I joint after the manner of fishing rods with or without bayonet catch or by screw joints. I purpose to make the sleeve of cylindrical, oval, or angular section, and the rods of wood, cane, or metal in part or entire.

I declare that what I claim is—

1st. The employment of a sleeve or its counterpart with two hinges for the purpose as substantially set forth and described.

2nd. The employment of the rachet-face clamp and folding disk-headed screw in combination for the purpose as substantially set forth and described.

Patent Granted in America.

309.974. Charles A. Needham, New York, N. Y., assignor to E. P. Needham and Son, same place. "Photographic printing-frame for vignetting."—Filed June 12, 1884. (No model).

Claim.—The combination, with a photographic printing-frame, of rails arranged directly on the front and provided with grooves, the piece of card or analogous material, and the stopper being unconnected with the rails, and provided with grooves.

MUSINGS AFTER THE EXHIBITION.

BY PORTCRAYON.*

We cannot but think that some interest may arise from looking at our Exhibition from more standpoints than those usually adopted by our critics. There is one point of view which seems to appeal so readily to our sympathies, that we propose to make it the subject of our first musing. It is upon some of the differences between the amateur and professional photographer as evidenced in their exhibited works. At the outset it does appear somewhat curious when one considers the amount of time which many of our well-known amateurs have at their command, that we are not inundated by the quantity of pictures which it might reasonably be supposed would be sent every year to the head-quarters of photographic exhibitions; however, it is a fact that this is not the case, and hence we are at liberty to indulge in all sorts of imaginative speculations why it is so. It almost follows that it would be a curious statistical inquiry to ascertain the relative quantity of negatives taken by amateurs, and the final number of prints produced from probably only a small residue of the original large stock taken by them. The next thought that comes up is, who produces the largest proportion of good results—the amateur or professional? This question is not of any importance taken by itself, but it assumes another aspect, in relation to the time at the disposal of each class of workers; and if one may go back, and build up a speculation from the beginning, it may probably be predicted that the amateur exposed plate after plate upon subjects which, upon being finally resolved into black and white, did not realise the effect which the coloured work of Nature had upon his mental vision. On the other hand, it might be that the professional, having the ultimate results to look at from the pecuniary as well as the pictorial point of view, subdues the effect of colour on his mind, and, attending more to the capacity of his apparatus to register certain portions of his picture, thinks of the chemical results which are to follow, and produces stronger contrasts of black and white, without a too anxious regard as to whether Nature's colours were translated rightly. This leads us then a step farther; and again it may be surmised that the amateur will produce more delicate results than the professional. And it may be here observed that we are not making the slightest comparison between any one picture and another, but simply taking the two classes *en masse*, and endeavouring to look upon them from the standpoint of memory rather than from actual vision. And sitting in one's easy-chair, how pleasant it is to let the imagination run loose, and revel in all those pleasant thoughts which only reproduce the beautiful, rather than those—we will not say ugly—bits of obscurity, or portions of undefined something, which come so painfully upon the vision when seen as a reality. While thus ruminating we think of another matter which will force itself upon our minds, and that is as to the difference between the culture of the amateur and the professional. Much might be said upon the general culture of the classes, but we now allude to culture as affecting pictorial possibilities. We cannot but recognise the outcome of a more refined and higher cultured training in the modern race of amateurs, who bring to bear upon this new fad of picture-making the cultivated power of the various modern schools of mental progress. They therefore look upon Nature with different eyes to those whose training has not been so fortunate, but who, strong in the profession of latent feeling for pictures, push this quality right through any deficiency in other walks of culture. In this struggle, however, some traces of a conflict will ever remain, and thus the ultimate result is not equal to the product of the other side. But to return to the possible practical. One reflects that it only shows that culture in any way or degree must gain the goal; therefore by study alone must the aspirant for pictorial success go on, and accumulate not only knowledge in this particular branch of depicting Nature, but also store the mind with other thoughtful matters.

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* From *Journal of the Photographic Society.*

Again we muse, and think whether this delicacy of treatment atones for the absence of pictorial composition, and the building up or selection of lines. If not, it tends to prove that Art (like many other mundane matters which appear to be beyond rules) is subject to laws which should be acquired, if ultimate success is aimed at; but hopes arise when we review the fact that, as more cultured students invade the photographic territory, so they, from their previous acquaintance with laws which govern their other studies, will recognise the stern necessity of laws in Art; and hence the amateur may hold up the standard of study, which eventually must permeate the professional phalanx; and our younger brethren, by increasing their own stores, will help to still farther increase the stores of others.

Another thought arises, viz., the animus which governs both the amateur and the professional. It may be said, taking amateurs as a body, that they have other work or occupation to engage their attention, photography coming in as a hobby or pastime. Hence there will naturally be more ardour in its pursuit, and the mind will be alternately rested. This means a freshness of attention, whose every faculty is on the *qui-vive*, and observations made are recorded upon the historically clean sheet of writing paper. Thus, with all these differences in favour of the amateur, no wonder that he can turn out good work, and also, sometimes, be the pioneer of discoveries and applications of forgotten theories, which may result in something advantageous to photographic progress.

The professional, on the contrary, whose whole life and thoughts are compelled to be engaged upon his daily return of work, comes to his task without that change of mental recreation which is rest to the brain of man. This is not often thought about when criticising professional exhibits. Neither should it be considered, if it is to be to his advantage; nevertheless, the fact remains, and it is like fighting the battle encased in a heavy suit of armour; in other words, the conditions should not be possible; yet, until better days come, it must remain as it is. Thinking of better days, another thought comes up. To the professional, what is the reward attending the production of pictorial photographs? We fear it cannot be so satisfactory as it ought to be, otherwise we should see more time and study devoted to this phase of photography. But with this matter the amateur has no concern, and it is only alluded to incidentally, as it may be the nucleus of other musings in relation to the professional, considered by himself.

And as a last thought, photography is probably the only recreation involving thought where the amateur can make such a display of results, as not only fairly to challenge the professional, but very often go beyond him, especially when brought to the test of either awards on the one hand, implying a higher appreciation of work done, or on the other, appealing to the general public, whose verdict is worth something as evincing the soundness of popular applause. What a grand opportunity is now offered to those who desire to utilise their moments of leisure in the study and production of some tangible result which will bear the thought of conscientious self-satisfaction, both in its pursuit and in its affording gratification to others.

Correspondence.

LENSES FOR PORTRAITURE.

Sir,—Will you allow me to point out a necessary qualification of one of the rules laid down—perhaps too absolutely—by the writer of the article in your last "On the Choice of Lenses for Portraiture." Twelve inches certainly seems an excessive diameter (the focal length is not mentioned); yet large lenses retain, even when stopped down, a real practical value which was overlooked, the writer not bearing in mind that the ratios of central and marginal intensities may be made to vary in lenses which, though of similar focal length, differ much in their diameters.

I am reminded of a curious incident, narrated in your columns, as occurring at a lecture on lenses given some time ago by Mr. Debenham. A photographer was present, who did not pretend to be scientific, but a practical man, and who stoutly maintained, from his own experience, that he could not get a picture so well and quickly exposed with a rapid rectilinear lens, as with a large portrait combination stopped down to the same aperture. It was in vain demonstrated to him (not, as I gathered, by the lecturer, but by bystanders) that each lens stopped down to the same intensity must necessarily have the same rapidity. He held firmly by his belief in his own experience, and was consequently regarded as an unreasoning despiser of science.

Yet I think he was probably quite right. It did not apparently occur to the theorists that identical intensity at the *centre* of the field does not necessarily imply identical intensity at its *margin*. In a combination used with the full aperture the central pencil only is transmitted by the *whole lens*, all marginal pencils having more or less light cut off at back or front, or both; while, when stopped down, pencils of the full size of the stop are transmitted over a greater or less area, varying with the relative sizes of stop and lens. Thus, a comparatively small lens used with the full aperture falls off in intensity towards the margin far more rapidly than a larger one stopped down to that aperture. For example, a 12 by 10 group taken in the studio on a dull December day with a Voightlander in my possession, of 14¼ inch focus, and lenses over 4 inches diameter, will (the lens being stopped down to 2½ inches) be distinctly quicker and *better*, because more *equally* exposed, than with a D lens of about the same focus and full aperture. And if compared with one of the rapid doublets, and stopped down further to *its* aperture, the difference will be still more marked. If, on the other hand, both lenses are stopped down below the full aperture of either, this difference tends to disappear. Of course, a marginal falling off in light from this cause must always be accompanied by an improvement in marginal definition, gained at the expense of light.

I believe there is now a tendency unduly to depreciate the Petzval lens in favour of doublets. Yet the peculiar efficacy of the method by which flatness of field is obtained on the Petzval principle admits of a greater variety in its application than I imagine to be used or suspected, and possesses great practical advantages in combinations of very large size and long focus.

It must not be forgotten that the large diameters usually given in these lenses present the principle under great disadvantages in comparison with other forms which will not admit of so great aperture. For out-door work their liability to flare is generally fatal; yet I have adapted a form quite free from flare, even when stopped down to $\frac{1}{25}$. That was a special device, for a special purpose. But, as a copying lens, I generally prefer a Ross' 4A, and find it very useful, from its long focus and excellent definition in varying positions. And I have recently put together a combination of about 4 feet focus, in which the construction of the back lens is altered, though preserving the Petzval principle, from which I anticipate excellent results in copying paintings. As for flatness of field, I have actually reached *concavity* by sacrificing some of the marginal definition, which was useless without flatness. Let anyone compare a good lens of the Petzval type with one of the rapid rectilinear class in copying to the *same size*—the experience may be useful.

I found a most excellent Steinheil so tested come off decidedly second best, and there may be good reason for this, the best form of lens for rays nearly or quite parallel being not necessarily the best when as strongly divergent as they are from an object arranged to be copied to the same size.

But, however, one cannot too often recommend (and here I have the pleasure of entirely agreeing with the writer) that, especially in the studio, we should always, where practicable, prefer a *long focus lens*; and when this is used for a relatively small picture, the marginal intensity will not be materially affected by the cause above mentioned.—I am, dear sir, yours truly, W. H. Wheeler.

HISTORICAL EXHIBIT AT THE INVENTIONS EXHIBITION.

Dear Sir,—The authorities of the forthcoming Inventions Exhibition have invited the council of the Photographic Society of Great Britain to exhibit a collection of photographic apparatus and processes illustrative of the history and progress of the science of photography.

I shall be much obliged if you will allow me to make this fact known through the medium of your pages, and to say that the council have cordially accepted this invitation, and have appointed a committee to make the necessary arrangements. It will greatly assist them if possessors of specimens of apparatus, &c., of historical interest, who would be willing to lend them for exhibition, would communicate with me as soon as possible on the subject. The following list, which is by no means complete, indicates the kind of specimens which it is desired to collect. It should be understood that the examples—as, for instance, of obsolete processes—must be the best obtainable.

Daguerreotypes, Calotypes, Glass positives. Negatives taken on collodion wet plates, collodion dry plates, tannin, collodio-albumen, gum-gallic, collodion emulsion. *Printing Processes*—Salted paper, albumenized paper, Wothlytype, old photo-engravings. *Apparatus*—Pantascopic camera, stereoscopic apparatus, old instantaneous shutters.—Yours faithfully,

W. F. Donkin, *Hon. Sec.*

97, *Upper Tulse Hill, London, S.W.*

OBTAINING SPECIMENS.

Sir,—I answered the advertisement of "T. B." which appeared in the News of January 2nd, enclosing some unmounted specimen photographs (all I had, unfortunately), and I enclosed a stamped directed envelope, asking for their return as soon as convenient, should he ("T. B.") be suited. But after waiting and waiting, and not hearing anything of them, it occurred to me that "T. B." must be some dishonest fellow who has advertised so as to obtain specimen photographs under false pretences.

I thought perhaps you would kindly assist me, if you could, by inserting this letter in the News in the hope that "T. B." is not so bad as I have been thinking him to be, which he would show by returning the specimens he has received, to their proper owners.—I am, sir, yours respectfully, Fair Play.

Proceedings of Societies.

Photographic Society of Great Britain.

The ordinary meeting of this Society was held on Tuesday, the 13th inst., at the Gallery, 5A, Pall Mall East, Mr. James Glaisher, F.R.S. (President), in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. E. C. Simpson, W. H. Plaister, M.D., H. Trueman Wood, and G. Fowler Jones, were elected members of the Society.

The Chairman then called upon Mr. L. Warnerke to demonstrate the method of using his "rapid positive paper."

Mr. Warnerke commenced by saying that the principle on which he based the new paper he intended describing, was by no means a new discovery, since he had read particulars regarding it in various photographic publiciatons from time to time during the last two or three years.* The credit of applying this principle to commercial paper at the present moment was due to the perseverance of Messrs. Marion and Co., who had taken great pains to bring it well before the notice of photographers. Mr. Warnerke then passed round examples of the paper as finished prints (also paper merely coated), and remarked that the coating consisted in applying one of the various forms of bromo-chloride or bromo-citro-chloride emulsions to ordinary commercial photographic paper, without any substratum or other special treatment. The finest paper he could find was either plain Saxe or Rive, and when this was suitably covered with emulsion, they had all they required for the purpose of producing the very finest results. Whatever formula was employed, the emulsion would be washed, the paper coated, and dried in a non-actinic apartment; exposed a short time under a negative in contact, developed with one of the ordinary developers, well washed, soaked in common alum solution, toned in an ordinary gold bath, fixed, washed, and finished. Printing was performed as with ordinary silvered albumenized paper, the difference being that ordinary paper required a long exposure to daylight, whereas the new paper needed a very short exposure—even to artificial light—thus allowing, in the latter case, a large amount of work to be done which would be impossible by the older method. Regarding the colour of the image, much depended on giving a proper exposure; over-exposure yielded warm tones, and under-exposure the darker shades. Mr. Warnerke laid some stress on the slowing action caused when printing from yellow stained negatives, and he thought the present standard density of negatives considered suitable for ordinary silver printing was by far too great for the method he was describing. The mode of developing was precisely similar to that employed when the emulsion was spread on a glass plate, and any developer which suited a chloride plate would suit his paper. The following formulæ answered, each producing a different tone:—

1.—*Ferrous Oxalate Developer.*

A.—Potash oxalate	... ...	25 parts,	or $2\frac{1}{2}$ ounces
Ammonia bromide	... ...	1 part,	or 48 grains
Water ...	... ...	100 parts,	or 10 ounces
B.—Iron sulphate ...	... ...	10 ,,	or 1 ounce
Water ...	... ...	150 ,,	or 15 ounces

Adding a small crystal of citric acid.

These two solutions are mixed in equal proportions.

2.—*Ferrous Citrate Developer.*

A.—Citric acid	... ...	200 parts,	or 4 ounces
Ammonia carbonate ...	...	100 ,,	or 2 ,,
Water...	... ...	500 ,,	or 10 ,,
B.—Iron sulphate...	... ...	100 ,,	or 1 ounce
Water...	... ...	500 ,,	or 5 ounces

Adding a small crystal of citric acid.

C.—Common table salt	... ...	5 parts,	or 1 ounce
Water	... ...	100 ,,	or 20 ounces

A and B are mixed in equal proportions, and a few drops of C added, according to exposure given and tone of the print desired.

3.—*Hydrokinone Developer.*

A.—Hydrokinone ...	... ...	5 parts,	or 24 grains
Alcohol	... ...	100 ,,	or 1 ounce
B.—Potash carbonate	... ...	20 ,,	or 96 grains
Water ...	... ...	100 ,,	or 1 ounce
C.—Common table salt	... ...	5 ,,	or 24 grains
Water ...	... ...	100 ,,	or 1 ounce

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* Practical information respecting the method of preparing and using emulsion paper for positives will be found on pages 721, 738, and 786 of our volume for 1883, and on page 20 of the last volume.

To form a developer, mix 10 drops of A, 5 to 10 drops of B, 1 to 3 drops of C, and water 1 ounce. Ferrous oxalate can be mixed with ferrous citrate if desired. Ferrous citrate generally produced the warmest tone. Mr. Warnerke said the ferrous-citrate solution kept in good working order for some hours after mixing; not so the ferrous-oxalate, which had the property of working well when freshly mixed, but lost its power in fifteen minutes. Hydrokinone would not keep either, and only one print could be developed in a given quantity of solution. Upon the whole, he considered hydrokinone the cheapest developer of the three, notwithstanding all that had been said regarding its price. His object in mentioning three developers was because they gave him power to get any colours he pleased, which could not be done by using either of the iron developers when a certain class of negative was employed. Very little could be said at present regarding permanence; but developed prints had been found to be more permanent than those obtained by the ordinary method of printing. The object of soaking the prints in alum after development was to remove the last traces of developer, which would otherwise interfere materially with the process of toning. Although any toning solution would answer, he preferred using the mixed hypo and gold bath, which toned and fixed prints in ten minutes, and had the further advantage of keeping—a matter of some importance to an amateur. After the usual washing, the prints could be dried and rolled, when they resembled ordinary prints, the alum bath having hardened the gelatine sufficiently to offer little risk of injury. Mounting in contact with a talced glass plate gave, when dry, a surface equal to the best enamelled prints. To overcome marks due to certain imperfections in glass plates, which are not readily observed on the surface of the plates, but are seen on the prints, Mr. Warnerke found it better to use, as a substitute for glass, a polished sheet of ebonite. The surface of prints mounted on ebonite was not quite so brilliant as those on glass, but quite sufficient for all practical purposes. As a standard test of sensitiveness, Mr. Warnerke suggested a modification of his sensitometer. He substituted the phosphorescent tablet by a gas jet at a fixed distance from a sliding platform, arranged to hold the sensitometer; an exposure of one minute he deemed suitable, the burner consuming five feet per hour. He found the ordinary sensitometric scale gave very accurate results when used in this manner. The arrangment was also very suitable for holding printing frames when gas-light was employed for printing. Prints were made under negatives, with exposures varying from one to five seconds to burning magnesium ribbon, and developed in the room, the results being satisfactory.

Mr. T. Sebastian Davis congratulated the lecturer. He thought a paper of this kind would be the basis of future printing, since there was an entire absence of free silver nitrate to combine with gelatine in the manner it combined with albumen. They were approaching the goal of perfection, namely, rapid and permanent printing. As the subject was of much importance, he proposed that the discussion be taken at the next ordinary meeting.

The Chairman said the subject was one of the greatest interest to photographers, as it threatened to supersede all kinds of printing where albumen was now employed. He would not ask anyone else to speak, but adjourn the discussion as proposed. He then announced that the Hon. Secretary would be pleased to receive either photographs or apparatus of historical interest to exhibit at the forthcoming Inventions Exhibition, all communications in respect of the same to be addressed to Mr. Donkin, the Hon. Secretary, at the Gallery. A letter announcing an exhibition of photographs at Nottingham in February was read, and the Chairman hoped their Society would be well represented.

The gentlemen appointed to act as auditors were Messrs. W. Cobb and G. L. Addenbrooke. Scrutineers—Messrs. Ackworth, W. K. Burton, W. England, and J. Ince.

The retiring officers are, the President—Mr. James Glaisher; Treasurer, Mr. W. S. Bird; and six members of Council—Messrs. W. Bedford, H. B. Berkeley, A. Cowan, Jabez Hughes, F. Maxwell Lyte, and Leon Warnerke. Nominations must be sent in on or before the 19th inst. The annual meeting will take place on Tuesday, February 10th.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 8th inst., Mr. A. Cowan in the chair.

Mr. Cooke passed round some effective examples of oil colouring produced in the space of twenty minutes by the method demonstrated at the previous meeting, and said it was possible to obtain effects similar to the demonstrator's with only ten minutes' work.

Mr. Henderson showed a vigorous wet collodion transparency from an under-exposed gelatine negative, wherein the image was scarcely distinguishable, owing to red and green fog. In reply to a query, he stated that the positive was toned with mercury and Schlippe's salt.

Mr. W. Cobb then delivered his promised lecturette on "Instantaneous Photography" (see page 38), illustrating his remarks with a large number of 10 by 8 studies of London street life, many of which were obtained from the roofs of omnibuses and other vehicles.

The prints were much admired, and the Chairman, in thanking Mr. Cobb for his very excellent paper, said the examples before him were the finest of that class of subject he had seen. As Mr. Cobb's paper contained a question of considerable interest, it would be well to deal with it before asking the lecturer questions. Mr. Cobb desired to know why some rapid plates receiving $\frac{1}{50}$ or $\frac{1}{60}$ of a second's exposure required nearly an hour to develop, when plates of the same batch exposed four times as much developed in the usual time, and in each case the negatives appeared to be correctly exposed.

Mr. W. E. Debenham attributed the circumstance to latitude of the plates; long exposure bringing out detail in one case, and the developer doing so in the other.

Mr. Henderson spoke of some of his plates requiring twenty minutes to develop in his studio, and only seven minutes in another studio; the difference he attributed to temperature. By heating his developer the action was quickened.

Mr. Haddon pointed out that as Mr. Cobb's plates were all developed during the hot weather, the variation of temperature did not account for it.

Mr. W. K. Burton, in speaking of latitude, mentioned a case in which the high lights appeared sufficiently dense after five minutes' development; but it required twenty minutes to bring out the details, during which time the lights had not increased in density.

Mr. Debenham did not think the lecturer's remarks just to instantaneous work, when he spoke of it as being inferior to those pictures receiving longer exposures, such as carefully grouped and combination pictures. He preferred many of Mr. Cobb's examples to any combination photograph he had yet seen, so far as reality was concerned. Reality concerned the photographer most; the other effects more properly belonged to the artist than the photographer

Mr. Cook, although disagreeing with Mr. Debenham regarding combination pictures, thought no artist could produce better results of some of the subjects exhibited.

In reply to questions,

Mr. Cobb said he generally employed a lens of rectilinear type with an aperture of an inch and a-half, combining it often with a French combination, the focus then being thirteen inches; a spring shutter was used. The plates were by the ammonia process, not boiled; the proportions of gelatine and ammonia rather large; the developer was the normal pyro and ammonia; and the ordinary camera stand fitted with turn-table was adopted.

A hearty vote of thanks was passed to Mr. Cobb for his excellent paper.

Mr. Trinks, speaking of a recent suggestion for removing the printed albumen image from an ordinary print by means of a saturated solution of borax, said he had failed to strip it off and desired further information.

Mr. J. B. B. Wellington showed prints made from his, formula as reported last week (see also page 36, and he found, by reducing the quantity of bromide to six grains, he reduced the exposure five times, still retaining the warm tones.

Mr. R. Frost was elected a member of the Association.

Leeds Photographic Society.

The ordinary monthly meeting was held on Thursday, Jan. 8, Mr. J. W. Ramsden (Vice-President) in the chair. There was a very large attendance of members.

After the confirmation of the minutes and some other formal business, Messrs. Smith and Hall were elected members.

Mr. Thos. W. Thornton (Hon. Secretary) gave an address relating to some experiments he had been trying with the paper for printing by development, and gave a demonstration of the process. He also exhibited a number of prints varying in colour from black to a very delicate tone of terra-cotta, showing the alterations in tones and colours that can be procured by variations in the time of exposure and developers.

After the demonstration the prints were examined with much interest, and a general conversation ensued.

The members then proceeded to the inspection of a large number of two-, three-, four-, and five-wick optical lanterns that had been sent for that purpose.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The Board of Management held its usual monthly meeting at 181, Aldersgate Street, on the 7th inst. The minutes of the previous meeting having been read and confirmed, Messrs. Jas. Saller, W. W. Roberts, N. S. Brown, F. Shettle, and L. H. Masser were elected members.

An application for assistance was made, and granted by the meeting.

Mr. J. G. Gibson was elected as local secretary for Newcastle-on-Tyne and district, and Mr. W. Auckorn for Arbroath and Dundee. Mr. J. Stuart was elected treasurer.

It was decided that the Annual General Meeting should be held at above address on Wednesday, February 4th, at 8 o'clock.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

The monthly meeting was held in the Masonic Hall on Tuesday, the 6th, when a good assembly of members were present. Mr. W. B. Hatfield occupied the chair, Mr. Councillor Thomas Firth the vice-chair.

Mr. J. B. Lowe was elected a member, and Mr. Johnson and Mr. H. Rawson were then deputed to purchase a real good lantern for the use of the members.

The Chairman then asked Mr. H. Rawson and Mr. T. G. Hibbert, who were elected at the previous meeting, to expose six half-plates, each with very different exposures on one subject, ranging from three seconds to thirty, where fifteen seconds was considered a proper exposure; the object being to test the latitude of various formulæ in developing over-, under-, and properly-exposed plates up to the same quality of negative.

Mr. Rawson first took to the laboratory, and with the use of Mr. Brightman's formula, varied by separate solutions of bromide and ammonia, succeeded in astonishing many of the amateur members by accomplishing the effect he worked for in a skilful and easy manner.

Mr. Hibbert then proceeded with the sodic sulphite formula with similar results. Other formulas were shown, but none with the striking success attending Mr. Rawson's work.

It was proposed by Mr. Turner, and seconded by Mr. Firth, that the subject of discourse at the next meeting be "Toning," when a short paper will be read on the subject by Mr. W. B. Hatfield.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

A monthly meeting was held in Lamb's Hotel, Dundee, on Thursday, January 8th, when there was a good attendance, Mr. J. C. Cox presiding.

After the routine business had been disposed of, Mr. V. C. Baird proceeded to explain the process of manufacturing gelatino-bromide emulsion and coating plates. At the close of his remarks he prepared, washed, and coated a sample batch of emulsion in a very neat and successful manner.

Mr. J. C. Cox volunteered to present a gas stove for the Society's dark-room, so that it can be used for emulsion making.

Mr. J. Geddes then made some remarks on enlarging, and detailed his experiences with Marion's "Alpha" printing paper; but said he had found difficulty in getting regularity of tone. A number of prints by this process were handed round.

Mr. Geddes also showed a print on the "Acme" rapid printing paper. This, he said, took about the same time to print as ordinary sensitized paper, but toned very rapidly.

The washing apparatus recently patented by Mr. Sturrock, Dundee, was then explained and put into operation, when it worked most successfully.

A lantern slide competition was arranged for the 19th of February, when two prizes will be given for the best sets of slides produced by the members.

HYDE AMATEUR PHOTOGRAPHIC SOCIETY.

On Wednesday evening the usual fortnightly meeting was held in the Mechanics' Institution, when the new lamp, designed by the President, Mr. F. W. Cheetham (see page 30), underwent a test as to its use and utility. Three plates having been exposed upon various scenes in the district during the daytime, were brought forward for development. The lamp was found to do its work admirably, all the light being thrown downwards upon the work, the eyes of the operator being screened from the glare of the ruby light. The plates were developed with Wratten's developer, and were watched with keen interest by those only just commencing photography.

Several members brought specimens of work, and were shown how to avoid the faults in them in future.

Mr. Ed. McLean exhibited a plate manufactured by himself, which, although a first trial, was nevertheless a good start, and showed that by a little practice and perseverance a good and reliable plate could be manufactured at home.

Altogether the meeting was a very interesting one.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The usual monthly meeting was held at the Manchester Technical Schools on Thursday, the 8th inst., Mr. John S. Pollitt, President, in the chair.

The minutes of the previous meeting were read and confirmed, and Messrs. John Stoveld, P. Higson, J. A. Furnival, and Herbert Parker were elected members of the Society.

The President informed the meeting that the exhibition of members' work would be held in March, and he urged upon the members the desirability of at once getting their exhibits ready.

Mr. Brothers, in answer to a question respecting the polishing of Daguerreotype plates, said that there were two ways, viz., by rubbing on a buff, and also by polishing in a lathe. The method he adopted was—rubbing first on a buff (*i.e.*, a piece of wood covered with a pad of velvet) dressed with oil and rotten stone, then on a second one to clean off the oil, &c., and finishing on a clean buff to give the final polish; and he pointed out that the rubbing should be always in one direction, or a perfect polish could not be obtained. He further said that the plate was polished in order to remove all tarnish from its surface, and to render it in a fit condition to combine evenly with the vapours of iodine and bromine to be applied to its surface; in other words, it was to make it clean, exactly as a glass plate had to be cleaned for the collodion, &c., processes.

In fulfilment of a promise made at the last meeting, Mr. Brothers then made a few remarks on the subject of "Mounting Photographs," and said that the selection of the mountant was a point of great importance, as if any substance liable to turn sour was used, the print would be sure to fade, and mentioned a number of Talbot-type prints which had been in his possession for a number of years, and which had been mounted by the edges only, all of which had been discoloured round the margins where the mounting medium had been applied, leaving the centre of the prints quite perfect. He had for many years used gelatine as the mounting medium, but found it very unmanageable when mounting large pictures, owing to its setting before the entire surface could be covered, and he had therefore discarded gelatine in favour of starch paste, mixed to about the same consistency (or a little thicker) as for starching linen. With this medium prints, small and large, could be easily coated, and as the starch did not dry too quickly, the adjustment of the picture on its mount could be done deliberately without fear of parts of the print failing to adhere. The only objection he had to the starch was, that when a print was once mounted and dried, it was almost impossible to get it off the mount again. Another important point was the cutting out of the print. If a number of one size had to be done, the best way was to carefully cut a plate of glass to the exact size required, using this as a template, and cutting upon a plate of zinc. Prints should be cut before toning; firstly, because they are then flat, and can be easily handled; and secondly, if the paper has been sensitized at home, the cuttings form a valuable addition to the residues. In case only a few prints of one size had to be cut, a very good plan was to use a set square, cutting a base line first, and cutting the sides and top from that by means of the square. Mr. Brothers incidentally mentioned at this point, that linen cloths were much superior to blotting paper for absorbing the moisture from prints after washing, as they could always be made clean by washing, and could be relied on to be free from foreign substances likely to damage the prints. When a number of prints have been toned, fixed, and washed, and had the bulk of the water blotted off by means of the linen cloths, they should be laid in a pile one on the other, back upwards; the upper one is then covered with the starch paste, laid on its mount, and rubbed down in the usual way, and so on through the pile. To ensure the print being placed in the right position on the mount, Mr. B. suggested the use of a guide as shown by the Hon. Secretary at the last meeting, or the position could be marked by two small pencil dots for the top corners of the print. Mr. Brothers proceeded to point out that the operation described would be found to answer perfectly well so long as a board of desirable thickness was used, but if prints had to be mounted on thin boards or paper, then it would be found very difficult to avoid cockling of the mount. India-rubber solution had been recommended as a perfect remedy for this trouble, but he had never tried it, as he always adopted another plan which he recommended to the members, viz., to send their prints to a London firm (who made a speciality of this work) and have them mounted on plate paper. Mr. Brothers exhibited a 10 by 8 print mounted in this manner, and pointed out that it was perfectly flat, and, being flexible, could be rolled up without damage. Mr. Brothers, in answer to the question whether there was any difference in the way paper expanded when wetted, replied that he believed there was a difference, as he had once noticed a difference of about one-sixteenth of an inch in a small head, but could not say at the moment in which direction of the sheet the expansion was greatest. He supplemented his former remarks with a hint that a most important point in connection with mounting was to have the mounting paste fresh, and he did not consider that starch or similar material was safe for more than twenty-four hours after mixing.

Mr. Rishton said the expansion of the paper was in the direction of the length of the sheet.

Mr. Atherton said that on one occasion having to mount a print on thin paper, he coated the print with ordinary gum mucilage and allowed it to dry, and, after damping it slightly, placed it on the mount, the experiment being a complete success, no cockling of the mountant taking place.

Mr. Faulkner, referring to Mr. Brothers' remark about fresh paste, asked if the mountant known as parlour paste was included in that category.

The President explained that the mountant alluded to had a large proportion of alcohol in its composition, and did not, therefore, decompose as starch or other paste mixed entirely with water; and he further expressed a preference for alcoholic pastes in consequence of their greater immunity from cockling. He also referred at some length to the question raised by Mr. Brothers in reference to dismounting a print which had been fixed to its mount by means of starch, and said that in his own experience he had found it almost impossible to completely remove a print so mounted.

A lengthy discussion on this point followed, in which Messrs. Rishton, A. Whitham, Dr. Bahin, and others joined.

Mr. Foster showed a number of transparencies on Cowan's and Hutinet's plates; and in reply to a question by Mr. Stevenson, described his mode of printing and toning the latter.

The meeting closed with the customary vote of thanks to those gentlemen who had contributed to the interest of the meeting.

Bradford Amateur Photographic Society.

The monthly meeting was held in the Law Institute, on Thursday, January 8th, Mr. Duncan G. Law in the chair.

There was a good attendance of members, many of whom had brought transparencies from their negatives taken during the summer. These were shown in the oxy-hydrogen lantern by the Secretary. Amongst them were thirty fine views of Switzerland, by Mr. F. B. Muff; also Yorkshire views by Messrs. Law, Scorah, Howarth, and Smithson.

After the Lantern Exhibition, a short paper was read by Mr. J. D. Scorah, on "How to find the Focus of a Lens."

Mr. F. Illingworth showed a very portable camera for $8\frac{1}{2}$ by $6\frac{1}{2}$ plates, weighing only 4 lbs.

It was decided to have competition of photos. during the autumn, prizes of £3 3s. and £2 2s. being promised.

Talk in the Studio.

Portraits by Artificial Light.—From Mr. W. Barry, of Hull, come to hand five cabinet portraits made by artificial light at a fancy dress ball, and three out of the five are full-length pictures. So good is the lighting that the idea of artificial illumination does not suggest itself to the observer. Mr. Barry uses a pyrotechnical light.

Fire at Fallowfield's in Lower Marsh.—On Wednesday night, the shop of Mr. Fallowfield, at 36, Lower Marsh, Lambeth, was completely destroyed by fire in the course of a few minutes; a package of pyrotechnical composition having become accidentally ignited. We are glad to be able to state that the photographic department of the business is in no way affected by the occurrence, as only the druggist department has suffered, the photographic stock being kept at 86, Oakley Street.

The Bichromate Process of Tanning.—At the present time leather made by soaking skins in bichromate of potassium solution is being made on a considerable scale, and is said to compare favourably with leather made in the usual way. According to the plan adopted by Dr. Henizerling, a solution containing not only bichromate, but also alum and common salt, is far better than one containing bichromate only. It seems that the reducing action of the organic matter on the chromic acid proceeds very slowly, so that even in the case of bichromate leather which has been kept for several months, a soluble chromium compound still remains. This fact suggests the possibility of serious consequences following the use of chromate leather for shoes or boots, as soluble chromium compounds produce a peculiarly malignant disease of the skin.

Sprague's Ink-Photo Process for Journalistic Illustrations.—No less than eight double page sheets printed by Sprague's method have been issued with a recent number of the *Kennel Review*, and we have here an excellent indication of the value of the method as a means of issuing, not only real photographic pictures, but also reproductions of engravings, with magazines or journals. The eight sheets include nineteen distinct subjects, the greater number of which are, as may be supposed, portraits or group pictures of dogs. It is, however, to be regretted that the photographs are issued without the names of the original producers of the negatives being appended.

A New Photographic Quarterly.—*The Practical Photographer*, of which No. 1 is to hand, is published by Garrison Brothers, of Chicago. Four numbers are to appear in the year, and the subscription is 50 cents.

International Inventions Exhibition.—The Council of the Society of Arts are prepared to award the following Gold Medals in connection with this Exhibition:—Under the John Stock Trust, one Gold Medal for the best application of Photography to a Permanent Printing Process. Group XXVI., Class 110; Group XXIX., Class 159. Under the Howard Trust, five Gold Medals for the best exhibits (coming within the terms of the Trust) in the following Classes:—One for the best exhibit in Group IV., "Prime Movers." Class 26; Steam Engines and Boilers. One for the best exhibit in Group IV., Class 27; Gas and Air Engines. One for the best exhibit in Group IV., Class 23; Means of Utilising Natural Forces. One for the best exhibit in Group XI., "Hydraulic Machines, &c.," Classes 59 to 62. One for the best exhibit in Group XIII., "Electricity," Class 72; Distribution and Utilisation of Power. Under the Fothergill Trust, one Gold Medal for the most novel and best exhibit in Group XXVIII., "Philosophical Instruments and Apparatus," Classes 148 to 158. Under the Alfred Davis Trust, three Gold Medals to be awarded in Division II. of the Exhibition (Music), Groups XXXII. to XXXIV., Classes 166 to 180. The Council propose to ask the Juries in each Class to recommend for their consideration either two or three exhibits which they might consider deserving a prize. It will not be necessary for any special application to be made in respect of these prizes.

A Royal Amateur Photographer.—Prince Edward is a most amiable young man. He has a good deal of his mother's gentleness in his features and in his manners. I hope he may grow up as good as he looks, and be as happy as a prince can expect to be. Mr. Barraud photographed the Prince and his father and mother and brother and sisters, and afterwards the Prince of Wales insisted upon photographing Mr. Barraud.—"Dagonet," in the *Referee*.

Prince Albert Victor's Birthday.—The rear-guard of Sanger's army having disappeared, there was a brief pause, ended by the photographing of the Prince's family by Mr. Barraud, of Oxford Street, in presence of the line of labourers and school children. This operation was of absorbing interest to the little ones, some of whom appeared at first to fear that the uncanny-looking apparatus levelled at the Royal party was meant to harm them. But they were at length informed that this was a London gentleman specially summoned to Sandringham to make pictures that would commemorate the happy birthday of the young master, and so were content. Mr. Barraud placed his august patients in an angle of the porch, and carefully arranged them, now in this, now in that combination, until his artistic taste was satisfied. Fortunately, just before the critical moment, his hat was blown off by the wind and trundled over the gravel towards the porch, and the Princess of Wales uttered an exclamation which made the others smile. The accident relieved the Princes and Princesses, at any rate, from the sustained motionless interval which had preceded it, and Mr. Barraud promptly seized the opportunity to finish his work. Prince Albert Victor, on the right, pushed his deerstalker a little further off his forehead; Prince George, on the left, gave a hasty twirl to his side locks; the three young Princesses sat very still upon their chairs in the foreground; the Prince of Wales, in his velvet-collared and velvet-cuffed overcoat, and the Princess of Wales, in hat, long jacket, and furs, by his side, both standing between their sons, fixed their eyes; and in a twinkling the deed was done. Mr. Barraud took a number of other photographs, including several single portraits and a group of all the Royal persons now staying in the house.—*Daily News.*

PHOTOGRAPHING A MAYOR AND CORPORATION.—The Canadian Correspondent of the *Liverpool Journal of Commerce*, says:—"The Winnipeg City Council has just passed an account of $100 for photographing in a group the mayor and aldermen of that city for the present year. The unfortunate citizens seem to be of opinion that the city fathers are dear enough in the flesh without spending money for their counterfeit presentment."

THE PARIS UNIT FOR THE MEASUREMENT OF LIGHT. By W. Siemens (*Ann. Phys. Chem.*, 22, 304).—The recent Conference at Paris for the determination of the units of electric quantities, adopted for their unit of light that which is given from a surface of fused platinum one centimetre square at the moment of its solidification (this vol., p. 2). The author has arranged an apparatus to realise this unit. The contrivance consists of a piece of very thin platinum foil, heated to its melting point by an electric current, while the light from it is allowed to pass through an aperture one-tenth of a square centimetre in area. This light is about equal of 1·5 English standard candles.—*Journal of the Chemical Society.*

IF the experiments of M. Mihailoff are to be relied on, an aqueous solution of pure albumen can be boiled without coagulation taking place. To obtain the solution of pure albumin, white of egg is precipitated by adding excess of a saturated solution of ammonium sulphate, and to this as much more solid ammonium sulphate is added as will dissolve. The albuminoid substances (globulins, globulinates, and albumin) are thus precipitated. The precipitate is washed with a saturated solution of ammonium sulphate, and, having been rendered slightly alkaline with ammonia, is dialysed. The water which replaces the excess of sulphate and the alkalis of the precipitated albuminoids leaves the whole of the globulins and globulinates in the precipitate, and the pure albumin is obtained in solution. These particulars are taken from the Chemical Society's abstracts of foreign papers.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting, January 21st, will be "Paper Negatives."

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To Correspondents.

*** We cannot undertake to return rejected communications.

W. G.—A little more care is required in making the paste from a high class starch, such as the best arrowroot. Let the basin and spoon be slightly warm, and do not make the first mixing with absolutely cold water. The water for the principal mixing should be quite boiling, and the stirring must be thorough. If stringy or lumpy, squeeze through muslin. Those very qualities which trouble you are those which make the paste better.

W. J. W. S.—We have seen them in a print shop on the east side of Chancery Lane.

JAMES WEBB.—The safety depends altogether on the care and judgment exercised by the person in charge, and the fact that many accidents have happened proves that some risk exists. The apparatus you mention is a modification of the original "Hemming's safety jet," but by no means does away with the need of care. Accidents frequently happen because those working the lantern depend rather on their apparatus than upon themselves.

L. BESSAU.—You can either subscribe direct, or order them through a foreign bookseller. If you adopt the former course, it will in each case be sufficient to address your letter to the publisher of the journal you require, at the town mentioned in the YEAR-BOOK list.

AMATEUR.—Abney's "Instruction" is the best as a general hand-book; and special works on the branches you mention will be found in Piper and Carter's series of Photographic Handy-Books.

E. J. LOVEJOY.—1. A lens having an equivalent focus of four inches will answer your purpose. 2. We congratulate you on your success.

W. T. ANCKORN.—Thank you for the print; the tone is very pleasing.

A. J. RICHARDSON.—Manufacturers often advertise goods before they are ready to supply them, and doubtless this is what has been done in the case you refer to. There is, however, no excuse for not answering your repeated letters of enquiry with respect to your remittance.

A. W. DAVIS.—The letter shall be sent on to Berlin.

EBBW VALE.—1. Thanks; we will write to you. 2. Perhaps not thoroughly, but the complete obliteration only takes place when the second exposure is a very prolonged one. 3. It is not in the market at present, but probably some manufacturer will shortly construct it for sale.

W. A. C. A.—1. There is no absolute necessity to use acid in such a case, but of late it has become the custom to make a small addition. 2. Sulphuric acid is intended; by its decomposing action upon the sulphite, sulphurous acid is liberated. 3. In our opinion you are right; the "better and more delicate shades" may be the offspring of imagination. 4 In this case we can hardly decide for you; but remember that the best for any particular person is generally that with which he has had most experience. Write again if our remarks are insufficient.

S. S. Y.—Go to Hopkin and Williams', Cross Street, Hatton Garden, and mention the purpose for which you require them.

P. A. C. O.—1. Neither of those you mention is the best, although each is good value for the money. If you require the *very best*, you must go to one of the first opticians, and pay six or seven times the price. 2. None too large for properly including the whole of a quarter-plate negative; in some establishments where enlargements are made commercially, condensers of twice the diameter are used. 3. The lens you mention would be better only in the case of originals over three inches square, or thereabouts; assuming, of course, that both instruments are equally good of their kind.

CLARKE.—1. White paper cut up very fine is sometimes used, and another way is to sprinkle the varnished negative with a spray of indian ink, removing it where not required—this latter to represent the falling snow. To make the spray, charge a nail brush with indian ink, and draw the edge of a card sharply over the bristles. 2. Curve the top backwards, so that it catches the top light.

TADRUS HANNA.—1. We are glad that you were so successful. 2. Try reducing the intensity of the negative by means of the clearing solution described on page 664 of our last volume.

MANCHESTER.—We should prefer to make them by the carbon process, but it does not follow by any means that this is the best method for you to adopt, as much depends on the direction in which you have previously worked.

The Photographic News.

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SUPPLEMENT TO "THE PHOTOGRAPHIC NEWS," 16TH JANUARY, 1885.

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1377.—*January* 23, 1885.

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THE BYGONE IN PHOTOGRAPHY: THE PROPOSED HISTORICAL COLLECTION.

What is more characteristic of the present day than a neglect of the past, and giving one's whole strength to the contest with the hard-pressing and rapidly-moving realities of the time?

Half a century ago, when photography was born, things were not so; workers and thinkers had more leisure, and the past—not only in science, but also in literature—had a much larger proportion of attention.

That the past—even of the half century during which sun pictures have been a reality—is almost a sealed book to a very large proportion of photographic workers, is abundently evidenced by the frequency with which old devices, both in the way of apparatus and of processes, are re-introduced. Even the gelatine emulsion process itself, the method of working which has almost revolutionised the photography of the current decade, slept, unthought of and forgotten, for about a quarter of a century after the time when a few tried it, and ceased to use it.

Hence it is that we are especially gratified to learn that a collection illustrative of the gradual progress of the photographic art is to be made in connection with the Inventions Exhibition which will open at South Kensington in May next. The scheme originated, we understand, with Mr. H. Trueman Wood, the Secretary to the Society of Arts, and at his suggestion the Photographic Society of Great Britain was invited to make a collection of apparatus and specimens illustrative of the progress of photographic experiment and research.

To make the collection even approximately complete will involve no little work on the part of the sub-committee appointed to carry out the scheme, and the co-operation of those who possess specimens of interest, and apparatus of the bygone time.

To obtain and exhibit the faintly-outlined pictures on silver plates which were labelled "sun pictures," and found among the belongings of Messrs. Boulton and Watt, at Soho Works, would be of especial interest. These were, undoubtedly, made in the last century, and there is much reason to believe they are true camera pictures. It will also be remembered that Matthew Boulton produced commercially what he called "sun pictures" on paper, and many of these are still in existence. Probably an examination at the present time would set at rest the vexed question whether they are actual photographs or not. In this examination two points should be mainly considered: the distortion of the marginal lines, which would be almost a certainty; and the chemical nature of the image.

Many of the early specimens of work with the camera executed by Nicéphore Niepce still exist, and will no doubt be forthcoming; while there will be no difficulty in obtaining tolerably full illustrations of the mode of working the Daguerreotype process. Specimens of Talbot's early work should be shown, not only of his paper process, but of his intaglio engraving method—the first process by which satisfactory permanent prints in carbon were made. Again, an effort should be made to gather together a collection of the Pretsch blocks or plates; Pretsch being the first to make really good typographic blocks by purely photographic means. To obtain representative specimens illustrating the more recent photographic progress will be easy.

It is to be hoped that when the collection is once made, the objects exhibited will not be immediately dispersed, as the authorities of South Kensington will be prepared to retain charge of them either as gifts or loans. We hope that Captain Abney's scheme of establishing a permanent and thorougly representative museum will grow out of the matter now in hand.

Persons able to lend objects of interest should communicate with the Secretary of the Photographic Society of Great Britain, Mr. W. F. Donkin, at his residence, 97, Upper Tulse Hill, London, S.W.

THE INTERNATIONAL CONVENTION FOR THE PROTECTION OF INDUSTRIAL PROPERTY.

The scope and main objects of this organization, recently founded by the governments of the principal countries of Europe, in order to afford protection to patentees and owners of analogous properties, was fully detailed in our last volume, p. 434. Arrangements have now been made for the Convention to publish a monthly journal, and in pursuance of these arrangements, the International Office at Berne has issued the following notice:—

The International Office for the Protection of Industrial Property, established in Berne by the Convention concluded on the 20th of March, 1883, between Belgium, Brazil, Ecuador, France, Great Britain, Guatemala, Italy, Netherlands, Portugal, Salvador, Servia, Spain, Switzerland, and Tunis, will publish from the 1st of January, 1885, under the title of "La Propriété Industrielle," a monthly periodical in the French language, in order to centralise all kinds of information concerning the protection of patents, designs, or trade marks.

This periodical will contain—Articles discussing or explaining matters of general interest for the Union. The text of the above-mentioned Convention, of all documents relative to its execution, and of all laws and regulations, and International Conventions concerning the matters for which the Union has been founded. Official news relating to the protection of industrial property. Statistics of various kinds. Bibliography. Jurisprudence. Miscellanies.

Subscriptions for this periodical of five francs sixty centimes a year (including postage within the Postal Union) will be received by MM. Jent and Reinert, printers, Berne, Switzerland.

REDUCED COPIES OF MUSIC BY PHOTOGRAPHY.

We have several times referred to the possible advantage of having miniature waistcoat-pocket editions of vocal and instrumental music, and some years ago put the idea into practice. Recently our attention was drawn to the adaptation of the principle to violin music, the little photographic reductions being held by a small spring clipped to the instrument on the left-hand side near the neck, out of the way of the left hand and of the bow, and yet easily read.

An excellent method of working is to be found in the use of the old silver bath. A negative is taken a trifle under-exposed, fixed in cyanide, and the lines, if necessary, cleared by means of a weak iodine solution, followed by dilute cyanide. After well washing it is carefully flooded twice with distilled water, and treated by Eder and Toth's lead intensifier. First, in a solution containing—

Red prussiate of potash	6 parts
Nitrate of lead	4 „
Water	100 „

When quite whitened, and after again soaking in three or four changes of distilled water, it is ready to be immersed in a solution (1 to 4) of ammonium sulphide, which should produce a black opaque ground. With discoloured paper and indifferent printing it may be necessary to intensify a little with pyro and silver after fixing, to form a sufficient deposit upon which the lead can build up the requisite density. It is advisable to have a substratum of albumen, or the film may not stand so much washing.

Now, with the present condition of matters photographic, we are no doubt right in supposing that very few have a silver bath to utilize for any purpose, so we wish to indicate another method whereby a somewhat similar result may be obtained, the materials being within easy reach of all.

An inexpensive basis of operations is to be found in the commercial gelatino-bromide of silver paper, which lends itself admirably to this special purpose, if certain precautions are taken in its employment. Very often, all that is needed is a part of the music to be copied—as, for instance, the air and words out of a song—in which case it is easy to cut out those portions required from these paper negatives, to arrange them in due order on a piece of glass, and to print them at one operation. A little black varnish on the glass will cover the unavoidable breaks between the slips. Were it not that the ordinary sheets (10½ by 12½ in size) are not always covered fairly and evenly to the edges, we could get as many as fifteen little negatives out of one of them, each piece being 2½ by 3½ inches, a useful size for the pocket. It is safer, however, to be satisfied with nine pieces, and have plenty of margin to spare. We then proceed as follows. The sheet of music is secured to a board fixed up at right angles to the table, and a camera is placed at a suitable distance, to form an image of the size required.

If the ground glass in the camera is thin, it can be employed for focussing by turning it in the frame, so that the ground side is out. If this cannot be done, it is better to take two pieces of equally thin and clear glass of a suitable size, and, coating one of them with matt varnish, use it for focussing in the dark slide, with shutter drawn and back open, the matt side being outwards. The other piece is to form a support for the paper, the exposure being made through it, while a piece of cardboard or glass, to receive the pressure of the spring, secures all in place.

If the exposure is made by daylight—in a studio, for instance—it is well to have a sheet of white paper placed flat on the table in front of the music, when, in a good winter light, with an aperture of $\frac{f}{14}$, three seconds should suffice. We have sometimes preferred to work by artificial light, as rendering the process more certain and under control, and place two little screens of cardboard or tinplate about twelve inches in front of the object, just out of the way of rays entering the lens, and raised six inches from the table. If three inches of thin magnesium ribbon are burnt behind these screens, sufficient light is obtained to give a vigorous image, and the exposure can be regulated by altering the length of the pieces burned. There must not be the least over-exposure, so as to cover the fine lines of notes or words; and the development must be effected very slowly. Any form of the ferrous oxalate developer will answer, but it must not be too strong, and no hypo solution must be used with it.

The exceedingly thin coating of silver bromide that is formed on the paper makes it impossible to produce the same black opacity so readily obtained on a wet plate, and therefore one must have recourse to a non-actinic colour as the ground of the negatives. A suitable reagent will be found in Schlippe's salt, a solution of which is prepared—40 grains to the ounce of water, with fifteen drops of ammonia added. After bleaching the film with mercuric chloride, and washing away all traces of the mercury, the negative is rapidly plunged into the above mixture, which instantly changes it into a reddish brown, a colour sufficiently non-actinic for ordinary purpose.

The general yellow stain imparted by the last process would quite spoil the printing quality of the negative were it not removed; but this is easily done by soaking for a minute or two in a weak solution of chloride of lime, one drachm of a saturated solution and two ounces of water. This it is better to do after drying, and the colour should be watched in daylight, removing the paper the instant that it is sufficiently white. The application of a little cotton wool with gentle friction over the face of the negative helps to remove any free sulphide that would otherwise stain the albumenized paper during printing. We prefer coating it with a little plain collodion as a precaution against the staining, either of it or of the sensitized albumen.

There is no need to wax or oil such negatives, but they should be well rolled, and considerable pressure is required in the printing frame to obtain sharp prints.

There is some advantage in employing cyanotype for printing such subjects, as by its means we have often printed on both sides of a stout paper, and thus easily produced a miniature book without any mounting. As soon as one side is sensitized and dry, the other is also done.

In making the cyanotype paper we prefer to use two separate solutions which will keep; the first of potassium ferricyanide, dissolved in one part to three of water, the other of ferric ammonio-citrate, dissolved in two parts of water. These two can be mixed as desired, but equal parts of each answer the purpose very well. The paper is sensitized by floating, and fixation is effected by mere soaking in water.

Such diminutive music can, as we have pointed out, be produced by a photo-typographic or photo-lithographic process; but our present suggestions only cover those cases in which but a few copies of a subject are required.

By-the-Bye.

RAPID PRINTING.

Go where one will in photographic circles, printing by development is now the subject of talk, and the general consensus of opinion tends to the view that the methods of printing by development which have been so much discussed lately are likely to revolutionise the commercial production of silver prints, as completely as the gelatino-bromide process has brought about a new order of things as regards the making of the negative.

One must not, however, depend too much upon the prevailing notion that albumenised paper has received its death blow because the photographic world has just experienced a revolution which it would have been rash to predict half a decade ago, and this makes it ready to believe in the near advent of another change.

Is it necessary to mention the numerous occasions upon which the doom of albumenized paper has been sounded, as photographic herald after photographic herald has loudly trumpeted forth the merits of process after process. But let us confine our musings to the subject now so prominently before our readers—the making of prints on the new gelatino brom-chloride paper. Not that it is our intention to give in this column the formula for suitable emulsion, directions for coating the paper, or details as to development, as all this information will be found in Mr. T. B. B. Wellington's comprehensive paper of last week (see p. 36), or in other articles which have recently appeared; but it is rather our purpose to look at the question from such a point of view as the business man is likely to take.

If the new printing method is to become a reality for every-day work, certain conditions must be more or less completely satisfied, and if in the case of either one or two of these conditions the balance go against the new paper, there must be very considerable margin of advantage as far as the other points are concerned.

1. The new paper should be obtainable in commerce at a rate not higher than the price of ready-sensitized paper.

2. It must not only be practicable to produce the tone approved of, but it must be possible to do this without any uncertainty, and in the case of negatives varying to some considerable extent in quality and density.

3. The working expenses—that is to say, the salaries of the assistants—must not be considerably more than when ordinary albumenized prints are turned out.

4. The results must be fully equal in appearance to albumen prints, and the mounting must be so done as not to involve any serious difficulty or expense.

It is not easy at present to estimate how far the first condition will be fulfilled, although, if one may judge by present prices and processes, it may be conjectured that the cost of the new paper will settle down to a trifle over the cost of sensitive albumenised paper; still, it is necessary to be guarded in arriving at any conclusion, as improved methods of working are likely to lead to a considerable saving in the expense of manufacture, and it may be that in time the paper can be made with less silver in the film than now.

The second condition on our list is one which can undoubtedly be satisfied to a very great extent, and perhaps altogether; but as the tone is largely dependent upon not only the proper determination of the exposure, but also on the correct adaptation of the development to the exposure, it is reasonable to expect that greater care and watchfulness will be required on the part of the printer, than when ordinary albumen prints are made.

This brings us to an important point—the salary of the printer; and experience alone can show whether it will be possible to educate up the present race of printers to the new work without increasing their pay; indeed, it may be assumed that quite as much skill and judgment is required in working the development method of printing, as in the mere taking of a negative; and to obtain constantly uniform tones may perhaps demand even more skill than that of an average negative operator.

This much is certain: a mere beginner in photography could not be entrusted to take charge of the new printing process; and an employer might safely reckon on losing something considerable in waste during the instruction of a new worker.

As to the mounting and ultimate finishing of the prints, there does not appear to be any difficulty worth mentioning, as simple hard rolling will bring up a good surface upon the emulsion prints. Warnerke's proposal to squeegee down on thin plates of polished ebonite appears to be an excellent one, while if the prints are gummed on the back while adherent to the ebonite, and the gum is allowed to dry with the picture, the mounting becomes a very easy matter indeed. It is merely necessary to trim the dry and gummed print; then, after having slightly moistened the mount by means of a sponge, to place the print in position and pass through a rolling press.

As one of the older predictions regarding the future of printing by development, the reader may refer to an article contributed by Mr. W. B. Woodbury to the Year-Book for 1865, p. 61, where he will find the importance of using chloride insisted upon. Mr. Woodbury says: "The chloride gives the paper an agreeable tone not to be obtained by the other salts alone."

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LENSES FOR PORTRAITURE.

BY W. K. BURTON.

In a recent editorial article in the Photographic News, which treated of the subject of lenses for portraiture, it was stated that, apertures and focal lengths being equal, the rapidity of a rapid landscape lens would be as great as that of a portrait lens.

Mr. W. H. Wheeler points out in your last issue that although this may be true for the centre of the plate, it is not true for the edges; at any rate, when the landscape lens is used full aperture, the reason being that, in the case of the landscape lens used full aperture, the oblique pencils of light are reduced in intensity by being partly cut off by the mount of the lens, whereas, in the case of the portrait combination—used with the same angular aperture as the landscape lens—the oblique pencils do not impinge on the lens mount at all.

Mr. Wheeler is undoubtedly correct in his argument on this point. The only question to me seems to be whether, by the cause he mentions, any *perceptible* difference in the rapidity of the two lenses would exist.

In the first place, in justice to Mr. W. E. Debenham, let me state that, at the meeting of the London and Provincial Photographic Society to which Mr. Wheeler refers, he (Mr. Debenham) mentioned the very same circumstance that Mr. Wheeler does, as a possible explanation of the fact that a portrait lens may require a less exposure than a rapid landscape lens used with the same angular aperture.

Whilst admitting, as explained by Mr. Wheeler, that with a rapid landscape lens the edges of a plate must receive less exposure than with a portrait lens used with the same angular aperture, I much doubt if the difference from this cause will make the one lens perceptibly more rapid in practical work than the other. I do not wish to be dogmatic on this point; but give the following reasons for the opinion which I hold.

First.—The angle included in portraiture is generally—ought always to be—but a limited one, and the cutting down of the oblique pencils could come into play only to a very small extent, even were the landscape lens used with the full aperture of the lenses, which is very rarely the case, on account of the fixed stop.

Second.—In the case of a portrait negative, we do not judge of the exposure so much by the appearance of the ends and corners as by the portions near the centre.

At Mr. Debenham's lecture already referred to, I pointed out a well-known cause which might make a portrait lens somewhat more rapid than a landscape lens used with the same angular aperture. This is, that in the case of the portrait lens, the pencils of light are more condensed by the front combination by the time they reach the diaphragm than in the case of the landscape lens. The difference through this cause is, however, very slight, and is, moreover, almost entirely counteracted by the loss of light in the portrait combination, through the two extra reflecting surfaces of the lenses.

On considering the matter, it appears to me that there is a possible cause for the greater rapidity of the portrait lens which has as yet been overlooked. I put it forward as a suggestion only, but I think it is one somewhat worthy of consideration. Mr. Wheeler's remarks on "flare spot" suggested the idea to me.

Whilst mentioning "flare spot," it is, perhaps, worth while to say a word or two upon that subject.

When we enquire what is the cause of flare, we are always told that "flare spot" is an image of the aperture of the diaphragm thrown on the plate by the back lens. At any rate, this is the explanation which I always met with, and on expressing incredulity, I was referred to the demonstration of the matter given by the late Mr. Dallmeyer. The natural interpretation of the words which I have just given is that the back lens—acting as an objective by refraction—produces an image of the lens stop on the plate. This is an idea so absurd that I could not believe that it had emanated from so eminent an optician as Mr. Dallmeyer; and sure enough, on looking up the paper which that gentleman read before the Society of Great Britain in 1876, I found the explanation of the phenomenon to be very different from that generally given now-a-days.

Mr. Dallmeyer shows that the flare spot is due to *reflection* from the back surface of the back combination on to the front surface of the same combination, and hence on to the sensitive plate.

The easiest way in which to conceive of this double reflection is to suppose the back combination to be a plano-convex lens with the flat side towards the diaphragm. We can now readily understand that the back curved surface of the back combination will act as a concave mirror in regard to such rays as are reflected from it; that a portion of these rays will be again reflected from the flat front surface of the back lens as from a plane mirror, and will form an image of the diaphragm, which may be in the same plane as the sensitive plate.

Whether the plane of the image of the diaphragm coincides with that of the sensitive plate, and thus forms a definite "flare spot," or is in a different plane, so that no definite spot is produced on the plate, the amount of reflected light thrown from the back combination into the camera is the same. At first sight it might appear that the amount of the light would be proportional to the size of the back lens. A little consideration will, however, show that the amount of reflected light is a function of the angle subtended by the back lens to the centre of the stop, increasing as the angle increases. When, as in the Petzval portrait lens, the back combination is formed of two uncemented lenses, there is double as much reflection as when it is a cemented combination.

The front combination, although it cannot cause a definite flare, reflects into the camera practically the same amount of light as the lens of the back combination.

Now, if we consider this matter of reflection, we will see that the portrait lens—not on account of its size, but on account of its large number of reflecting surfaces—throws a larger amount of reflected light into the camera than a rapid landscape lens does, and this especially if we recollect that each surface not only reflects, but re-reflects and re-reflects again indefinitely.

Besides this, it is certain that each surface of a lens, as well as refracting light to form the image, causes a certain amount of diffusion of light. The amount of this diffused light—angular apertures being equal—will be proportional to the number of the surfaces of the lenses, and will be a function of the angle subtended by the lenses to the centre of the diaphragm. It will thus probably be greater in the case of a portrait lens than in the case of a rapid landscape lens.

Besides all this, we have yet another cause of diffused light in the camera. This is the reflection of the image on the sensitive plate by the lens. With equal angular apertures, the amount of reflection of this kind from the front combination of a portrait lens and of a rapid landscape lens may be taken as identical. From the back combination, however, there will be enormously more reflection in the case of the portrait lens than in that of the landscape; the amount being proportional to the number of reflecting surfaces, and also to the area of the lenses.

Taking all these considerations together, we will see that the portrait lens, when throwing on the sensitive plate the same amount of light *to form the image* as a rapid landscape lens, throws into the camera a vastly greater amount of diffused light. It is this diffused light, I believe, which may enable the portrait lens, at times, to be worked with a shorter exposure than would suit for a rapid landscape lens with the same US stop.

It was well-known in wet plate days that a pre-exposure of the sensitive film to a certain small amount of light would enable the exposure in the camera to be curtailed. The same effect was of course produced if a small amount of diffused light were allowed into the camera whilst the exposure was proceeding. Gelatine plates, although by no means so amenable to pre-exposure as a means of increasing sensitiveness, yet are to a small extent with *certain subjects.* The effects of the diffused light, which, as I have explained, the portrait lens throws into the camera, is exactly the same as would be a certain amount of pre-exposure: that is to say, will in certain cases enable the exposure to be curtailed.

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POSITIVES ON GELATINO-CHLORIDE OF SILVER.

(First Article.)

BY W. M. ASHMAN AND R. OFFORD.

The truly wonderful progress made in photography during the last quarter of a century cannot fail to impress itself upon the mind of the observer; and, indeed, how vast is the field of experimental research still open for all those who choose to labour!

Early workers like Hunt, Herschell, Davey, Ponton, Read, [illegible]ollock, &c., in their numerous discoveries, include so much of those fundamental principles upon which the practice of the photography of to-day is based, that it is now by no means easy to introduce any new principle which is not more or less founded upon a previously published invention or process. This fact, however, should not in any way deter scientists from energetically prosecuting their further study. Insignificant trifles, as they may appear to be at first sight, oftentimes turn out to be the nucleus of valuable improvements, and it is therefore well that in all matters of experiment each step should be clearly and definitely noted, and the conditions thoroughly understood. Illustrative of the wisdom of this plan of action, we may refer to the reading of a paper by Professor Roscoe, before a meeting of the British Association at Bath, in 1864. In the conversation that followed, the late Mr. George Wharton Simpson said he was not prepared to accept the Professor's theory, viz., "That the action of light on chloride of silver paper was a reliable means of obtaining photometric measurements;" and so impressed was he with this idea, that he instituted a number of experiments to prove the correctness of his objection. Out of these was formulated the first collodio-chloride positive printing process, which was published in the form of a paper read before the London Photographic Society in the following March.

For the purposes of our present articles, it will be convenient to refer to portions of this communication. Mr. Simpson's mode of procedure was as follows:—(Photographic News, 1865, p. 122). Sixteen grains of nitrate of silver is dissolved by trituration in a mortar, in one ounce of methylated alcohol, and to each fluid ounce of alcoholic silver solution thus obtained, there is added one fluid ounce of methylated ether, and from six to twelve grains of a cotton which is not of a horny character.

Sixteen grains of dry calcium, or sodium chloride, is dissolved in another ounce of alcohol, and forty-five minims of this solution added by slow degrees, and with frequent agitation, to each ounce of collodion containing the silver nitrate. Double decomposition at once takes place, leaving an emulsion with an excess of nearly three grains of nitrate of silver per ounce of collodion. This mixture was said to keep indefinitely. It was soon found that the admixture of certain suitable organic substances very much improved the brilliancy and vigour of the prints—castor oil, sugar, glycerine, various gums, and syrups being useful—and arrowroot sizing or gelatine as a substratum spread upon the paper. Rive, Saxe, or any smooth white paper was coated by laying it down on a glass plate, and pouring the collodion over in the usual way: when dry, the paper was fumed and ready for printing. Toning took place either before or after fixing, and washing occupied very little time.

Mr. J. S. Tunny, soon after this, read a paper before the Photographic Society of Scotland, in which he showed that a chlorized collodion film, sensitized in a dipping bath of silver nitrate, with a considerable quantity of citric acid added, was capable of giving exceedingly vigorous diapositives on glass. Mr. J. W. Swan, of Newcastle-on-Tyne, found the formulæ given by Mr. Simpson for prints could also be made suitable for making diapositives on glass by the addition of a small proportion of citric acid to the collodion.

Thus the first step was gained by suspending silver chloride in collodion with an excess of silver, and spreading the same upon paper. Then certain organic substances were added thereto, and effected a marked improvement in the printing; whilst for transparencies a large proportion of citric acid was found to be a necessity, in order to obtain the requisite vigour. The application of this process to printing on opal produced those charming pictures so universally admired many years ago. The recent substitution of gelatine instead of collodion, as a vehicle in which to suspend the more highly sensitive haloid salts of silver, naturally leads to the consideration of its employment in the form suggested by our title.

Gelatine as an organic substance increases the action of light upon a sensitive silver salt, and therein lies the principal difference between the processes of the past, and that we are about to describe, producing, as it does, some of the most fascinating pictures to be met with in photography. It has been shown, at page 161 of the last volume, how easily these results may be obtained, and a formula is there given specially suited to opal work, to which is added a description of a frame that removes all difficulty as regards printing (an illustration will be found on page 210). We propose giving other formulæ adapted to various kinds of work, including opals from hard or soft negatives, transparencies suited for lantern work or for enlarging; and in our next we shall deal with their preparation.

SUGGESTIONS FOR DEVELOPING INSTANTANEOUSLY OR UNDER-EXPOSED PLATES.

BY E. HOWARD FARMER.

It is usually considered an axiom in development that the soluble bromide or restrainer should be increased in cases of over-exposure. I would suggest that it be also largely increased in cases of under-exposure, and similarly, therefore, in all cases when employing plates at their maximum sensitiveness. Concurrently with this the ammonia and pyro should be increased, producing a developer very strong in all three constituents.

It is probable a fixed alkali will be found preferable to ammonia for very energetic development; employing such, negatives have been obtained full of detail, with about one-fifth the exposure required by ordinary formulæ.

The same remarks respecting bromide apply to oxalate development; it is usual to add a minute quantity of hypo in cases of the minimum or under-exposure being given; such addition is rendered far more effective if at the same time the restraining bromide be increased.

WINTER PHOTOGRAPHY: AN AMATEUR'S EXPERIENCE.

BY ALFRED M. SHARP.

WE had a heavy fall of snow on Monday and Tuesday, followed by sharp frost on Tuesday night. On Wednesday the sky was comparatively cloudless, and the sun shone out brilliantly. I have long had a desire to take some winter views. Now was my golden opportunity. Accordingly, hurriedly getting together my camera, slides, &c., I made a start, aiming, in the first instance, for the church. A rustic-looking water-cart, with wheels heavily covered with snow, in the field adjoining the church-yard, looked the very thing to relieve the foreground. I therefore availed myself of the opportunity. I had taken with me four of Warnerke's half-plates—20 on the sensitometer. For this view I took plate No. 1, and using stop $\frac{f}{11}$, I gave an exposure of one second with one of Ross' rapid symmetrical lenses. This exposure was a complete guess, as I have had no experience in winter photography. I then went to a place where the high road is considerably lower than the land on each side of it, and on each side are heavy trees. In summer this is very much shaded, and requires considerably longer exposure than ordinary landscape. It was all well covered with snow. I used plate No. 2, stop $\frac{f}{64}$, and gave an exposure of one minute.

Ascending the hill, I took in the open, and in sunlight, two other views, with waggon and pair of horses and foreground, with stop $\frac{f}{11}$. I gave plate No. 3 an exposure of one second, and with plate No. 4 I gave an exposure of two seconds, by way of experiment, on same subject. On my return home I proceeded to develop the plates, commencing with plate No. 3. To my horror, I found it so much over-exposed as not to be worth putting into the fixing bath. This being spoilt, I knew that the others would be spoilt also. Suddenly remembering an article in the YEAR-BOOK for 1884, by Mr. Seymour Conway, who had, when in Switzerland, suffered a similar disappointment, I at once looked up the book, and found that he had steeped his plates in bromide water. Accordingly, I put 6 grains of bromide of potassium into two ounces of water, and steeped plate No. 1 in the mixture for a minute or two. On developing with the normal developer, to my great delight I got a very good negative. Plate No. 4 I knew was hopelessly over-exposed; but, by way of experiment, I thought I would try it. I first put it into a mixture of water 2 ounces, bromide 10 grains. I then considerably increased the bromide and the developer, and got a very much better picture than I had anticipated.

I write this, thinking it may, perhaps, assist some amateur who wishes to get a few winter views, and who has no notion of the exposure necessary. In *full* sunlight, and snow on the ground, I found with stop $\frac{f}{8}$, and with plates 20 on the sensitometer,. I could get drop-shutter pictures—so much difference does the snow make in exposure.

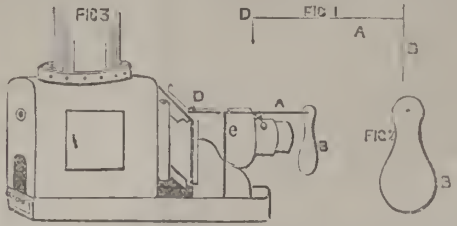
I use the potash and sulphite of soda developer, and prefer it to the old ammonia formula.

A SIMPLE DEVICE FOR ECLIPSING THE LIGHT WHEN CHANGING LANTERN SLIDES.

BY A. T. S. BERRINGTON.

Now that a good deal of interest is taken in lantern work, and several devices for changing slides whilst the light is shut off from the screen have excited attention, I think you may like to have a description of a very simple arrangement which I use and find most effective. The materials are stout wire and a piece of tin plate or cardboard, used in conjunction with the ordinary "push-through" carrier.

The drawings will, I hope, make it clear. D A (fig. 1) is a piece of brass wire bent at D, to the other end of which is fixed the "dissolver," B, shown also at fig. 2; when the dissolver is hanging freely, it is at one side of the lens, and does not obstruct the light. The bent end, D, drops through a hole cut in the top of the carrier (fig. 3), and hangs down inside the carrier about an inch. It is held in position by a staple fixed in the woodwork on the top of the carrier, and the woodwork is so cut as to allow the short arm or bend at D to work in the direction in which the slide is pushed (away from the observer). As the slide is pushed in from the side shown in the sketch, it pushes before it and lifts the bent end of the wire which hangs down in the carrier; this being short, causes the "dissolver" B to rise immediately, and cover the lens, thus cutting off the light before any part of the slide is in the field. The slide is pushed into place as usual, and at the moment when it reaches its proper position, it has also been pushed past the end of the bent wire, which, dissolver and all, drops by its own weight to its normal position, leaving lens uncovered and the image on the screen. The wire is supported at c by another piece of brass wire turned up into a loop, and soldered to the frame of the lantern. Fig. 3 shows this arrangement in position.



The action takes place without hitch as fast as one can push the slides through, and sixpence with half-an-hour's work about represent the cost.

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NOTES FROM NEW YORK.

Brief Resume of Photography in America for 1881—The Incandescent Platinum Lamp—Photographic Literature.

With the close of the year 1881, a *resumé* of what has been done in America for the course of photography is appropriate. In photographic apparatus and requisites some advances have been made. Several cameras, constructed with special reference to convenience in making instantaneous exposures, have been invented, those of Mr. Walter Clark and Mr. C. R. Smith being particularly noticeable.

A very successful improved detective camera, manufactured by Messrs. Anthony and Company, has met with large sale and favour. Dainty double plate-holders, which accompany it, are provided for, with a novel form of spring for ejecting the plates.

The Rochester Optical Company, of Rochester, New York, have been noteworthy in putting upon the market a remarkably light and well-made camera for amateur use, at a moderate price, which has proved very popular for those wishing to undertake photography at a small expense. The Blair Tourograph Company, of Boston, Mass., have also introduced several novelties in the shape of camera extensions and plate holders.

Messrs. Walmsley and Company, of Philadelphia, Pa., during the past year, have been quite energetic in introducing apparatus, especially of foreign manufacture, for the benefit of amateurs.

The Scovill Manufacturing Company, of New York, have equipped a new camera factory with sufficient fine machinery to turn out camera boxes by the thousand. They have introduced the plate-holder slide, having a roughened, slaty surface for marking the time of exposure thereon. I am informed by amateurs who have used this slide, that it is objectionable, because of its liability to catch on the shutter-flap in the holder, and thereby to move or push the camera out of position.

Two cameras, constructed after designs by Mr. Geo. H. Riply, especially adapted for long or short focus, have been constructed by the Scovill Company.

Nothing specially noteworthy has been done in utensils, unless it is the ebonite, or hard, smooth rubber tray, having two low raised ridges in the bottom to permit the easy raising of the plate.

An invention of S.B. Pratt, of Boston, for a developing tray with a glass bottom and adjustable feet, has been patented, but not introduced.

Mr. C. A. Needham has patented a few devices connected with developing trays and manipulations; they have not yet been placed on sale.

In photo-chemistry, no marked discoveries have been made.

The demand for extremely rapid plates has become so important that the backing manufacturers vie with each other to see who can introduce the most sensitive plate. With the rage for fast plates comes the necessity of devising rapid shutters for making short enough exposures, and it is needless to say there are almost as many forms of shutters as there are different makers of plates. The gravity drop, for ordinary work, is largely used; next comes the Prasch shutter, worked by a coiled spring. In use its main objection has been the liability of the coiled spring to break at a critical moment. The rotary shutter, used in the detective camera, has been popular and very serviceable. The speed is easily regulated, and the power is imparted by a plain, flat, steel spring, not liable to break. Perhaps the neatest and most novel shutter which has been introduced, is the Hoover shutter, which attracted attention at the Cincinnati Convention. The working mechanism, incased in a neat vulcanite box, is inserted permanently in the lens tube, midway between the front and rear lenses, the tube being cut in two. Two slides of light vulcanite are operated inside the case by a flat spring, with remarkable speed and certainty, and by the simple movement of a lever the exposure can be made with any sized diaphragm. The shutters furnish the diaphragms. The ready convenience it affords for changing from a large to a small diaphragm, including the advantage of making either an instantaneous or slow exposure, and its freedom from jar and dust, make it well adapted for general use. I have seen excellent specimens of work made with it.

Mr. Gableman, whose name is well-known from his instantaneous views around New York, I am informed, employs a horizontal shutter—two slides arranged at the back of the lens moving past each other It has no specially novel features. A shutter recently shown at the December special meeting of our New York Amateur Society, invented by Mr. H. W. Kelly, of Fall River, Mass., was quite novel in its idea. It was located in the camera just behind the lens, and consisted of a hinged metal disc—the hinged portion being at the bottom of the camera—which covered the rear of the lens. In line with the hinged portion was arranged at one side an S-shaped cam half an inch long, which was revolved by the hand by means of a thumb-piece on the outside of the camera. Two small coiled wire springs manipulated the shutter in a way similar to the spring hinges sold at hardware stores. One spring was twice as heavy as the other, the lighter spring always keeping the shutter closed. The novelty consisted in the catching of the free projecting end of the heavy spring in the hook portion of the S cam, as it was revolved by the fingers from the outside, and in forcing the end down until it slid under a projection soldered to the rear face of the shutter. The S continuing to revolve, released the heavy spring, which, in flying up, rapidly opened the shutter inward towards the ground glass, and slipping by the projection, which was slightly bevelled, permitted the light spring to immediately close the shutter. Its principle of action consisted in two springs, one working against the other.

Concerning developers for dry plates, some progress has been made. I believe it is generally conceded that the pyro developer is fast supplanting the oxalate for all ordinary work. The tendency has been to simplify the operation of development as much as possible. Perhaps the developer which has found the most favour is carbonate of soda and sulphite of soda in equal parts, dissolved in any suitable quantity of water in combination with either dry pyro or pyro preserved with sulphuric, citric, oxalic, or sulphurous acid.

A developer introduced by Hoover—known as Hoover's potash developer—has been largely used, and is recommended for drop-shutter exposure. This has been modified by Mr. Newton and Mr. Beach. Mr. Newton's ferricyanide of potash (yellow prussiate potash), carbonate of potash, carbonate of soda, and sulphite combination, has proved quite satisfactory in some hands. The potash developer devised by Mr. Beach has been tried very largely by a number of amateurs and professionals, and has met with uniform success. On some plates the tendency to frill, when a large amount of potash is used, has been noticed, but this would be likely to happen with any alkaline developer. The developer has been so successful for beginners that I am informed one dealer in photographic goods here makes and keeps large quantities on sale.

Mr. David Cooper has recently introduced the idea of soaking a plate in a separate carbonate of soda solution for a minute or two, then washing and developing in the usual way with pyro and carbonate and sulphite of soda. Some recent experiments he has made prove very conclusively that this plan is quite useful for bringing out details when a plate has had a drop-shutter exposure.

The ammonia developer is very little used, the extremes of our climate (93° above zero in summer, and sometimes 20° below zero in winter) making it difficult to keep an ammonia solution of uniform strength.

A clearing solution known as "Robinson's clearing solution," made in Chicago, I am told, produces rapid and wonderful effects on a negative which is at all a slow printer. Two solutions are sold; the dark one is of no consequence, but the clear one is said to do the work, and is thought to be composed of nitric acid and alum. It is used over and over, and possesses the quality of clearing a negative to such an extent that two silver prints can be made in the same time that one could, prior to its application.

The sulphite soda intensifying solution has met with much favour, that devised by Scolik, of Vienna, being regarded as the best.

Mr. T. C. Roche has made some improvements in gelatino-bromide paper, combining albumen with the gelatine in such a way as to produce clear brilliant prints. In this connection perhaps the improvements got up by the Eastman Dry Plate Company may play an important part in the future. Their plan of coating paper on a large scale for negative work with a bromide gelatine emulsion will, if successful, prove of great advantage to amateur photographers.

We have lost by death one able worker and friend, Mr. H. T. Anthony, who had grown up with the advance of photography.

The current literature of photography has not been neglected; there has been started *Photography*, of Chicago, which expired at the end of six numbers, and *The Photographic Eye*, the first general photo weekly paper of the U. S. The latter seems to have been the means of apparently infusing new life into our staid journals, *The Photographic Times*, and *Anthony's Bulletin*, since the former is now issued weekly, and the latter is to be issued semi-monthly, under the guidance of Professor Chandler, of Columbia College. A new journal, published quarterly by Mr. H. D. Garrison, of Chicago, entitled, *The Practical Photographer*, has made its appearance. Judging from its compact and readable shape, and its low price, it will doubtless receive a due share of patronage. It is a gratifying sign that current photographic literature is to be so largely advanced, and with the ability employed and the capital invested, photography generally must be promoted.

On December 23rd, the platinum gauze incandescent lamp was very successfully employed in enlarging upon gelatino paper, at a meeting of the New York Society of Amateurs.

The establishment of a flourishing and leading Amateur Society in New York, for the real advancement of photography among those who practise it, has been one of the events of the past year that should be mentioned. Let the good work go on. The New York Amateur.

New York, January 5th, 1885.

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JUDGE LYNCH'S COURT AT CHICAGO.

In the *Photographic Times* we read of an amusing case in which the Chicago photographers constituted themselves into a Court to deal with one of their fraternity who competed with them too severely.

The meeting of the Chicago Photographers was held on Friday evening, December 19th, at the studio of Mr. Melander, 208, Ohio Street, in answer to a special call to take action against Mr. Felt. The charge against him was that he had hung out a sign offering to give a coloured panel worth two dollars as a premium to any one who ordered a dozen cabinets of him.

The meeting was called to order by Mr. Joshua Smith, who stated its object at some length.

The culprit said he thought there was some misconception as to what he had done, as to his position in regard to lowering prices. He only had the sign put up temporarily, and intended to take it down the first of the year.

Mr. Aubert said Mr. Felt ought to lend a helping hand toward keeping up prices, instead of doing anything to reduce them.

Mr. Oren suggested the sign should be taken down for the additional reason that Mr. Felt would feel himself obliged to continue it after the holidays. The gentleman had a fine place and business, and ought to help keep prices up.

The culprit said he wanted to see prices kept up.

Mr. La Tour offered a bit of personal experience. He had been compelled to lower his prices to three dollars, because his esteemed fellow-craft, Mr. Oren, had reduced his terms to three dollars.

Mr. Melander announced himself as an advocate for the highest prices that could be obtained. He was surprised to see so many come down in their terms. Mr. Felt owed something to the members of the Society, even though he probably, like all others, was affected by the general depression throughout the country.

The culprit remarked that all photographers could not get the same prices for their work. He could not not get five dollars for cabinets. There must be a difference in prices by different men.

Mr. Melander was of the same opinion. But it was not the intention of the Society to dictate to each one what he should charge. The large handsome galleries were most to blame for initiating a reduction. If Mr. Felt offered a panel, the result would soon be that cabinets would be one dollar a dozen.

The culprit remarked that his coloured panel was worth two dollars.

The Chairman thought it was degrading to have such a sign out. It would soon be necessary to offer an 8 by 10 photograph, with no increase of business. He spoke from experience in offering panels, for he had experienced much trouble about it. As a stimulant to their courage he wished to read a price list of Mr. Carlisle, of Providence, R. I., who charged eight dollars for cabinets.

Mr. Melander remarked that each one had a right to charge what he pleased, and it was not intended to dictate. But, he added, it was hardly right in Mr. Felt to do what he had done.

After some further discussion, a committee was appointed to take down the sign. They proceeded immediately to the performance of their duty, and after the culprit had warned his wife not to be alarmed at any unusual sounds down stairs, the obnoxious sign was hauled down and soon reduced to an unsightly mass of kindling wood and rags. The affair was taken in the most good-natured way, though it might have easily resulted in much bad feeling, but for Mr. Felt's forbearance.

Notes.

The extent to which photography may be applied to the making of Christmas and New-Year Cards was remarked upon in our Notes some two months ago; and as a result we received abundant proof that this use of sun pictures has been far more widely recognized than carried into commercial practice.

Valentines made up with a photograph as the leading feature may be seen now and again; although just at present, complex and pad-like accumulations of paper filigree-work appear to be far more purchased by those who commemorate, in the eccentric fashion of our time, the day of Rome's third-century priest and martyr. Assuming that the main object of valentine-senders is to recall each other's existence, and at the same time to touch a sympathetic chord, could not photography be well pressed into service?

A miniature album, containing views of places calculated to recall memories of the sender, might form the photographic valentine; or, instead of these, the album might contain illustrations from books read by both, portraits of jointly-admired statesmen, musicians, or authors. Indeed, the number of instances in which the photograph might be used to recall old sympathies is legion.

A word or two as to the album—to use the word in its widest significance. It may be a lithographed card, with outlined spaces upon which appropriate photographs can be mounted—a series of cards hinged together after the fashion of the collections sold at watering places—or an ordinary book album; while a dozen d'oyleys imprinted with the selected photographs would form in themselves an excellent and conversation-producing album, to say nothing of the practicability of sending a dozen or so of dessert plates bearing the pictures executed in enamel.

The exceptionally ingenious lift and return shutter described on page 176 of the Year-Book is, it appears, the invention of M. Boumans, a talented amateur photographer; M. Jonniaux, whose name we associated with it, being the manufacturer.

As a means of giving a bright and smooth surface to emulsion prints on paper, Mr. Warnerke's suggestion to squeegee down on ebonite plates is a good one; but we have found something which, to our mind, is better and more convenient. It is a smooth kind of American cloth which is commonly used for covering tables; some kinds of mackintosh cloth also answer very well, but the surface obtained is not so bright as when the smooth American leather cloth is used.

White mackintosh also makes an admirable flexible temporary support for carbon printing; it should be waxed with one of the usual waxing solutions.

Next week we hope to publish an article on winter work with the tricycle, from the pen of Mr. Henry Sturney, the well-known 'cyclist. Few pastimes accord so well as photography and wheeling.

The extent to which over-exposure may be remedied in the case of a gelatino-bromide plate is so great, that one might well adopt the old dictum, that it is impossible to over-expose a dry plate. Still, it is necessary to have some idea as to the extent of the over-exposure. Some of the finest of Baron de Koussoff's interiors of the Czar's Palace at Moscow were about ten-fold over-exposed, but immersion for a few seconds in a ten per cent. solution of potassium bromide proved a remedy. The plates were immersed in the bromide before development, and the adherent solution was not rinsed off.

The great value of preliminary treatment with bromide in case of over-exposure is also illustrated by the remarks of Mr. Alfred M. Sharp, which will be found on page 53. Many plates which would in the ordinary case of events be spoiled, can be made to yield good negatives if treated as Mr. Sharp suggests.

Whitehall's sensitizer is a liquid sold in Paris, and it is said by the vendors that the exposure required by a gelatino-bromide plate is reduced to one-third if it is allowed to remain for half a minute in the sensitizer before it is developed.

Dr. Vogel has examined the liquid, and finds that it contains a trace of iron, smells of thymol, and, with a nitrate of silver solution, it gives the reactions of the hyposulphites.

One part of hyposulphite of soda dissolved in about a thousand parts of distilled water (let us say eight or ten grains to a pint) possess all the good qualities of Whitehall's sensitizer, and, considering that this latter is sold at a price of something over ten shillings a quart, economy is on the side of the simple solution of "hypo."

As a matter of fact, Vogel finds that neither Whitehall's fluid, nor the simple solution of hyposulphite, does really reduce the time of exposure required to one-third, nor even to one-half, but plates treated with the solution develop very rapidly, and there appears to be a decided gain; still the shadows tend towards fog, and partial reversal of the image sometimes occurs.

Gelatine and sunlight are essentials in the methods of detecting bacteria and other organisms in potable water adopted by Brantlecht.

With certain precautions, some of the suspected water is made up into a jelly with sterilized gelatine, and spread on a glass plate which is divided into minute squares of known area. In the course of forty or sixty hours each bacterium founds a colony, and these can be counted under the microscope. One cubic centimeter of carefully distilled water only gave four colonies, while a similar quantity of water taken from a well in Berlin gave twelve thousand colonies. A cubic centimeter of unfiltered sewage founded no less than thirty-eight million bacterial colonies in the test slab of jelly.

Now as to the examination by sunlight. It appears that if a sunbeam is allowed to pass through a glass filled with water, and protected from side-light by means of a covering of black paper, in such a manner that the ray enters through a rectangular hole in the paper, and is observed through a second opposite hole, hyaline bodies of different forms are occasionally observed: so great is their plasticity that although they are about 2 mm. in diameter, they pass through every filter.

Constant complaints reach us regarding mounts which cause the prints to fade, and this subject has recently been considered by the Photographic Association at Berlin.

A thoroughly practical way to test a sample of card, and a method against which little can be said—except that one has to wait some weeks for the result—is as follows:—Cut a print in two, mount one half on card that is known to be satisfactory, and the other half on the card to be tested; then keep both prints side by side in a damp place.

Herr Schulz has modified the above test, so as to obtain a result in twenty-four hours; he uses paste containing one-twentieth of its weight of glacial acetic acid.

Photographers, when buying mounts, would do well to require a written guarantee that they will not injure the prints.

In the comic "topical business" which has been freely introduced into Offenbach's *Barbe Bleue,* now playing at the Comedy Theatre, there is a hit at photography not altogether unwarranted. Boulotte, the sixth wife of Blue Beard, takes what she imagines to be poison, but which is only a sleeping draught, and sinks upon a couch. Popolani, Blue Beard's chamberlain, thereupon proceeds to galvanize her into life with the aid of a mock electrical machine, and goes through a ridiculous performance of posing the body and taking its portrait. After the usual instructions to turn the head "a little more to the left," and so on, resulting in a most awkward and angular position, the photographer says: "Do you feel quite comfortable?" adding, "Never do to feel comfortable, you know"—a statement which too many sitters, after being tormented by fidgety and over-zealous photographers, will appreciate.

Twilight parties—at which no light but that of the fire is allowed—form a feature of New York social life at the present time. Curiously picturesque effects are the results of this mode of lighting.

No doubt it is all right, still the description given by the *Court Journal* of the photographing of the Royal group on the occasion of the coming of age does not impress one. We are told that "Mr. Barraud placed the august group in an angle of the porch and carefully arranged them, now in this, now in that combination, until his artistic taste was satisfied." We are further informed that "Prince Edward was on the right" and "Prince George on the left;" that "the three young Princesses sat very still (how comforting to know this; suppose they had been fidgetty) upon their chairs in the foreground;" that the Prince of Wales and the Princess, "both standing between their sons, fixed their eyes, and in a twinkling the deed was done."

There is a rumour about, which we do not for a moment credit, that one of the novel features connected with the carrying on of the enormous new London Hotel, now nearly complete, will be the photographing of all the guests as they severally interview the manager or his representatives. The operation would be completed unknown to the visitors, and it is not at all certain that this would not be in the eye of the law a constructive assault. The photographer would, in fact, take a likeness and an illegal liberty at the same time. But no doubt the report is a mere *canard,* like that which asserted that tramways would be laid down along the interminable corridors of the hotel, or that still more daring one, that the waiters would wait at the *table-d'hôte* on horse-back.

It has just been made clear by the Tribunal de Commerce, of Brussels, that there is a trade mark in a portrait. The point was decided in an action brought by the Liebig's Extract of Meat Company against a rival Company who placed a photograph of Baron Liebig on their jars. This, the Tribunal of Commerce decrees, is an infringement of the plaintiff's rights, and, in so doing, confirms a decision which had been obtained in Paris previously.

In the dark rooms of many dry plate works, the only lamps used are incandescent electric lights, makers having found that the freedom of the air from floating particles of black or soot more than compensates for the additional expense of the incandescent lights. It may also be mentioned that in powder mills the use of the incandescent light is becoming general, but in one extensive mill in Germany the arc light is employed, but in such a way as to make it even safer than the incandescent light.

This is how they manage it. The arc is in the focus of a lens which makes the rays parallel, and these parallel rays are conducted to the required point by tubes (plain reflectors being provided when a corner is to be turned) where it is distributed by a lens, or rather, by a number of small prisms grouped together.

The above-mentioned ingenious method of lighting a powder mill suggests the possibility of supplying a town with ready-made light, by means of an underground system of pipes like the gas or water mains.

Patent Intelligence.

Application for Letters Patent.

509. William Henry Marshall, 12, Westborough, Scarborough, Yorkshire, for "Improvements in photographic shutters or caps."—Dated 14th January, 1885.

Patent Granted in America.

310,486. Walter B. Woodbury, London, England, assignor to Frederick Nevill Clarke, same place. "Producing gelatinous printing-plates. — Filed Feb. 16, 1884. (No specimens.) Patented in Belgium Nov. 14, 1879, No. 49,819, June 9, 1880, No. 51,703, and July 7, 1881, No. 55,113; in France Nov. 15, 1879, No. 133,677; and in England June 10, 1881, No. 2,527.

Claim.—1. The method of producing photographic gelatinous printing-plates by first developing a photographic design upon a sheet of gelatinous matter, then drying and mounting said sheet upon a solid back, and then coating the surface of said sheet with tinfoil applied thereto under pressure, for developing on the surface of the foil the photographic design, and thereby affording a metallic printing-surface for reproducing said design, substantially as described.

2. The method of producing foil-coated photographic gelatinous printing-plates by applying between the foil and the gelatinous matter a thin layer or film of caoutchouc, and then subjecting the foil to pressure, substantially as described.

3. The method of producing photographic gelatinous printing-plates by first developing a photographic design upon a sheet of gelatinous matter, then coating said sheet with foil, and developing said design on the surface of said foil by pressure, and then electro-plating said foil-surface, substantially as described.

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DEVELOPMENT;

A Sketch Illustrated on Copper.

BY MR. BREBNER.*

Much as I should like to state my beliefs, and go into my reasons for undertaking certain experiments whose direction was constantly the same as that which I wish to describe to-night, I believe I shall serve my purpose better by leaving alone for the present all explanation of the principles upon which the various effects depend. This much, however, I will say, that I am most inclined to believe in the "metallic" as opposed to the "sub-bromide" theory, and while I do not presume to deny the possible validity of the latter, yet the former seems to me so simple—by comparison, at least—so thoroughly explanatory of all the facts hitherto elucidated, so consistent with all scientific requirements, that considering the lessons taught by electro-galvanic action, by catalytic reduction—regarding which we know more to-day than when the sub-bromide theory was first propounded—by the development of the Daguerreotype, by all we know regarding the nature of amalgams and alloys, and looking at these side by side with the more familiar photographic actions, all of which are favoured or accelerated by electro-positive elements and compounds, by reducing agents, and by alkaline reducing agents in particular, I do not hesitate to say not only that the sub-bromide theory is antagonistic to established chemical dicta, fundamentally and *in extenso*, but that its acceptation militates against the comprehension even of such simple actions as toning; and I would suggest further that it is only superficially that its dogmas appear satisfactory. Witness such protestants as Scheele, Spiller, Draper, Monckhoven, Davanne and Girard, Guthrie and Zantedeschi.

But, *non ludere cum sacris*, among the first experiments I tried was the following:—I acidulated a little water, moistened therewith a plate of copper and an exposed dry plate film, and brought the two surfaces into contact. After over half-an-hour the film was unequally marked, and after fixation showed one or two faint but unmistakable traces of an image. Out of the five times that I have performed this experiment I have only twice succeeded in indicating the impression the plate had received by exposure to light; moreover, the plates used had a strongly alkaline reaction, and I cleaned the copper plate with ammonia.

My next attempt with copper was in the direction I had satisfied myself such experiments should be made. Substituting for the acidulated water the dilute ammonia and bromide accelerator used in ordinary pyro development, but otherwise proceeding as before, I only succeeded in causing film and copper so to adhere that I had to use great effort in separating them, and only partially succeeded in that, as in one or two places the film, which had darkened, however, was torn. In the next trial I made, I took great care to allow the film to become thoroughly saturated before applying it to the copper. This time the two surfaces showed no tendency to adhere, but after leaving them at rest for a little, I found it safer gently to rub the glass backwards and forwards over the copper. When I finally separated the plates, I found that the film had darkened very considerably, slightly unequally, it is true, but showed no sign of a picture. I fixed it, however, and found a very distinct though light grey-purple image upon a ground almost as grey. I repeated this experiment many times, altering the strength of the accelerator—from stock to dilute—and adding, one after the other, various organic and inorganic acids, such as tartaric, citric, oxalic, and hydrochloric, and more than once I substituted iodide of ammonium. Each of the acids changed the general colour of the fixed film, but all were more or less grey all over, greatly wanting in graduation. The iodide, on the other hand, appeared to exercise a powerful effect in the direction of clearing the shadows, but the images I obtained by its use were the faintest of all.

I now discarded bromide, and adopted dilute ammonia simply, using it at first in the same proportion as the "stock," but finally settling down to a strength of one part ammonia to three of water. This I modified much as I had done the other; but, finding three terrible obstacles in the way of seeing my results with anything like regularity, I stopped experimenting and took to pondering.

These three obstacles were: 1st, a more or less complete dissolving away of the film, chiefly at the edges; 2nd, a most inordinate tendency to frill, the film occasionally almost springing off the glass if I attempted to wash it, before or after fixing; 3rd, an odour more irritating than even that of ammonia pure and simple, and almost as bad as the nitrous oxide, which laid me up with asthma when I attempted chemically to clean my copper-plate.

The dissolution of the gelatine I attributed to the solvent action of the ammoniacal solution of cupric oxide, although gelatine can scarcely be called a variety of cellulose. The abnormal frilling I assigned to introduction of acids acting on the already dissolving film. The smell I assumed to be that of nitrite of ammonium.

Of my three enemies, the frilling annoyed me most; but for it I could have seen and shown what I was doing. I had always a little bit of gelatine left in the middle of the plate, and after a while I came to be fond of the smell. I had tried alum, not only to no purpose, but to my complete dismay, so I determined to try some viscous substance to moderate the action, and here, as a matter of course, the idea presented itself that a glucosic aldehyde might cure both the tendency to frill and the solvent action at once. Honey! Alas, there was on that day no honey to be had, but I borrowed some syrup from my next-door neighbour, and to very much better results.

I was, however, very unwilling to use an organic compound to alleviate my griefs, as one object I had in view was extreme simplicity, a simplicity so great that there would be no difficulty in following out every reaction involved, and where the analogical nature of the reasoning as to the results would alone oppose the formation or support of a rational explanation of the nature of the invisible image. On this account I had tried substituting potassium hydrate for ammonium hydrate, but the solvent action was so intense that, for the time being, I gave it up. That I might exhibit the best results I could, I stuck to the honey, and I will now proceed to detail at once the greatest vexation I experienced, and its results as opposed to my earlier, and, to my own mind, more convincing experiments.

Hitherto the developing liquid, almost colourless when applied between the plates, had become bluer and bluer as development proceeded. Hitherto the film had become darker and darker under the same circumstances without showing any trace of the image till after fixing. Hitherto an insufferable stench had been a concomitant of every experiment. And, hitherto also, the copperplates had invariably been coated with metallic silver, the deposition being greatest where the dry plate had been exposed to light. In fact when, as a corroborative proof, I submitted a plate which had never seen daylight at all, and one which had been carried unsheltered into the sunshine, to the action of the ammonium nitrite, oxide of copper, and copper plate, the latter was absolutely somewhat cleaner than before, after the unexposed plate had been removed, but uniformly silvered when the light-affected plate was withdrawn. This action, which was so far in favour of the truth of some of the most important of my assumptions when thinking out a metal developer, to function as a metal, ceased entirely from the first moment that I added the glucose. All was now changed, so far.

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* A communication to the Edinburgh Photographic Society.

Although I am possibly premature in doing so, I shall now give the formula with which I am experimenting at present, premising that though it uniformly gives results in my own hands equal to those which a third-rate professional would take no shame to sell, and many an amateur might be proud of, yet I acknowledge that it is not to be compared for a moment with any of the received and perfected developers.

One thing to its credit, however, I may point out: the older the liquid is, the more it is used, and the browner it becomes, the better it works. This, at the least, is the result of my very limited experience.

Recipe—Ammonia, one part; water, two parts; honey, one part; and a copperplate. To prepare, place the copperplate in a porcelain bath, cover it with ammonia, leave therein till the smell of ammonia is almost gone (as yet I cannot say whether it is best to dilute the ammonia with water in the first instance or not), stir up the liquid, and pour it into a measuring-glass, add the water, and last the honey. Though the development is slower, it may be as well to filter the mixture, in order to prevent a dirty or scratched negative. Pour this into a developing dish, immerse the dry plate till saturated, leave it there if you like for a few days, till sufficient density is obtained, or lift it out, replace it with the copperplate, and then gently bring the two face to face. From time to time raise the glass, both to guard against sticking and to judge of progress. Sufficient density being obtained, wash and fix as usual.

The image will appear in this case even before the application of the copperplate, which now appears simply to take the place of an accelerator. The last plate I developed was only brought into contact with the copper after it had been nearly ten minutes in the liquid; it then sprang into full density at once. In this instance I made a point of adding no fresh ammonia, and the developer was a mixture of one newly prepared with one which I had used first several weeks ago, and from beginning to end the smell of ammonia was not. The plate before that again was developed by an absolutely fresh mixture, to which I added, while using, about two or three drops of ammonia; this plate was five minutes or so in the solution altogether, was in contact with the copper during three, perhaps; it showed no sign of an image until the copperplate touched it, when out came the clearest and most dense image I have yet produced. Although, when I first began the experiments which I have just detailed, I had no intention of working up an efficient developer, but only to narrow down my own ideas regarding the nature of the latent image—as I had more than once succeeded in doing before—yet in case any one is disposed to apply himself to the perfecting of the notion, and thereby throw still further light upon unsatisfactorily explained photographic phenomena, I may say that the only direction in which I think it in need of much improvement is the further clearing of the shadows.

My own attempts will be chiefly retrograde. I have already suffered through introducing the action of dextrose, and though even it, as far as I can see, only obscures the true action, I am anxious rather to lay it bare than to conceal it. The first experiment I shall now make will be to supplant the copperplate with zinc-foil immersed in bluestone, and even this will admit of some improvement in the developing action, for the coppered foil may then, being placed above the film, be mechanically pressed so as to give various densities as desired. I will then try copper filings, and resume some discontinued chemical experiments with cupric and cuprous oxides. Possibly, as regards the organic agent, I may try to find out the relative actions of Fehling's solution, potassic-cupric-tartrate, and dextrose proper, but more likely I shall first return to the iodine which was at first my bane, to the chlorine which gave me purple negatives, to the oxalic acid which gave me green ones, or to the citric acid by which I have till now "cleared" in the usual manner.

There are always, however, too many attractions cropping up, all tending to lead the theorist astray, either with his will or against it—when they take the form of croppers—for any one to predict with any certainty even what he will attempt.

SILVER LAKES FOR EMULSION PLATES.

BY M. CAREY LEA.

The idea of staining the film is at present attracting a great deal of attention. Plates affirmed to be equally sensitive to all the colours of the spectrum are manufactured and sold in London, Paris, and Berlin. It is understood that the film is dyed with reosine or some aniline colouring matter, and even a patent has been taken out.

This plan of dyeing the film is far from being a new one, and if I am not mistaken I was the first to advocate it sixteen years ago. In 1866 I made many experiments with red and yellow colouring matters in the film, and found red litmus (litmus reddened by acetic acid) to give the best results.

It was long a favourite method of operating with me, and for years I used it exclusively in taking landscapes. The object I had in view was principally the prevention of blurring.

The next experiments on stained films were made by Major Waterhouse and by Dr. Vogel; the latter affirms that each color increases the sensitiveness of the plate to those rays which the colouring matter absorbs, subject to the condition that the colouring matter must be capable of combining with chlorine, bromine, and iodine, according as AgH, AgBr, or AgI is used.

The results obtained by myself were contradictory, and seemed as often to oppose the theory as support it.

Even Dr. Vogel's results are often in disaccord with his views. Indeed, it must be evident that colouring the film is liable to a serious objection when used for changing the sensitiveness of the film to particular rays, namely, that not only the particles of silver haloid, but also the film in which they rest, is coloured.

These two agencies act in directly contrary ways; for the particle is placed in a colour screen which tends to absorb the very rays to which it is intended to render the particle more sensitive.

Being desirous to find an explanation to these contradictions, I commenced a series of experiments, which resulted in showing:—

1st. That the silver haloids are capable of entering into combination with many colouring matters very much in the same way that alumina does, though they are not so strongly coloured. The combination is intimate; the colour cannot be removed by washing. To effect this combination the haloid is precipitated and washed, and the colouring matter in solution is poured over it; the excess is then washed away, and the haloid remains permanently coloured. Or when the dye does not form a precipitate with silver nitrate, it may be added first, and the precipitate is then formed in its presence and combines with it. In this way the haloid may be obtained coloured to any shade required, and may then be emulsified in pure gelatine. Or it may be emulsified, precipitated, coloured, and re-emulsified.

2nd. The colour imparted to the silver haloid is generally that of the colouring matter, but not invariably. Some blues dyed the silver salt lavender, and one specimen of methyl green coloured Ag Br and AgI pink.

3rd. The colour imparted by any one dye to the three haloids is generally the same, but not always.

4th. Many colouring matters form these combinations, but there are also many that do not.

A moment's consideration will show that this last-mentioned fact is of vital importance. For suppose a colouring matter applied to the film which is not capable of combining with the silver salt; then, without influencing the silver salt directly, it *simply acts to obstruct the very rays whose effect it intended to increase.* The result, therefore, will be exactly the reverse of what was sought.

In this way I think the anomalies and contradictions observed find their explanation. The new method here described renders it possible to colour the silver haloid and emulsify it afterwards, or, perhaps better, to emulsify, precipitate, apply the colour, and then re-emulsify. I have already found the means in this way of greatly increasing sensitiveness. Blurring can be cured, and plates of the most varied sensitiveness to particular rays and colours can be produced.

Finally, it is clear that no colour can directly influence the haloid unless it be amongst those that have the power of combining with it. Evidently this is the true criterion. The power to combine with chlorine, bromine, and iodine may cause the colour to affect the general sensitiveness to light, but to modify that sensitiveness to particular rays the colouring matter must combine with the haloid.—*Anthony's Photographic Bulletin.*

PHOTO-LITHOGRAPHY AND PHOTO-ZINCOGRAPHY.

BY MAJOR J. WATERHOUSE, B.S.C.,
Assistant Surveyor-General of India.

Chapter XVIII.—Photo-Lithography in Half-Tones.*

Fair results have been obtained by some of the transfer methods.

Sir Henry James published a method of obtaining half-tone transfers by the Southampton process, by which some views of Jerusalem, Netley Abbey, and Stonehenge have been photo-zincographed with fair success, though heavy as compared with collotypes or ink-photo prints. For this kind of work the transfer paper is prepared in the usual way, but is kept for about a week, so that the coating becomes insoluble, and retains the ink more readily. The exposure is conducted under an ordinary negative, varying from five to fifteen minutes, according to the density of the negative and the intensity of the light. The inking is conducted as for line work, but the ink may be harder and the pressure greater. The development is the most important part of the process, and requires some skill and experience to ensure success. The prints, coated with ink, are laid face downwards, on luke-warm water, and allowed to remain till the gelatine is softened ; the surface ink is then gently removed by dabbing the surface with a very soft sponge and warm water, taking care not to scrub it. The print is then soaked in warm water, which is gently agitated, and the detail will gradually appear. The water is changed after a short time, and the operations repeated, the prints being allowed to soak for an hour or so between each change. When most of the unaltered gelatine has been removed, and the print appears to have soaked enough, it may be finished off by again washing with a sponge and warm water ; it is hung up to dry, and can be transferred to zinc or stone, in the usual way. These transfers require very careful printing. The process is most suitable for architectural subjects, or others without any very delicate detail. Very fair reproductions of maps, with brush-shaded hills, have been made by it both in England and in India. It improves the appearance of the pictures if they are printed on enamelled paper, slightly tinted, or to print them with a tint in which the high-lights may be taken out and left white.

Very good examples of half-tone photo-lithography have also been obtained by Toovey's process, described in chapter xvi.

Another process recommended as giving excellent results in half-tones is Asser's. A very full description of this process, taken from the *Photo Archiv*, has been given in the News, vol. xxi. p. 405, and several times more recently. It is of interest as the earliest transfer process, and certainly gives admirable results for line work.

Unsized paper, coated on one side with starch, is sensitised by floating it face upwards on a saturated solution of bichromate of potash, and dried. After exposure under a negative, the print is laid face upwards on cold water, and allowed to remain until all the soluble bichromate is removed. It is then dried, and exposed to a considerable heat by laying it on a heated slab, or by passing a hot iron over it. This operation causes the ink to take more readily on the exposed parts.

A piece of unsized paper, smaller than the print, is laid down wet on a sheet of plate glass, the superfluous water being blotted off. The print is floated face upwards, in warm water, for a few minutes, until the starch coating is moistened. It is then taken out of the water and well rubbed down on to the paper on the glass plate. A cloth roller, charged with a mixture of printer's ink and litho-ink, and a little oil varnish, is passed over the print without pressure, and gradually brings up the image. The print is transferred to the stone while still damp. The unsized paper, by easily absorbing water in the unexposed parts, aids in the inking.

Several processes of photo-lithography in half-tones were patented by Mr. F. R. Window, including the dusting process described in the last chapter. In these processes little or no account seems to be taken of grain. Among them is one by which the effect of half-tone was obtained somewhat in the same way as in Marie's asphalt process by printing from two or more plates, by which the subject is divided into a series of tints. The plates are printed in succession in a more or less transparent ink of a depth calculated to give the requisite tint : and as each plate contains different portions of the subject, the first containing the whole and the last only, the dark touches forming the deepest shadows, the entire subject is ultimately produced with a degree of delicacy proportionate to the number of printing plates employed.

Another method, followed by Mr. Window, but not claimed by him, was to coat paper first with gum-arabic and sugar, or gum and glycerine, and then with a solution of gelatine composed of—

Gelatine	... ...	3 parts
Sugar ...	... ...	1 ,,
Water ...	... ...	9 ,,

If the paper is to be used at once, half a part of bichromate of potash in fine powder may be added, together with 20 drops of glacial acetic acid to each imperial pint of the solution. Or the paper may be sensitised in a bath of bichromate and acid containing about 5 per cent. of the former.

When dry, the sensitive paper is printed until the subject is seen fully up, and is then washed in very cold water, until all the chrome salts are removed. The gelatinous film will be found to have floated off, and must be reattached, exposed side up, on a lithographic stone, or preferably a finely-grained zinc or copper-plate coated with a solution of india-rubber and dammar in benzole, so as to retain the gelatine film upon the plate during the operation of printing. The film is dried, and after moistening to the proper degree, can be inked up as in the collotype processes.

It would appear better to modify this method by squeegeeing down the exposed print to the stone or zinc, and then developing with warm water as in the pigment process.

The processes depending on the use of ordinary pigment tissue, described in the last chapter, are also applicable to half-tone work, though it is probable that a grained negative would be requisite to produce the best results. The image might also be grained by waxed sand or by reticulation.

(To be continued.)

Correspondence.

LENSES FOR PORTRAITURE AND COPYING.

Sir,—Mr. W. H. Wheeler, in your last issue, refers to the discussion which followed my paper on lenses, and says that the photographer who stated that a longer exposure was necessary with a rapid rectilinear lens than with a portrait combination stopped down to the same aperture, was probably right. Mr. Wheeler continues that it did not apparently occur to the "theorists" that identical intensity at the centre of the field does not necessarily imply identical intensity at the margin.

It is natural that at this distance of time the details of a discussion should not be present to the mind of Mr. Wheeler, but on turning to the published reports I find the following:—"Mr. Debenham showed on the blackboard that with lenses of the same focus and diaphragm, increasing the diameter of the lens would have no effect on the illumination of the picture. Towards the margin it would have an effect, unless the smaller lenses were placed nearer to the diaphragm." The possible explanation which Mr. Wheeler assumes to have been overlooked was therefore given at the time.

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* Continued from page 22.

As to another point in Mr. Wheeler's letter: it is satisfactory to find that he has succeeded in producing an instrument in which the curvature of field is reversed with (it is to be presumed) sufficiently good definition. In my lecture I particularly dwelt upon the desirability of such a lens for copying purposes, and suggested that opticians should give their attention to the best method of constructing such an instrument. If Mr. Wheeler is disposed to furnish the details of the alteration which he has made in the Petzval lens for producing the effect desired, I think it would certainly prove interesting.—I am, yours faithfully, W. E. DEBENHAM.

[It is to be hoped that Mr. Wheeler will send a description of his modification of the Petzval lens, for the benefit of our readers.—ED. P.N.]

THE NEW PRINTING PAPER.

DEAR SIR,—I have been amongst many photographers lately, and, as may be imagined, the topic is the new printing paper; but the majority of experimentalists seem to make nothing of it. I find the proper exposure is much more (for average negatives) than the directions give, and on account of the short exposure the prevalent tones obtained are olive or green. I have been ringing the changes on all sorts of developers and toning baths, and have come to this conclusion (for the present): that for ordinary good average negatives, the ferrous-citrate developer is best; for medium, ferrous-citro-oxalate; and for thin and very thin negatives, ferrous-oxalate as published by Marion. I also find that after development it is of great advantage to immerse the prints in a weak solution of salt and water, taking care not to allow any of the salt and water to be returned to the developing dish.

My humble opinion is: that, with care and perseverance, all the difficulties connected with the process will be easily overcome, and that the day is now close at hand when that disgrace to our art, the ephemeral albumen process will be classed amongst the obsolete processes.—Yours faithfully,

W. T. WILKINSON

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Society was held on Thursday, the 15th inst., Mr. ALEXANDER MACKIE in the chair.

A Member showed several negatives obtained by combining a cheap spectacle lens with a French portrait lens, aperture $\frac{f}{8}$. The plates (8 by 6) were well covered.

The CHAIRMAN then read the following question:—"Why does collodion split from opal glass, and especially so when a matt surface has been ground?"

Some doubt was expressed whether this was really the case when the surface was clean. In support of the question, Mr. Henderson had cleaned ground glass with hydrofluoric acid, and then the film peeled off. The reason he attributed to ground glass possessing a larger area of surface, the undulations preventing perfect contact. The remedy would be found in a substratum insoluble in water.

Mr. F. W. HART said that air imprisoned in the cavities of ground glass prevented actual contact with the collodion film, and it was a fact that collodion poured over such a surface would split off when dry.

The next question:—"Is there any objection to washing prints in zinc vessels when the zinc is covered with black varnish?" was then considered.

The CHAIRMAN thought harm would not result so long as the prints were kept in motion. The general opinion, however, was not favourable to zinc unless the same were well protected, owing to the tendency of prints settling at the bottom of the tank.

Mr. A. HADDON mentioned that shellac applied to heated zinc enters into combination with it

Mr. E. TWISS explained that shellac combined with the oxidized surface, and formed a very hard coating when dry.

Mr. WINTER recommended the method adopted in the manufacture of advertising tablets, the subject of which was transferred to its permanent support by means of copal varnish; when dry, it was again coated with hard spirit varnish.

Mr. HENDERSON showed a negative in which an opaque mark corresponding to a printed pattern was observed; it was caused by the packing. He also passed round a clamp with ball-and-socket joint for attaching a camera to any convenient place, such as a fence, or tricycle.

A letter from Mr. York was also read, giving an interesting account of his travels in America. Mr. York found the light at New York in November so actinic that many of his negatives were over-exposed; he used a drop shutter, and worked with an aperture $\frac{f}{11}$. He has now adopted the plan of soaking in bromide previous to development, and obtains good results.

Mr. A. COWAN passed round views taken in the vicinity of Kimberley, S A, by Mr. Alder.

Mr. J. H. TRINKS showed a microscopic enlargement to illustrate an oft-expressed opinion by Professor A. Hesse and others, that markings which cannot be seen in certain diatoms with the eye by any power of enlargement, may be seen in a photograph. In the specimen obtained by Mr. Trinks, lines were distinctly traced through the entire disk of hexagonal cells. The power used was one-sixth; neither the power used, nor one-fifteenth, showed these lines to the eye, nor could Professor Hesse discern them with any power other than a photograph.

The CHAIRMAN remarked that Dr. H. Charters-White had shown very distinct marks by means of photography, which were invisible by any other known means. The same diatoms had been photographed several times, and always with the same result.

Mr. G. T. PLOMER thought allowance should be made for the difference between actinic and visual foci when high powers were employed. This was not necessary in the case of low powers. He thought Mr. Trinks' specimen, which had been photographed with oblique rays, rendered it questionable whether markings thus seen on a dark ground were not spurious; if photographed in direct light, the lines might be absent.

Mr. TRINKS had not tried a direct light, as he merely wished to confirm Professor Hesse's statement.

The next lecturette will be, "A Chat about Limelight," by Messrs. C. and F. Darker, on Thursday, February 12th.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE third meeting for the current session was held in 5, St. Andrew Square, Edinburgh, on Wednesday, 7th January, 1885, at eight o'clock, Mr. W. FORGAN, Vice-President, in the chair.

The minutes of last meeting were read and approved of, after which the following gentlemen were declared duly admitted:—Messrs. John Coubrough, Thomas Burns, A. N. M'Alpine, B.Sc., George Gowie, Wm. Grey, H. Pummell, David J. Lawson, James Sharp, George W. Heathcote, T. A. Douglas Wood, and Rev. R. G. Fraser.

The SECRETARY then proposed for election as honorary members Mr. T. Bolas, and Mr. A. T. Niven, C.A., auditor of the Society. The subject of a work-room for the use of members was again brought up, and it was agreed to remit the question to a committee.

The SECRETARY stated that it had been proposed in the Council that instead of going to outsiders for pictures for the current year's presentation print, the members of the Society should be asked to send in suitable pictures. The display on the walls in November last showed as good work as could be found anywhere, and he proposed that all the members should therefore be invited to make a special effort to produce and send in something worth reproducing as the presentation print for the current session. Seconded by Dr. Hunter, and unanimously agreed to.

Mr. BREBNER then read a paper entitled "Development, a Sketch, illustrated on Copper" (see page).

Owing to some misunderstanding, for which he was in no way responsible, Mr. Brebner was unable to demonstrate his process, but he handed round several negatives, developed in different ways, in illustration of his theory, and explained how these were developed. He stated, however, that he had been unable to obtain anything like satisfactory results until he had added honey to the developer, when he got results which were more nearly presentable.

After conversation it was agreed that the discussion be continued at a future meeting.

Mr. **Morgan** exhibited what he termed a multiplex photograph background, and fully explained its working. This is a frame supporting eight or more backgrounds on rollers, fixed on the circumference of a wheel, and so arranged that by an ingenious contrivance any one of these backgrounds can be brought to the front and let down—one cord revolving on one spindle answering for each background. By means of the great ingenuity displayed in reducing the mechanism to the utmost simplicity, what might appear a somewhat complicated contrivance is really resolved into grasping a small lever and pulling a cord. By Mr. Morgan's method of hanging, the canvas is quite as flat as if mounted on a stretcher. The space occupied by the whole apparatus is no larger than that of an ordinary scene on a stretcher.

Dr. **Hunter** had had a good deal of experience with scenery, and had often found great difficulty in working it, but this seemed to be all that was required.

Mr. **Bashford** said the exhibitor had met a great many of the difficulties of the photographer by his apparatus. It was exceedingly compact; it was easily moved so as to have the light fall upon it any angle required, and the whole thing was so simple that he really thought it a remarkable invention.

Mr. **M'Kean** thought that to the practical photographer this apparatus would prove a great boon. He had one difficulty, however; if a scene got worn out or old-fashioned or shabby, was there any provision for having it repainted and getting it to roll absolutely straight again?

Mr. **Morgan** replied that this idea had never occurred to him, but now that canvas was so cheap the best thing to do with a useless scene would be to throw it away and make a new one.

The **Secretary** then stated that in consequence of the illness of the President (Mr. Norman Macbeth), he had received the following note from him regarding the conference on the picturesque:—

"Works subject to the Conference, which takes place every alternative month—*i.e.*, in February, April, and June—shall be exhibited on the walls of the Society Room's at the meeting previous, *i.e.*—in January, March, and May. The object of this arrangement is to afford ample time for considering the subjects, and their varied treatment; to afford, if desirable, the opportunity to any member to write a short dissertation on any picture thus presented, and so to let it be introductory to the proceedings of the Conference next to be held. Rather than run the risk of offending the feelings of any member, it is desirable that no work of any member be brought forward for Conference without the full knowledge or concurrence of the author. In all discussions, works are to be characterised by their titles or descriptions of subject, rather than by the names of the authors. It is specially desirable that as much as possible (if not entirely), works sent in for Conference be mostly those of strangers unknown to the Society. If the subjects of strangers' works have been published, then (should it be found necessary for distinguishing the different styles of artists), mention may be made of their names. This may be done specially when reviewing engravings or paintings. It must ever be kept before the members that the acquirement of artistic knowledge, sound views derived from the best examples, is our paramount aim. There can be no objection to a full report of our proceedings being put into our 'Transactions,' or sent to the respective Photographic Journals, provided they are sent in strict accordance with the above regulations."

This was adopted.

Mr. **Bashford** then handed round some specimen prints on the new gelatine paper which had been sent him for exhibition.

Mr. **Turnbull** then exhibited a view-finder, consisting of a miniature camera, to fix on the top of the ordinary camera.

Mr. **Knolles** also exhibited a view-finder made of two pieces of brass tube sliding the one within the other, and adjustable to correspond with the focus of the lens and camera, one end having a small circular opening for the eye, and the other end having a rectangular opening corresponding to the shape of the plate.

The presentation print for last session—"The Gloaming," a photo engraving by Messrs. Aunan, of Glasgow, from the well-known picture by Mr. Adam Diston, of Leven—was then distributed, and the meeting, after a vote of thanks to the Chairman, separated.

Newcastle-on-Tyne and Northern Counties' Photographic Association.

The annual meeting was held in the College of Physical Science, Newcastle, on Tuesday evening, the 13th instant, Mr. J. P. **Gibson** in the chair.

The minutes of the previous meeting having been confirmed, Messrs. James Huntly, H. R. Proctor, A. Dunn, J. G. Dennison, T. Wilson, and J. G. Sinclair were nominated for membership.

The **Secretary** (Mr. J. Pike) then read the

Annual Report.—Your Council have much pleasure in offering to you the fourth annual report. During the past year thirteen members have joined the Association; the number of members, however, shows a small decrease as compared with the last report, as eight members have resigned, and six names have been removed from the list for non-payment of subscriptions. The attendance at the meetings has been well up to the average. The Society held a very successful lantern demonstration in May last, and a demonstration of Platinotype printing has been given. Papers have been read by Mr. Dodds, Mr. Freeman, Mr. J. P. Gibson, Professor Herschel, and Mr. Templeton, and the thanks of the Association are due to these gentlemen. Six out-door meetings were held during the months of June, July, August, and September, and were, taken as a whole, high successful. The medal and prize, offered respectively by Mr. Borrow and Mr. J. P. Gibson, produced a good collection of pictures. The thanks of the Association are due to the above-named gentlemen, and to Colonel Sheppee, Mr. W. Cozens Way, and Mr. P. M. Laws, for their services as judges. The competitive exhibition for the selection of a suitable presentation print resulted in a picture by Mr. Goold being chosen by the votes of the members. Your Council have ordered this picture to be printed in Platinotype, and it will be shortly ready for distribution. Your Council, in conclusion, would call attention to the desirability of a better response to the invitation of the Secretary to contribute papers. As time advances, the difficulties in this direction increase, and it is only by a liberal assistance on the part of all members that the interest of our meetings will be maintained.

Mr. **Pike** said, in explanation of the statement that the number of members had decreased slightly, that it was comparatively easy to raise the total of members; but that unless the subscriptions were forthcoming they were an expense, without doing the Society any good. To keep the Association on a sound basis, they had decided to, from time to time, erase the names of those who failed, after a reasonable time, to pay their subscriptions.

The **Treasurer** then made his general statement of receipts and expenditure for 1884, showing a balance in bank of £11 4s. 11d.

The reports were passed unanimously.

The meeting then proceeded to discuss several questions found in the box; amongst others—"How to develop a plate known to have had double the exposure necessary?"

Mr. **McLeod** recommended commencing first with the pyro solution, adding small quantities of the ammonia solution from time to time as necessary.

"What is the best method of toning chloride plates for transparencies?"

Mr. **Gibson** thought chloride plates required no toning if properly exposed, and that the length of exposure had a great deal to do with the tone obtained.

Mr. **Gray** suggested slightly under-developing the plate, and then intensifying and toning with metallic chlorides.

"What is the best thing to clear chloride transparencies?"

Mr. **Pike** recommended a resolution containing one ounce of sulphuric acid and one ounce of alum to a pint of water, and said he thought it was Edwards' formula.

The following officers were elected:—

President—Professor A. S. Herschell, M.A., &c.

Vice-Presidents—Prof. Bedson, D.Sc., and Mr. J. Buxton Payne.

Hon. Treasurer—Mr. P. M. Laws. *Hon. Sec.*—Mr. J. Pike.

Council—Messrs. Auty, Downey, Dodds, Goold, Maling, J. W. Robinson, jun., Ridley, Sawyer, and Templeton.

An alteration was made in the rules, and after which the meeting adjourned.

Glasgow and West of Scotland Amateur Photographic Association.

The usual monthly meeting of the above Asssociation was held in their rooms, 180, West Regent Street, Glasgow, on Tuesday evening, 13th inst., Mr. **Hugh Reid** (President) in the chair.

After the approval of the minutes, the following new members were admitted:—F. Robertson Reid, Junr., Jas. T. Darling, John Henderson, David Irving, Dr. Fleming, Richd. Watson, Edward Beckitt, Jas. G. Young, Alex. Robb, David Irving, Dr. Bell, Jas. McRab, Jas. R. Craig.

The Secretary then read the Annual Report, from which if appeared there were 114 members now on the roll, an increase o 57 members during the year. The finances were in a good condition, notwithstanding the heavy expense of furnishing the rooms and the drawings, as the recent Exhibition more than covered expenses.

The President, after a few introductory remarks, calling on members to have a still better exhibition next year, presented the medals to the successful competitors, whose names have already appeared in our columns.

The rules for next exhibition were then considered, and only a few technical alterations made, it being again decided that the prizes be awarded by vote of members, as this system has given every satisfaction, and has saved any squabbling over the awards.

Mr. W. Lang, Junr., then gave a short demonstration of the carbon process in the hall, whilst for the benefit of the younger members, the President and Mr. Goodwin developed a number of plates by different formulas in the dark-room.

Derby Photographic Society.

A general meeting of the above Society was held at the London Restaurant, Irongate, on Wednesday evening, Jan. 14th, Mr. Richard Keene occupying the chair.

The minutes of the December meeting having been read and confirmed,

Mr. James E. Kaye read a paper entitled, "America and Photography," which he illustrated with a large selection of photographs of American scenery, among which there were some very fine pictures of the Niagara Falls.

A cordial vote of thanks was passed to Mr. Kaye for his interesting paper.

It was unanimously agreed that the number of the Committee should be increased from three to five, and Messrs. Merry and Bourden were elected to fill the two vacancies.

It was also decided to hold a conversazione on February 20th; and after some discussion on this subject, and a vote of thanks to the Chairman, the meeting terminated

Messrs. F. Cooper and S. Sampson were elected members of the Society.

Cheltenham Photographic Society.

The monthly meeting was held January 8th, Colonel Dawson in the chair.

Mr. L. Parsons was elected a member.

Mr. Joyner explained a plan by which he had avoided the blurring caused by the large window of a church when taking the interior. A piece of board covered with velvet cut to the shape of the window was hung at such a distance before the lens as to cover the window during the first part of the exposure, being afterwards removed. This might be easily extended to the case of several windows.

Mr. D. Barnett exhibited a fine series of prints, both in silver and platinotype, from negatives taken during a trip to Norway. The plates were Martyn's Cheltonian plates, and the results obtained spoke well for their excellent quality.

Mr. Penny showed several exposure shutters of his own construction.

The meeting closed with votes of thanks to Mr. Joyner and Mr. Barnet for their respective contributions.

Halifax Photographic Society.

The annual lime light exhibition was held on the 12th inst.; the great popularity of this class of entertainment was manifested by the presence of an appreciative audience of over three hundred persons, the pictures, as they were exhibited, receiving rounds of applause, the Rev. W. E. Hancock, M.A., the President, adding life and humour by his happy hits and timely remarks.

Mr. Martin Manley, a member of the Society, very liberally came forward with his own improved bi-unial apparatus, and as he used the mixed gases, the light was exceedingly powerful, and doubtless this combination of favourable circumstances contributed largely to the success of the exhibition.

There was a considerable number of slides exhibited made by the members, and upwards of sixty produced from the members' negatives and supplied by Mr. Manley, the quality of which was of a very high class. The following gentlemen contributed to the exhibition:—Messrs. E. A. Caw, Ed. Gledhill, Rev. W.E. Hancock, M.A., Messrs. Ed. Huntriss, Thos. Illingworth, J. E. Jones, H. Mossman, T. Rowley, Fred. Smith, Jas. Whiteley, and W. Clement Williams.

Mr. J. H. Steward sent one of his new style lanterns for the inspection of the Society, also one of Beard's self-centering carriers; the superior workmanship and neatness, together with the perfect arrangement of all the parts, was the subject of much favourable comment, and a vote of thanks was accorded to Mr. Steward for the great privilege he had thus afforded the Society.

A vote of thanks to Mr. Manley, the President, brought the meeting to a close.

By special request, the Society will give another lantern exhibition on Friday evening, February 13th, when an entirely new selection of slides will be shown.

Bolton Photographic Society.

The January meeting was held at the Baths, on the 8th inst., Mr. Thomas Parkinson in the chair.

Mr. W. Knowles exhibited one of Marion's miniature cameras for $1\frac{1}{4}$ inch plates, and also a negative taken with it.

Mr. W. Banks brought an instantaneous shutter. This shutter, for a lens $1\frac{1}{2}$ diameter, weighs three ounces, and when closed, measures $2\frac{3}{4}$ by $1\frac{3}{4}$ by $\frac{1}{2}$ inch.

The remainder of the evening was spent in testing several oil-burning optical lanterns; a five-wick, a three-wick, and the Sciopticon, two-wick, were tried against each other in various ways, resulting in an unanimous vote in favour of the Sciopticon for whiteness of light and best definition.

Notts Photographic Association.

At the annual meeting of this Association, held on January 19th, at the Nottingham Institute, Shakespeare Street, Mr. George Shepperley (President) in the chair, the Hon. Secretary (Mr. George E. Inger) presented the report of the committee for the past year, showing an enrolment of fifty-two members, and three nominations for future election.

Since the Association started last April seven ordinary meetings had been held, when papers of merit, followed by discussion, were read, and lantern transparencies shown, produced from negatives of members, illustrating various wet and dry processes in use. Prize awards had been made to members for photographs taken during the summer. An enjoyable excursion, among other outings, took place to Dovedale last June, and the first annual dinner was held last month.

The Treasurer's account showed a balance of £4 11s. 2d. in favour of the Association.

The Chairman stated that they were to be indeed congratulated on the exceedingly satisfactory and flourishing state of the Association.

An election of officers then followed, resulting as follows:—

President—Mr. George Shepperley.

Vice-President—Mr. Alfred Cox.

Treasurer—Mr. H. Sands. *Hon. Sec.*—Mr. George E. Inger.

Committee—Messrs. S. Bourne, Henry Blandy, J. H. Burton, T. Carnell, W. J. Collings, B. S. Dodd, G. Pendry, A. Standley, T. K. Townsend, M. Tuquet, H. A. Wigley, and G. E. Williams.

Chicago Photographic Association.

At the annual meeting, held on January 8th, the following officers were elected for the year ending February 1st, 1886:—

President—G. H. Sherman, Elgin, Ill.

Vice-Presidents—Chas. Gentile, T. B. Greene.

Secretary and Treasurer—F. H. Davies.

Exec-Committee—G. A. Douglass, Thos Markley, H. D. Garrison.

Talk in the Studio.

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will take place on Tuesday next, January 27th, at eight o'clock p.m., at 5a, Pall Mall, East.

The Journal of the Versailles Photographic Society.—Three monthly numbers of the organ of the new Society come to hand, and it differs from other photographic journals insomuch as it is written and lithographed, autographic drawings being worked in the text, and silver prints inserted as illustrations. Not only does the *Bulletin de la Société de Versailles* report the proceedings of the Versailles Society, but it contains a useful selection of matter from various sources. A panoramic camera, devised and constructed by Captain Moëssard, which is described in the first number, presents points of novelty, and we intend to describe it in an early number.

NOTICE TO SITTERS, AS SEEN IN THE SKYLIGHT OF C. TOMLINSON ELMIRA, N.Y.—Dress your hair and arrange your toilet about your neck, just as you wish to appear. Avoid all strong contrasts of black and white, dress with taste, and your portrait will always look well. Please remember that I have not the physical or financial ability to try experiments on your various toilets, unless you are willing to pay for the extra sittings. It will be to your advantage to leave your position to me, unless you are the better educated in art; then I will gladly defer to your superior judgement.

THE SEMI-MONTHLY ISSUE OF "ANTHONY'S PHOTOGRAPHIC BULLETIN."—Under the editorial charge of Professor C. F. Chandler, and with Dr. Arthur H. Elliott as associate editor, the first number of the new series of our transatlantic contemporary made its appearance on the 10th instant. It opens with an editorial on a subject which has long—even from the time of Daguerre—occupied the earnest attention of workers, the question of photography in colours. It is pointed out how those researches on isochromatic photography which have from time occupied the attention of Vogel, Abney, Waterhouse, Carey Lea, Ives, Eder, Schumann, Albert, and others, are gradually pointing to the possibility of making true photographs in colours. Let us have a sufficient series of plates, each sensitive to one tint only, and the task becomes accomplished in a certain sense, as the printing from each negative in its proper tint, and the superposition of the various coloured impressions, would then become practicable, if not simple and easy. Professor Chandler contributes a chatty and agreeable paper on the history of photography, dating from the time when Dr. Hooper, in his *Rational Recreation*, published in 1774, gave directions for copying cut-out paper letters by a photographic method. It is pleasing to find the name of Mr. Carey Lea in the *Bulletin*, but as we report this gentleman's communication (page 59), we need say nothing regarding it. An excellent selection of matter makes up the remainder of the number, communications from well-known American luminaries in the photographic world, copious reports of the proceedings of societies, European correspondence, and translations from the German being included. Altogether, the number is an excellent one, and *Anthony's Bulletin* may be expected to enter upon a new career of usefulness with the present year.

ARGENTAMMONIUM COMPOUNDS. By A. Reychler (*Ber.*, 17, 2263—2266).—Ammonia is rapidly absorbed by silver citrate with considerable development of heat and a discoloration of the salt: about 4—5 mols, NH_3 are thus absorbed. Silver citrate dissolves readily in ammonia, and alcohol precipitates from this solution hexammonio-silver citrate as a thick syrup easily soluble in water. Silver benzoate absorbs dry ammonia to form diammonio-silver benzoate, a white substance insoluble in water. Carey Lea has described (*Chem. News*, 1861) a yellow crystalline diammonio-silver picrate. The power of the picrate to absorb ammonia is probably due to its nitro-groups. Ammonium picrate absorbs 1 mol. NH_3 at 0° to form monammonio-ammonium picrate, $C_6H_3(NO_3)_3.ONH_4, NH_3$: at summer heat (about 26°) scarcely a trace of ammonia is absorbed.—*Journal of the Chemical Society.*

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting, on January 28th, will be "Preparation of Lantern Slides." This will be a lantern night. Visitors will be welcomed to take part in exhibiting.

◆

To Correspondents.

*** We cannot undertake to return rejected communications.

E. B. S.—Full directions will be found on page 338 of our volume for 1883. Brass and copper are treated in the same way.

X.—The electrical retouching machine can be obtained from Géruzet Brothers, 27, Rue de l'Ecuyer, Brussels; and the air-brush apparatus from the Air-Brush Manufacturing Company, 53, Nassau Street, Rockford, Ill., United States.

T. WHEELER.—More space than we can spare would be taken up by the reprint, so it is impracticable to do what you ask. The volume can be obtained by advertising for it.

MORTIMER FIELD.—We have posted on the prints as requested. Certainly they are not up to the mark, but, on the other hand, we have seen excellent work turned out from the same establishment. No doubt you will be able to get others done in place of them.

ARTIST.—The best and latest information on the subject is contained in an article which Mr. Jarman contributes to the YEAR-BOOK, p. 119. Write to Mr. Jarman at the works of the Jarman Electric Light Company, Homerton, London, N.

W. A. C. A.—1. Probably you carry your development too far on the whole; but this is difficult to judge of without seeing examples of your work. We will write and suggest what appears to us the best course to adopt. 2. Naturally it is not efflorescent, and the probability is that it contains carbonate of soda. Being such a cheap material, it would perhaps be wise to throw it on one side and obtain a fresh sample.

ENQUIRER.—Full directions will be found in "Silver Printing," by Robinson and Abney; published by Messrs. Piper and Carter.

ALFRED DAVY.—The Crosscup and West Engraving Company, Philadelphia, Pa., U. S. America.

VERO C. DRIFFIELD:—A short and practical series of articles on the subject shall be published before long.

K. T.—Do not think too much of the reported anticipation of your idea, as it is a rare thing to meet with any such notion which has not been to some extent anticipated. You had better put the thing on the market, and if the party of whom you have heard should appear as a rival, give him a share in your own invention: He will thus enjoy the protection of your patent, and the interests of both parties will be secured. 2. Thank you for the enclosure. We should have been glad to have had it earlier, as we could then have made good use of it.

H. GONZALEZ.—1. Mr. F. C. Beach is an amateur photographer, and does not make the apparatus for sale; but the description is so clear that any maker of photographic apparatus can construct it for you. 2. Perhaps you are not sufficiently careful to guard the paper against diffused light.

M. CAPPELLI.—From what you say, we are inclined to think that the markings are due to traces of fatty matter in the gelatine. This often forms a scum on the surface, and gives rise to such markings as you describe. Wash the flakes of gelatine with ether, or try another sample.

G. W. G.—The instrument you refer to is a very useful one, and probably the modification you suggest would make it still more useful. A description is to be found on page 793 of our last volume.

W. W. P.—Probably the mounts contain hyposulphite. See Notes on page 56.

H. WHITFIELD.—1. One reason is because you have not yourself undertaken the task. 2. It can be had through any foreign bookseller. 3. All the parts hitherto published have been reviewed in the PHOTOGRAPHIC NEWS.

R. BLAKELOUGH.—The slides are fairly good on the whole, but differ widely in character. We can hardly make any suggestions likely to be useful to you without having details as to the methods you have tried. What shall we do with the slides?

F. R. F.—1 (*a*). As close as it is practicable to put it without making the illumination unequal—let us say, six inches in an ordinary case. (*b*) About eight inches in diameter; but there is no reason why it should not be rectangular, and of the exact size of the negative. (*c*) Close together, or with an interspace of about half-an-inch. 2. (*a*) Yes, unless the box is large, and the air-ways are left very free. The larger the box is the better, the only limit being the inconvenience of working with one of very large dimensions. We suggest sixteen inches high, twelve inches across, and nineteen from front to back. An eighth-inch reflector will serve, and you must find the best position by trial. (*b*) An Argand gas burner may be used, but it is not quite so efficient; that is, not so rapid in its action.

H. E. M.—Thank you for the cuttings. It is no uncommon thing; but to notice it would be to give a free advertisement to the publication in question. It is a journal built up almost entirely of matter appropriated without acknowledgment.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

VOL. XXIX. No. 1378.—*January* 30, 1885.

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PRINTING BY ELECTRIC LIGHT.

WHEN, a few years ago, the question of the electric light came so prominently before the public, photographers—almost without exception—began to look forward with confidence to the halcyon days when they would be independent of daylight for all photographic operations. How far their expectations have been fulfilled in this country is pretty well known. Portraiture by electric light is becoming an every-day affair. In the process of enlarging, the arc light is becoming more and more popular; but as regards the ordinary work of printing little has been done, although it has, from time to time, been proved that a print on albumenized paper may be got by the aid of the electric light. Still, as each winter nears, and we in London are plunged into the gloom of never-ending fog, we cannot help turning eyes of yearning in the direction of the electric light, thinking of it in connection with printing. That the same holds in Germany is shown by an article in a recent number of the *Photographische Wochenblatt.* Moreover, it is evident that the Editor of the *Wochenblatt* takes a tolerably hopeful view of the matter. We quote from the article referred to:—

> "By any who consider how the light is reduced during our winter months, often for weeks together, by yellow fogs or thick clouds, it will not be denied that, particularly in our climate, there will in the future be many establishments set apart for the sole purpose of printing or photographic copying by the electric light."

If the Editor of the *Wochenblatt* imagines that he can claim for Germany a monopoly of "yellow fogs or thick clouds," we think he is vastly mistaken. We have always considered that London excelled in that particular direction.

It may be remembered that, in treating of the subject of silver printing by the electric light in the NEWS some time ago, we mentioned that we had found difficulty from the fact that, if we placed the printing-frame so near the light that printing went on tolerably rapidly, the heat was great. This fact is borne out by the Editor of the *Wochenblatt,* who says that in experiments which he had made, when "the printing-frame was brought to a distance of one metre from an arc light, the heat was so great that, not only was there danger of the breaking of the negative, but that many kinds of varnish were so softened that the print stuck fast to the negative."

Herr Himley has recently been experimenting in various ways with a view to overcoming the difficulty of the excessive heating referred to, and the article in the *Wochenblatt,* which we have already mentioned, is chiefly taken up with accounts of these experiments. An interesting table is given wherein are shown the results as regards time taken, for printing and increase of temperature when, on the one hand, there is used a white reflector with matt surface, on the other Herr Hauptmann Himley's "diffuser."

We can scarcely afford space to reproduce the table as it stands, but we may briefly sum up the results which it shows.

The experiments were all performed at the distance of one metre from the light. The actinic strength of the light was estimated by Vogel's photometer, freshly sensitized albumenized paper being used, all pieces for testing being cut from the same sheet.

In the first set of experiments with the reflector a single arc light giving "at the most favourable estimate" 1,200 candle light, and absorbing 2 hp., was used. In the second set, with the diffuser, two lights, giving each the same candle power as that used in the first, and each absorbing the same power, were used.

With the single light and the reflector the time required to bring out No. 17 on the photometer was 80 minutes. In the meantime the temperature at the photometer was raised through nearly 20° Fahr.

With the double light and the "diffuser" the time taken to get the same number on the photometer was 145 minutes, whilst the temperature was raised through only 4½° F.

Comparing the results to be seen here with those got with what is described as "exceptionally good winter daylight," we find that in the case of the sunlight 18½ on the photometer was brought out with an exposure of 95 minutes.

From this we may assume that with an arc light of, say, 1,000 candles and a white reflector, we may print at a distance of a metre about as rapidly as in very good sunlight in winter.

Comparing again the results got with the reflector and the diffuser, we see that, although heating is decreased by the diffuser more than proportionately to the actinism, the latter is also very materially reduced. In the exact proportion of 29 to 8, if we make allowance for the two lights in the one case, the one in the other.

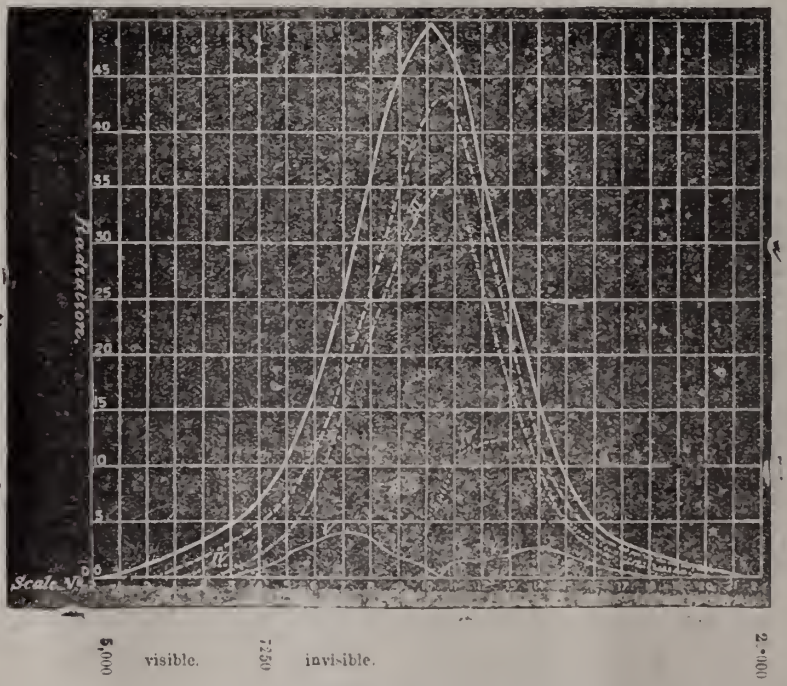
Against this we have to place the fact that the diffuser illuminates a considerably larger area than does the reflector. The reflector illuminates, it appears, an area of only ·96 square metres, whilst the diffuser illuminates an area of 2·88 square metres. If, therefore, our work is on so large a scale that we can make use of the whole area of nearly three square metres—somewhat over 30 square feet—we very nearly make up, in the case of the diffuser, by the extra number of the frames which we may place in the light, for the longer exposure which we have to give, while we have the advantages of a scarcely appreciable increase in temperature in place of a very decided heating.

Himley's "diffuser" is described and illustrated on page 5 of our present volume.

HEAT MEASURERS AND PHOTOGRAPHY.

It is very often forgotten, though for some purposes it should be remembered, that when light passes through different media, such as coloured glasses, not only are the visible rays cut off, but that in the ultra-violet and ultra-red part of the spectrum there are rays which have also to be taken into account. It is more particularly the ultra-violet rays which must be reckoned with by photographers. If a thermopile of a proper shape be moved along a solar spectrum, or that due to artificial sources, the sensitive galvanometer which, by the amount of the deflection of the needle, indicates the heating of the thermopile from the different radiation, tells us that very little heating power or energy is existent in the ultra-violet or blue end of the spectrum. When the pile is in the yellow, there is a decided deflection of the needle, and as it enters into the red, there is a still greater deflection, which attains its maximum far beyond the limits of the visible spectrum, and then lessens till at length there is no indication of any radiant energy whatsoever. We may remark that the heating power of radiation is an exact measure of its energy, and a thermopile is an excellent way of making comparative measures of the heating power of the heat, as it can be made to indicate a rise in temperature of as small a quantity as $\frac{1}{1000}$ of a degree in the lamp-black with which the face of the pile is covered. Captain Abney has at various times shown that certain kinds of yellow and orange glass are permeable by part of the ultra-violet spectrum; and in a paper read recently before the Royal Society by him and Colonel Festing, they have attacked with success the ultra dark part of the spectrum, and their results have a certain amount of interest for photographers. It will be in the recollection of our readers that Captain Abney prepares a collodion emulsion with which he is able to photograph a kettle of boiling water by its own radiation—that is, by the dark rays which radiate from lamp black. Now, in analysing these dark rays with a prism, they are so crowded together that in the case of solar radiation it is impossible to distinguish in a photograph impressed by them anything beyond general indications that the earth's atmosphere, or that of the sun, absorbs certain masses of them; and it was hopeless to find any similar fine lines to those which are called Fraunhofer lines in the visible part of the spectrum. In order to ascertain the existence of such, it becomes necessary to use a diffraction grating, by which the dark rays are as much separated as the visible. Unfortunately, with a diffraction grating there are what are termed different orders of spectra on each side of a central image of the slit through which the light to be analysed passes.

The two spectra nearest the image of the slit are called spectra of the 1st order, those next of the 2nd order, and so on, and the ultra-violet of the 2nd order overlaps the ultra-red of the 1st order, whilst the blue of the 3rd order overlaps the red of the 2nd. It is evident that if a sensitive plate were placed in the spectrum of the 1st order, the plate would be impressed by the ultra violet of the 2nd order, and that the photograph would therefore be valueless if it was required merely to photograph the ultra red rays. One way, though there are others, of getting over this difficulty is to place coloured glass before the slit of the spectroscope, such that all the rays from the ultra-violet to green, yellow, or red, are absorbed, and then to photograph this filtered spectrum. The question, then, is, what medium is the best to employ; it being an essential that the rays to be photographed should be as little affected as possible, whilst the other rays should be cut off. To this question Captain Abney and Colonel Festing have given a decisive answer. The source of radiation they employed was a small glow lamp kept at a temperature of about 1650° by means of an electric current. After the radiation had passed through various media, thermograms of the spectrum were recorded by means of the thermopile. The annexed diagram will give an idea of the results No. I curve is that of the unshaded lamp, showing no absorption of any special kind, as would be expected. No. II, that of orange glass, the orange being obtained by flashing one side of the glass with oxides of silver and antimony, and the other with cuprous oxide. No. III is that due to ruby glass, whilst Nos. IV and V are those given by the absorption of cobalt and green glass respectively, the latter being obtained by flashing with a mixture of the oxide of iron and cupric oxide. It will strike even the uninitiated that orange and ruby glass are far better media for the purpose in question than cobalt or green glass;



The scale number means tenths of an inch in the height of the spectrum. The height of the curves are relative heating effects."

the two former cut off but few of the dark rays, whilst the two latter allow but few to pass. The dip in the cobalt glass curve is suggestive of the absorption in the visible spectrum which takes place with the same glass. In reference to the different uses of these glasses, the authors remark :—

"In a paper by Captain Abney, which appeared in the *Philosophical Magazine* (vol. x., 1880)* it was shown that the reversal of the photographic image was caused by rays of low refrangibility. If a photographic plate which has been exposed to white light in the camera be subsequently exposed to radiations of low refrangibility—as, for instance, light passing through a combination of ruby and orange glass—we should expect there would be a gradual extension of the effect of the white light. This is true in practice, though it rarely happens that the after-exposure to such radiation is sufficiently prolonged to be hurtful. A case, however, might arise where a knowledge—or perhaps it should rather be said an appreciation—of this fact would be of practical use. In such a case, the visible radiation coming through a combination of cobalt and orange glass might be successfully employed."

In the paper in question, other absorbents, such as iodine in alcohol and in bisulphide of carbon, are discussed, and the latter, in conjunction with orange glass, is recommended for the purpose in view, as this had cut off nearly all the visible rays and only allowed the heat rays to pass. There are one or two other curious observations made in the same paper. In all text-books dealing with the subject, a solution of alum, it is told us, cuts off all the heat rays from a source of radiation. It is found, however, that two thicknesses of ordinary water is equivalent to one of alum, and that even then a very large number of heat rays pass.

We have drawn attention to this paper chiefly on account of the principles which underlie it, viz., making a heat-recording instrument a hand-maid to photography. It can scarcely be supposed that the elaborate experiments here recorded would have been undertaken except to aid photographic investigation. Captain Abney, we believe it was, who said that "photography was the best introduction to science," and certainly we have here an exemplification of the same. We would just call attention to one other fact, which is, perhaps, more astounding than any other, viz., that the lowest wave-length recorded in the thermogram embraces nearly ten times the visible spectrum. In this immense region lies a mine of scientific wealth, which has only been slightly worked. Judging by present appearances, it is to photography that we must look for exhibiting its vast treasures.

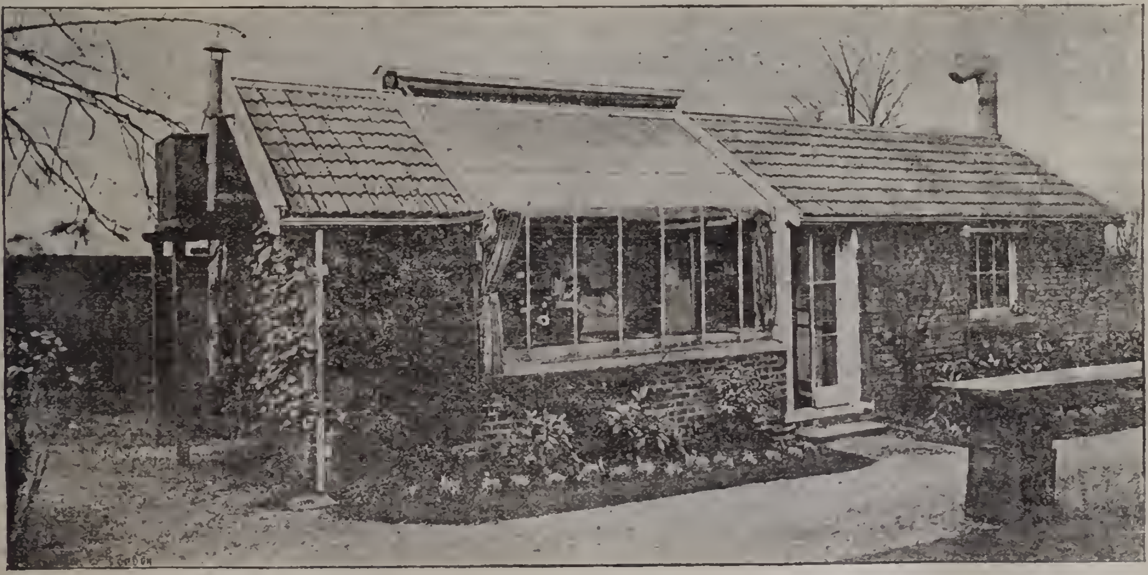
At Home.

WITH MR. MATTHEW WHITING AT WANDSWORTH.

A photographic establishment so complete and so well-found as that of Mr. Whiting is a rare possession for the amateur, and it is not too much to say that many a professional photographer in a good way of business is not nearly so well supplied with conveniences for working.

While taking us to his studio and dark-room, which are at the extreme end of the garden, our host makes a halt before an arrangement which recalls the shunt-board at a telegraph office ; and after having manipulated the keys, he tells us that we can now walk into the glass house without ringing the electric alarm bell ; and unless a twinkle of Mr. Whiting's eye was misinterpreted by ourselves, we fancy that any person invading the photographic premises with felonious intent might possibly become the subject of a practical demonstration as to the disturbing influence which electricity may have upon the nervous system.

Here is a photograph of glass-house and laboratory, and



on entering, one sees signs of active work on every side, but almost altogether in the direction of landscape photography, the appliances specially adapted for portraiture being evidently somewhat out of use. As to the glazing of the skylight, there is one point noticeable—and this is very well illustrated by the phototype block—namely, the avoidance of eaves and gutters by the use of bent glass. As will be seen, the panes are large, so that only seven pieces of bent glass are required. Warmth and ventilation are well provided for, a coal stove serving to warm the studio, while the ingress of cold air takes place through cast iron gratings on the floor-level.

The glass room or studio is the head-quarters of the printing department, and as Mr. Whiting seldom—or more probably never—refuses to give his friends such copies as they may wish for, and moreover, he mounts his prints in optical contact with glass, the production of the positive copies involves no small amount of work. The chloride of gold used for toning is made by dissolving an Australian sovereign in *aqua-regia*, and diluting with about twenty-one ounces of water. Each drachm of this solution will tone a sheet of paper under ordinary circumstances, and supposing that eleven sheets are to be toned, the following is the procedure :—Eleven drachms of the highly acid solution of chloride of gold are measured out and diluted with a pint of distilled water, when prepared chalk, or whiting, is stirred in until there is a slight excess, this being known by the solution remaining thick or turbid after a thorough agitation. Next day the clear liquor is poured off and diluted with two or three times its volume of water, the solution being then ready for use. Mr. Whiting does not approve of very long washing, about four hours being the time he generally allows; but he strongly insists on the importance of *thoroughly draining the prints after each washing*, and we may safely aver that the hyposulphite is far more effectually removed by Mr. Whiting in four hours than by long washings—extending over twenty hours or more—as given by many others.

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* Photographic News, 1880, 435, 454.

We have not yet finished with the printing. When the prints are dry, they are ironed with a moderately warm iron, and trimmed to a trifle under the size of the glass plates upon which they are to be mounted; these plates being 7¼ by 5¼ inches, or, in other words, the same size as the negatives. The glasses are well washed, and any adherent dirt rubbed off, after which they are placed in a metal vessel containing hot water, and if much work is to be done it is found convenient to keep this at about 100° F. by means of a gas burner. The gelatinous solution, which consists of one part of fine hard gelatine dissolved in twelve and a-half parts of water, stands ready for use in a flat dish, this dish being kept at about 100° F. by means of an outside hot-water jacket; and before the worker is placed a stout slab of plate glass, on the top of which is cemented a piece of thick cardboard about the same size as the prints. A sheet of glass is now taken from the warm water, the loosely-adhering water is swung off, when one of the prints from the gelatine bath having been laid, face downwards, on the glass, the excess of gelatine is drained off, and contact between glass and print is established by use of a squeezee. The patch of cardboard, which has already been mentioned as being attached to the plate glass slab in front of the worker, makes an admirable support for the plate while the print is being squeezeed into contact with the glass, and it may be mentioned that the most convenient way of making a squeezee is to take a strip of rubber two inches wide and ten long, and to sandwich this between two laths of wood an inch and a-half wide, so that a quarter of an inch of rubber projects on each side; screws or rivets being used to hold all together. When one of the projecting rubber edges of the squeezee is drawn over the wet paper, a very perfect contact is established between the glass and the print.

The next step is to wipe the face of the glass on a towel, which hangs over the edge of the bench, after which a little of the gelatine solution is rubbed over the back of the paper, and the plates are laid on approximately level bars to dry. When dry the glass is cleaned on the face, and the glass is fixed—by means of strips of gummed paper—behind a cut-out mount, which measures 10 by 8 inches outside, the opening being about 6¾ by 4¾ inches.

Mr. Whiting makes his own emulsion, and that part of his work-place shown on the right-hand side of our illustration is divided off from the glass-house, and specially fitted for dry-plate making and for developing. Double doors serve to make ingress and egress safe during the progress of work.

All the benches and sinks in the preparation room are carefully levelled, so that when a dish is placed upon a table, or on rules of wood, reaching from edge to edge of a sink, one is sure of the work not being much out of the horizontal position.

Ample provision is made for controlling the lighting of the dark room—a large gas lamp, provided with an exit, tube, leading the products of combustion into the external air, serving for night work; while two windows—the light of which is quite under control—make it easy to work in daylight of varying intensity. The small casement window, which looks out of the end not shown in the illustration, is that generally used when plates are to be developed, and on the inside of its frame fits a second casement window, which can be lifted off its hinges as required, or left partially open, according to the intensity of the light outside.

The ammonia method of Eder, and also the boiling method, are both employed by Mr. Whiting in making his emulsions; but with respect to the former, he remarked that exceptional care is required, or the plates will tend towards green fog; still, if this should be the case, they must be developed with the soda developer.

For dividing the emulsion a large circle of fine canvas is used, the edges being gathered together on a ring or hoop of wood, so that the canvas can hang down loosely in the pan of water where the threads of emulsion are to be collected.

The drying cupboard, which is kept constantly warm by means of a gas stove, and serves as a storehouse for such things as it may be important to keep thoroughly dry, is almost a small apartment in itself, and it will conveniently take six or seven dozen plates.

The cottage at Midhurst, which forms our supplement this week, will show our readers how successful Mr. Whiting is in securing good photographs of our country scenes; and the blocks illustrating his article on page 67 will further show what class of subjects he so much delights to reproduce by means of the camera.

THE INTENSIFICATION OF GELATINE PLATES*

BY ARNOLD SPILLER.

NOTWITHSTANDING the fact that a good deal of atttention has been given to the subject of intensifiers, but few photographers are satisfied with the results obtainable with the mercury methods. For my own part, I think that a perfect intensifier for gelatine plates as compared with the silver re-developer for collodion films does not exist; yet there are several processes, if used with care, that answer well for most purposes, and perfectly in a few cases. It will, no doubt, be of interest to some of the readers to explain here the difference between the silver solution acting with collodion film, and the mercury with gelatine.

In the collodion film the image is on the extreme surface, and the particles of silver on the film attract the crystalline silver precipitate which gradually separates out from the depositing solution. In the high lights, where there is a greater conglomeration of silver particles, a larger proportion of metallic crystals are deposited, because the attractive force there is greater. Thus in the intensification of a collodion film the second deposit is in exactly the same proportion as the first, and therefore the delicate gradation of the original image is perfectly preserved after the process of intensification. In the treatment of a gelatine plate with the mercury intensifier the effect is very different, for the image is not only on the extreme surface, but in the denser parts the deposit is situated throughout the thickness of the film. When treated with the mercury solution, the half-tones and details in the shadows of the negative are at once increased to double their original density, while only the surface of the deposit in the high-lights is attacked; therefore the increase in density of the latter is not more than perhaps twenty or thirty per cent., supposing that the negative under treatment only requires a moderate amount of intensification. In such a case, the image greatly loses its brilliant contrast—or, technically speaking, a general "flatness" in the resulting photographs is noticeable. This tendency of the mercury intensifier to produce "flatness" may, in some few exceptional instances, be turned to good account, as when a negative possesses too much contrast, but requires a slight strengthening of the image. There is still another example where the mercury solution will, if employed, yield results well nigh perfect—I refer to the intensification of very thin images, as are frequently produced with highly sensitive commercial plates. In this latter case the silver deposit should be subjected to the action of the mercury till the entire image is attacked—often a matter of seven to ten minutes—when, of course, the negative preserves its original delicate gradation after the process of intensification. By mercurial intensification I mean the process of bleaching the silver deposit with a mercuric salt, and then treating with some compound capable of blackening the image, such as ammonia, sulphuretted hydrogen, sulphite of soda, or ferrous-oxalate. The effect of mercuric chloride (the salt usually used) on the silver image is to convert the latter into silver chloride, and, at the same time, to deposit locally mercurous chloride; thus the bleached image consists of chloride of silver and mercurous chloride. In the process of blackening it is generally only the latter that is affected—*e.g.*, ammonia forms the black amido-chloride of mercury; while, again, sulphite of soda reduces the mercury salt to the metallic state. With sulphuretted hydrogen, or sulphide of ammonium, both the chlorides in the image are converted into the corresponding sulphides, and also ferrous-oxalate reduces the two chlorides to the metallic state.

When the process of reduction by sulphite of soda or ferrous oxalate is employed, it is possible to obtain almost any amount of intensity, and thus perfect printing negatives may be obtained from mere phantom images. To obtain such results it is only necessary to repeat the process of intensification a sufficient number of times till the desired intensity is produced. The negative, after being thoroughly washed from the sulphite of soda or ferrous oxalate reducing solution, is plunged directly into the mercuric solution, and the process proceeded with as usual.

There is one great defect always met with in mercurial intensification, more especially when ferrous oxalate or alkaline sulphide is used in the after treatment; I refer to the staining of the shadows due to the mercuric salt combining with the gelatine of the film to form an insoluble compound, which is afterwards rendered visible by conversion into sulphide or metallic mercury. No doubt the fading of mercurial intensified negatives is due in a great measure to the spontaneous decomposition of this organic mercury compound; also to the presence of the latter, together with the reduction of silver chloride, may be due the increase of intensity of negatives after exposure of some hours to light during printing. It is thus, I think, very evident that some method of preventing the formation of this organic compound should be employed; and I am glad to say that I have discovered a suitable means of carrying out the desired end. It is a well-known fact that free acids act as powerful restrainers in preventing the combination of metallic salts with organic substances; as, for example, the use of citric acid in hindering the formation of albuminate of silver in sensitized albumenized paper. In the same way, I find that hydrochloric acid prevents the formation of the gelatino-mercury compound. In proof of this assertion, I will cite here an illustrative experiment. An ordinary gelatine negative was cut in half, one piece was treated with the usual neutral mercuric solution, and the other was immersed in a similar solution, but containing a small proportion of hydrochloric acid; both films were then thoroughly washed in the same dish.

The two plates were next cut up into three, and one piece from each was treated with solutions of ferrous oxalate, ammonium sulphide, and dilute ammonia respectively. On examination it was found that while all the films that had been immersed in the acid mercury bath presented beautifully brilliant negatives and quite colourless in the shadows, those pieces from the neutral bath were more or less stained. I should mention that the alkaline sulphide solution developed the most stain, and was of a very non-actinic brown tint; ferrous oxalate yielded a less conspicuous grey deposit, while the ammonia gave the least objectionable result. It was found, however, that the ammonia-treated film turned quite brown on after treatment with the sulphide solution, proving that the ammonia did not remove part of the mercury, but the latter remained to a certain extent *in embryo*. For the intensification of gelatine films in which a preliminary treatment with mercuric chloride is required, I recommend the following solution:—

Saturated solution of bichloride of mercury	20 ounces
Hydrochloric acid (strong) ...	½ dram

A larger proportion of the restrainer might be added when treating hard films, but for general purposes the above formula is preferable, as the acid is liable to produce frilling.

Although not generally used, and probably unknown to many, the most perfect method for intensifying gelatine films is that in which a mercury compound is used simply as a carrier for silver, but does not actually exist in the final result. The process to which reference is made depends on the reduction of silver cyanide by a mercurous salt; the film is bleached in a solution of mercuric bromide, and, after slight washing, is immersed in a bath of cyanide of silver dissolved in cyanide of potassium. By the first treatment, the silver image is converted into mercurous and silver bromides, as is illustrated in the following equation:—

$$\overset{\text{Mercuric Bromide}}{HgBr_2} + \overset{\text{Silver}}{Ag} = \overset{\text{Mercurous Bromide}}{HgBr} + \overset{\text{Silver Bromide}}{AgBr}$$

In the second reaction the mercurous bromide reduces the silver cyanide to the metallic state, thus:—

$$\overset{\substack{\text{Mercurous}\\\text{Silver Bromide.}}}{HgBr.AgBr} + \overset{\substack{\text{Potassic}\\\text{Silver Cyanide.}}}{AgK(CN)_2} = \overset{\substack{\text{Mercuric}\\\text{Cyanide.}}}{Hg(CN)_2} + \overset{\substack{\text{Potassium}\\\text{Bromide.}}}{KBr} + \overset{\substack{\text{Bromide and Metallic}\\\text{Silver.}}}{Ag.AgBr}$$

From the above it will seen that the intensified image is composed of metallic and bromide of silver, so that should the deposit, after the treatment, be too intense, it can easily be reduced by a bath of dilute hypo, which dissolves the bromide.

The formula which I recommend for intensifying by this process, although possessing little that is novel, may prove of value to many of the readers who have no experience with the method. The following solutions are required:—

A.—	Bichloride of mercury	1 dram
	Bromide of potassium	1 ,,
	Water	16 ounces
B.—	Nitrate of silver...	1 dram
	Cyanide of potassium	1½ drams
	Water	8 ounces

The commercial cyanide of potassium is quite pure enough for this purpose; but if the pure salt be used, only 1 dram should be taken. The solution of cyanide should be made at least twenty-four hours before required, and the liquid shaken briskly from time to time, to ensure the saturation by the silver. Even after standing for the above period, a large precipitate will remain undissolved.

A negative to be treated by this method is first soaked in A till the image is more or less bleached, according to the amount of intensification required; it is then washed in two or three changes of water, and placed in another dish containing B, and there allowed to remain until the white deposit is blackened throughout the whole film. The latter is finally very thoroughly washed, preferably in running water, for about half an hour, in order to remove every trace of the silver. Negatives treated by this means ought to be permanent, as the cyanide acts like hydrochloric acid in dissolving out every trace of mercury.

In conclusion, I advise the addition of a small proportion of hydrochloric to the mercury bath for all processes in which the chloride *per se* is used; but when expense is no object, the mercuric bromide and silver cyanide is the most satisfactory method for gelatine films.

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'CYCLING AND PHOTOGRAPHY IN WINTER.

BY HENRY STURMEY, EDITOR OF "THE CYCLIST."

WINTER hath charms to both photographer and 'cyclist, and so also hath it many concomitants which render it anything but charming to either. Still, we must take things as they are, and not as they ought to be, and make the best of the gifts of nature as they are dealt out to us, to do which we obtain the best results when we know what most to avoid and what most to seek after. 'Cycling and photography work hand in hand alike in winter as in summer, and the wheel, in one or other of its various forms, will be found as useful an adjunct to the camera during the winter frosts as under a summer sun, in each transporting its owner with celerity and ease to "fresh fields and pastures new," where he may steal the face of nature and secure her charms by the aid of his faithful camera.

In our moist and changeable climate we have many variations of weather to contend with, and winter work in the open is attended with many discomforts, and at times rendered almost impossible, the disagreableness and positive danger to health of either riding or standing about for photographic purposes in a cold damp drizzle and a biting East wind, for instance, far outweighing any pleasure to be got from either ride or photograph; whilst a good thick fog will quite put a stop to all camera work, and render riding slow, anxious, and dangerous. On the other hand, a clear day, a hard frost, with perhaps a trace of snow on the surrounding landscape, will give—save the shortness of daylight—almost all that both photographer and 'cyclist can desire, and the ride through the clear, crisp, bracing air to the place of action will be immensely enjoyed, whilst at the same time most charming pictures of nature in winter's garb secured.

In following out the combined pursuits on such a day I would, however, utter a word of warning to the photographer. Let him not be led by the exhilaration induced by the ride to neglect the caution of wrapping up whilst working his camera. The body gets pleasantly heated, and the rider is apt to think he will be quite safe in getting his apparatus in order and taking the desired view without further care for himself; and, indeed, will probably rather congratulate himself on the pleasant warmth the tricycle work has given him. It will be a mistake, however, and he should not neglect to put on a light scarf, turn up his collar, button his coat more closely around him, and I would even recommend the slipping on for the time being of a broad flannel body-belt, for photo. taking is by no means active work compared with 'cycling, and the heat of the body becomes rapidly reduced. I give this advice as the result of painful experience, as my sister, who accompanies me on many of my 'cycling photographic expeditions, is even now but slowly recovering from a severe illness induced by a cold resulting from a neglect of this precaution so long ago as last November.

For all-round work in winter time a good strong machine will be wanted—I am speaking essentially of the tricycle. It will be of little use unless a "double driver," and the larger the wheels in moderation the better. The tyres should be thick, and care always taken to see that they are securely cemented into their rims, for winter work tries tyres terribly.

With this and the camera that suits him best, the 'cycling photographer will have to fight the weather. If foggy, wet, or blowing cold from NE. or E., he had better stay at home and develop his plates or work up his prints. If ordinary weather without frost, he can do pretty well as in summer time, but for the low actinic power of light, and the shortness of it for photographic purposes, and the patches of stones with which the several Local Boards at this period of the year usually "darn" the surface of our roadways. If winter be not far advanced, autumnal snatches of scenery can be obtained, showing the trees and hedgerows half denuded of their leaves, which lie thick in the roadway below; but, unfortunately, the real beauty of the autumnal dress of nature is lost to the camera user, who is here placed at a disadvantage with the plier of camel's hair and pigments, for he cannot catch the glorious tints and colours of departing vegetation. In this connection I do not know how far isochromatic plates may improve our pictures, for I have not put them to the test, nor do I know of any instance in which they have been utilised for the "taking" of autumn leaves.

After a thaw succeeding a hard, or long-sustained frost, especially if there has been much snow, the state of the roads will be one uncompromising state of mud, and this material will pervade everything under foot or wheel. At times such as these there are often to be found by the searching many picturesque views, for the sun may be bright and the air clear; so if the photographer have any special objects in view he will never mind the muddy covering of the earth, but sally forth on his wheels and secure them, though I would not counsel him to ramble forth purely "in search of the picturesque" on such a day, for though the labour of working the machine may not be great, owing to the softness and inconsistency of the mud, yet its discomfort will be great, for the liquid gritty mud penetrates everywhere and permeates everything; his clothes, his camera bag, his tripod, and every part of his tricycle will be spotted and soiled by the splashes. Ever and anon a wet nasty splash will be thrown on his hands; in a thoughtless moment he wipes it off with his handkerchief; and, a minute later, forgetful of this, he removes a bead of perspiration from his brow with the same *mouchoir*, and, lo and behold! the mud remains as a neither neat nor gaudy ornament to his countenance. His chain, cranks, and pedals, and all bearing parts get clogged and filled with grit, and nothing but a general over-haul will restore that machine to its pristine beauty. No, the game is not worth the candle, and my advice is, "stay at home when the roads are a sea of mud;" there will always be plenty of dark-room or other work found to do.

A good frost, however, as I said before, finds both 'cyclist and photographer full enjoyment. Unless the frost follow immediately on the afore-mentioned "sea of mud," the roads will be hard, dry, and in fine running order, with not even any dust to hold the wheel tyres and cause extra work; and even in that case, if there be a day or two's continued frost, the passage of a few waggons will wear down the ruts, and make the going even. Now, indeed, can the 'cyclist enjoy himself, for provided he be suitably and sufficiently warmly clad, he can "put in all he knows" till he is out of breath without becoming exhausted or more than pleasantly warm; in short, he is able to secure by his own exercise "not too much warmth, but just warmth enough," and to select some of the most charming scenes imaginable on which to bring his camera to bear.

A storm of snow will, like distance, lend enchantment to the view, though there may be too much of this, as of every other good thing under the sun. We may have too much snow from both a 'cycling and a photographic point of view, for from the former aspect, whilst an ordinary shower will not materially affect the progress of a good and not too highly-geared double-driving tricycle, a long continuance of a storm will prevent the 'cyclist getting through at all. A snow storm sometimes serves to improve matters rather than otherwise by covering the ruts, and fresh-laid stones, so as to render them harmless; and if a real hard frost or two follows on a medium layer of snow, a fairly good travelling surface is the result, though when the deposit exceeds four or five inches in depth the work of propulsion is rendered excessive, and all the pleasure taken out of the ride, which had better be abandoned at this stage of things. As to what snow and hoar frost can do for the photographer by improving and putting an entirely new aspect on the landscape, I need only refer to the beautiful "Winter Scene" of Mr. Valentine, given as a supplement to the News on January 2nd, which speaks for itself. Would that we had more opportunities for the production of such pictures in the Midland and Southern parts of England. Our confrères in the North and in some other lands are happier than we in this particular.

Perhaps, however, the most enchanting combination of work with the camera and the wheel in the winter time that I know of, and one which I think almost beats the best opportunities of summer work, is ice work on a river or lake. In this part of the country—the English Midlands—it is almost unobtainable, such is its rarity, but I have enjoyed it once, and have been thirsting for a repetition ever since. It wants a good three weeks of real "black" frost to freeze the ice thick enough to bear in safety the rider and machine. I say "in safety," for delightful and intoxicating almost as it is, I do not think it worth the risk of attempting on insecure ice. With a good sheet of ice fifteen inches to eighteen inches thick below, and a smooth surface above, the work of propulsion is reduced to a minimum. There is not the slightest vibration or sign of a jolt. Entirely without noise, and almost without an effort on the part of the rider, the machine glides on, and as each turn of the river brings some fresh display of nature's charming beauty in frost, snow, and ice to view, one feels quite undecided on which to direct the camera first, such is the *embarras de richesse* with which one is surrounded and met at each turn. Residents of less variable climes may be able to enjoy this year by year as a regular thing. Happy mortals. Do they enjoy it? I cannot say, but I certainly, once having once tasted its delights, am ever desirous of doing so again, for I must repeat my opinion that work on the frozen river is the *summum bonum* of 'cycling and photography in the winter.

A Dictionary of Photography.

AUROTYPE (*aurum*, gold).—A printing process due to R. Hunt. Paper is washed with a solution of the double chloride of gold and chloride of potassium, dried, and then treated with a solution of nitrate of silver. The prints are fixed in hyposulphite of soda solution.

AUTOTYPE.—*See* Carbon Printing.

AVOIRDUPOIS WEIGHT.—*See* Weights and Measures.

AXIS.—The straight line, imaginary or real, upon which a body revolves or may revolve. Optical axis is the central line of the bundle of rays passing through or emerging from a lens.

AXOLOTL.—An aquatic lizard found in Mexico. If kept in the dark it is of a deep brown tint, but on exposure to light becomes nearly white; the dark pigment appearing to fade under the action of the luminous rays.

AZOTE.—The old name for the gaseous element, nitrogen. It is not now used in England, but is still met with in continental works on chemistry; where, also, its derivations, *azotic* acid and *azotate*, are used instead of *nitric* acid and *nitrate*.

BACKGROUND.—The term background is frequently used in two senses by the photographer, as it may on the one hand be used to indicate those portions of the picture which occupy a considerable proportion of the sheet and are subordinate to the principal subject; or, on the other hand, it may denote such studio properties as, when placed behind the sitter, serve to cut off the view of undesirable objects, or to aid the photographer in realizing any effect he may wish for.

As regards the background of a photograph, one need say but little, except to give such details as may enable the reader to print in a fresh background, or, what comes to about the same thing, to combine any landscape and sky which may appear to be especially adapted for each other. Some manipulative skill is required to so make the combination that the line of junction shall be scarcely noticeable; and careful judgment must be exercised in the selection of subject and background, so as not to bring incongruous features into juxtaposition, as, for example, lighting from differen points.

The following manipulative details as to a convenient method of working given by Dr. Liesegang in the *Photographisches Archive* are excellent, and he also explains how to proceed when a vignette is required.

Upon the film side of the negative is laid a piece of yellow paper, and upon the latter is traced, by the aid of a pencil, an outline of the figure, holding up both against the light in order to do so. With a sharp penknife the figure is then cut out of the yellow paper, the same being put upon a plate of glass to facilitate the operation. The outer portion, which represents the background, is then attached, by means of gum, to the reverse side of the negative. When necessary, a little modification of the mask may be managed with a brush and some cinnabar, the pigment being also applied on the glass side of the negative. On the film side of the negative, the outline may also be further softened with a stump and graphite.

From this negative a print is now obtained, the portrait having, of course, a white background. If the background is to be shaded or vignetted, there is placed upon the printing frame a vignette mask, or a piece of wood with an oval opening, the under edges of which are bevelled, this latter being placed about an inch or an inch and a half from the glass plate.

The print upon a white ground is laid, picture-side uppermost, upon a strong piece of patent plate-glass; upon it is put an oval or angular mask of black paper, and upon this the negative of the background to be printed-in, whatever it may be, landscape, interior, stippled plate, &c., the film surface being underneath. Upon the glass of this negative you trace an outline of the portrait, making a line inside the figure with a brush dipped in a mixture of red oil colour and olive oil; the cut-out paper figure is then pressed down upon the glass, so as to print off upon it the red outline. With a pair of scissors the paper figure is trimmed to the red mark upon it, the glass is freed from the colour with a rag, and a second time an outline is painted with the brush more accurately than before, so that the line goes inwards over the figure. The properly cut paper figure is laid upon this outline, and over the whole is placed a thin glass plate, upon which some more red colour is applied on the border of the mask, so that no direct rays can fall upon the join underneath.

When the picture, with the vignette upon a white ground, has been printed, it is necessary, in order that the lower part should be gradually shaded, to apply some of the red colour, which is so rubbed and disseminated that the light is more or less screened off, and no sharp outlines are produced. The whole is covered with a heavy glass plate, and placed upon a movable table to print. The table is shifted from time to time to prevent the light from always acting from the same direction. As it is now impossible to get a peep at the print to see how it is getting on, it may be necessary to have recourse to a photometer.

When the background has been printed in this way, the negative is removed, and upon the print, still lying on the glass plate, is put a sheet of very thin, clear glass. Upon the latter the red colour is again applied over the outlines of all portions which are to remain light, such as hands, face, linen, &c., and an impression of these red lines having been made upon yellow paper, masks of the latter are cut out and placed over the parts to be covered.

Upon this is laid a somewhat thicker glass, upon which the outlines of the covered parts are exactly followed with red colour. High lights, that are to be kept clear, are also covered with a few lines of red colour. The print is then exposed to the light again for a very short time, and, if necessary, shaded the while by some mechanical arrangement.

From this description many may think the process very tedious and complicated. In practice, however, it is very simple, and when some little practice has been attained in the matter, the printing goes on very rapidly.

Notes.

What should be the range of a whole-plate camera for out-door work? Mr. Warnerke answers this question by saying that it should focus down to three inches, and yet expand sufficiently for use with a lens of twenty-two inches focus.

A sergeant-major, writing to *Truth*, suggests, as a remedy for fraudulent enlistment, the photographing of every soldier, and the writing of his description on the back of the picture. The plan no doubt would be effectual, but is the game worth the candle? What is the cost of a little extra bounty money compared with the expense of photographing 137,000 men—the strength of the British Army in 1884, exclusive of India.

The paper of Abney and Festing, on Absorbtion-Spectra Thermograms, which was read at the last meeting of the Royal Society, will not be published for some weeks, but the leading article on page 66 will serve to give one a notion as to the principal points.

With the New Year our New York contemporary, the *Photographic Times*, drops its polychromatic cover, and comes out in plain black and white, the size of the page being enlarged to just double the old dimensions, making it now a trifle over that of the PHOTOGRAPHIC NEWS.

In the publisher's announcement, on the first page, we find that three editors are introduced to the reader: Mr. J. Traill Taylor (who, as the old Editor, needs no re-introduction), Mr. W. J. Stillman, and Mr. Charles Ehrmann. There seems to be a sharp competition between the American journals just now as to which can publish the most impressive and confidence-inspiring list of editors; and either by the aid of, or in spite of, the multiplicity of editors, the new issue of the *Photographic Times* is excellent, and we hope it will meet with the success it so well deserves.

The production of lactic acid, being the result of fermentation, is associated with the presence of a special organism—*Bacterium lactis*. Unusual forms assumed by bacteria of the kind in question have been discovered and photographed by Dr. Maddox, this matter having been brought before the Royal Microscopical Society at their last meeting.

"Solar Printing by the Electric Light," is how Mr. E. H. Bell, of St. Louis, heads his advertisement in the *Chicago Eye*. This is even neater than the "three wheeled bicycle," but will hardly hold its own against the "superior achromatic microscope, without lenses," which recently formed an item in the catalogue at a well known West End auction room much frequented by photographers. In the last number of the *Bazaar*, Mr. J. Dale, of Warrenby, Redcar, Yorkshire, tells of his desire to sell a good "smooth-bore rifle" for 10s., and we have great pleasure in giving his wish the additional publicity of our columns.

Photography is now taking an important position at the various High Schools in Russia, and we are glad to be able to report that Mr. Sreznicwski, Secretary to the St. Petersburg Photographic Society, takes one of the newly created chairs. He is now Professor of Photography and its scientific applications, at the High School of Civil Engineering.

The Photographers' Benevolent Association will hold its next annual meeting at 181, Aldersgate Street, on Wednesday evening next, the 4th instant, at eight o'clock. Those who wish to learn something of the working of the organisation in question would do well to attend.

Captain Abney is now Assistant Science Director at South Kensington.

Makers of cameras seem to vie with each other in producing landscape cameras with multiple motion to back and front, each new swing or motion being heralded as a triumph of constructive art. Still it must be remembered that rectangularity, parallelism, and accurate centering, a condition of things which engineers express by the general term "truth," are of very essential importance, and difficult to ensure in the face of the complex adjustments so lavishly provided now-a-days.

In forty-nine cases out of fifty the camera should either be "true" in the engineer's sense, or only put out of centering by raising the front; and it is a question whether it is not better to correct the fiftieth negative by copying, than to have eight or ten adjustments to look to each time the camera is used.

At the last meeting of the Liverpool Astronomical Society, the President remarked upon the valuable aid which photography renders in determining the colour of stars. He had often noticed in the negative that certain stars were either below their normal magnitude, or were missing altogether. On examining these stars with the telescope he almost invariably found that they were of a red colour.

The late Colonel Burnaby was one of the few celebrities of the day who managed to exist without photography's artful aid. It is said that not a photograph of the gallant soldier has ever been seen in the shop-windows, and that the portrait sold by the Stereoscopic Company is not a photograph from life, but a photograph of a drawing made by Mr. Wallis Mackay. Directly the news arrived from the Soudan of the Colonel's death, there was a rush to all the photographic dealers by the representatives of all the illustrated papers, and one was fortunate enough to secure the only copy to be had, at the enhanced price of fifteen shillings.

Photographers are among those especially liable to be inconvenienced by the frequent dynamite explosions of the present day, or rather by the somewhat erratic course taken by the authorities. Every policeman is firmly convinced that to halt more than once near a public building with an inconveniently heavy package, or to appear in the street with any apparatus showing intricate brass work, is suspicious; but, if one carries a black bag which, being too small for the mystic looking apparatus, allows a detective to get a mere glimpse of what he imagines is being concealed from him, a questioning and burlesque examination is almost certain.

The exceptional freedom from annoyance, interference, or interruption enjoyed by real dynamiters, can only be explained by supposing that they have carefully noted the stereotyped notions of the police as to what is "suspicious," and, by studiously avoiding all such appearances, they move about unnoticed.

Photographing the results of the explosions does not seem to have been performed with very remarkable success up to the present; on Sunday afternoon attempts were made at Westminster to obtain photographs by the light of burning magnesium, but the result was altogether unsatisfactory, better pictures having been since obtained by daylight.

The Chemical Society now publishes—in addition to the journal—abstracts of its own proceedings. No. 1, which came to hand on the seventh day after the meeting reported, contains a good abstract of each of the seven papers read on the 15th instant, also the discussions arising therefrom, together with general notices to members and a list of the papers read before the Royal Society.

That the daily papers will before long be regularly illustrated is very probable, and that the block illustrations made automatically from photographic originals will be largely used, is likely enough. Eight reproductions of sketches showing the effects of last Saturday's explosions appear in the *Pall Mall Gazette* of Monday. These might have been purely and truly photographic illustrations, and as such would have carried far more weight than at present.

It would seem, from the review of a recently-published work on "Billiards," that photography has been employed in what would appear to be a novel way. The successive positions of the balls on the table in the course of a long break have been photographed and reproduced in a series of diagrams for the benefit of students of the fascinating game in question. Here, then, is clearly an idea which we shall undoubtedly see developed in other branches of sport. At every cricket match of national importance arrangements will be made to give the public not only Mr. Grace's score, or Mr. Spofforth's analysis, but there will be in the illustrated "daily" of the near future accompanying illustrations showing exactly how the one made his principal hits, and the other bowled his most successful balls.

And how useful a similar method may be extended into the realms of rhetoric and politics. As it is, we all remember the old-fashioned star-lined diagrams in the "speakers" and "anthologies" of our youth, in which we sought to convey the proper gestures for the expression of rage and indignation, hope and despair. But there is no reason why the coming "Enfield Speaker" should not have photographed reproductions of the position of Mr. Gladstone's arms in "denunciation" and "accusation," or Mr. Bright's precise pose when exposing the horrors of war and the crassness of the Tory party. The notion turned to account in the billiard-book is, in short, capable of endless extension, as we have said.

An art critic of New York, who had recently been commenting on the soulless character of photographs, and the mischief done to true art by the camera, was very much struck with the remarkable skill of the engraver who so perfectly reproduced Mr. W. H. Gibson's tint sketches in *Nature's Serial Story*, by E. P. Roe. In fact, one of these engravings was pronounced by the critic to be the finest thing in the book.

How much that critic must have suffered when he heard that the reproductions were photographs—impressions from blocks made by the method of Ives!

A correspondent of a quasi-scientific contemporary plaintively writes: "After developing, the image comes out weak, and the prints present an indistinct appearance, the face especially being darkish, although I have exposed them in different lights. I have my diaphragm cut out to a hole three-quarters of an inch in diameter, so that it gives a shorter exposure. Is this an improvement? My developer is composed of common washing soda, diluted with water and pyrogallic acid." Common washing soda diluted with water and pyrogallic acid! And yet he wonders that for every good negative he gets "about half-a-dozen failures." There is a charming *naivete* about this communication which is very refreshing.

Patent Intelligence.

Applications for Letters Patent.

976. Alfred Pumphrey, 77, Colmore Row, Birmingham, for "Improvements in tripods for photographic purposes, applicable, also, to other similar uses."—Dated 23rd January, 1885.

1027. Robert Gallard-Mason, 4, St. Ann's Square, Manchester, for "Improvements in micro-photoscopes."—Dated 24th January, 1885.

1072. James Thomson, 4, Clayton Square, Liverpool, for "Improvements in photographic cameras."—Dated 26th January, 1885.

1120. Frederick Woodward Branson, 33, Chancery Lane, London, for "Improvements in the construction of photographic cameras."—Dated 26th January, 1885.

1137. R. R. Beard, "Photographic camera clip."—Dated 27th January, 1885.

Patents Sealed.

1251. George Rydill, of 52, Chancery Lane, in the county of Middlesex, for "Improvements in treating photographic transparencies or transfers so as to represent stained glass."—Dated 11th January, 1884.

13,774. John Mitchell Dowling Worsnop, 4, South Street, Finsbury, London, for "An improved method of transferring the film of photographs, or a film of colour painted upon photographs, to canvas or other surfaces."—Dated 17th October, 1884.

Specifications Published during the Week.

14,335. William Griffith Honey, of 3, High Street, Devizes, in the County of Wilts, Artist and Photographer, for an "Improved holder and dark slides to be used therewith for sensitive plates."—Dated 30th Oct., 1884.

The first part of my invention relates to ordinary cameras in which pictures are produced on sensitized plates by exposure in the camera; it consists of a movable holder with an opening in the centre to fit at back of the camera, having grooves on one side to hold a single or double dark slide containing the sensitive plate or plates. The holder may be used either vertically or horizontally. On the reverse side are grooves for the focussing-screen.

The second part of my invention consists of a separate dark-slide of tin (or it may be made of wood), ebonite, brass, &c., with space at top to insert the plate or plates having grooves on each side. A thin cover is fitted over these plates to exclude the light, another outer cover or lid is fitted over this through which the slides work for exposing the plates (these slides may be made of tin, ferrotype plates, &c.) The dark slide is filled with the sensitive plates, placing a piece of paper or any thin opaque substance between them, after which a thin cover is placed over the mouth to exclude the light. I then take the outer lid or cover containing the sliding parts; these I insert in the grooves on the outside of the dark slide. I then slip down the lid, and the plates are ready for exposing by drawing the slides out in the ordinary way. By means of my improved holder and dark slides, as above described, changing bags and also expensive dark slides having hinges are entirely dispensed with. As the slides are the size of the plates, they may be stored away in very little space, and being made of such thin material are very light.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:

1. The movable frame in cameras, for enabling the dark slides to be inserted either vertically or horizontally, with an arrangement on the reverse side for focussing screen.

2. Dark slides, with space at top for inserting the sensitive plates, having grooves on the outside into which the slides work for exposing as described.

3. Dark slides, with space at top, having a movable lid, through which the thin slides for exposing the plates are inserted.

15,202. WILLIAM GRIFFITH HONEY, of No. 3, High Street, Devizes, in the County of Wilts, Artist and Photographer, for "A new or improved holder for manipulating a photographic plate."—Dated 19th November, 1884.

This invention consists of a device for manipulating a photographic plate from a piece of tin, ebonite, or other suitable material, having an opening in the centre, the outside edges of which are turned up to prevent the plate from slipping off. A handle is fixed at the top by which the holder can be raised. By means of my improved holder a photographic gelatine bromide plate can be developed, washed, and fixed without the solution coming in contact with the fingers, which has not hitherto been practicable by any other method.

1. Holders made of tin, ebonite, or other suitable material with an opening in the centre, having clips turned up on the outside edges for the purpose specified.

2. Holders having handles by which sensitized plates can be placed into or removed from dishes containing developing solutions, without introducing the fingers or other agency into the solutions.

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NOTES OF AN AMATEUR PHOTOGRAPHIC TRIP IN 1884.

BY MATTHEW WHITING.

FEW things can be more enjoyable than to start on a summer excursion to Scotland with about ten dozen 7½ by 5¼ dry plates, all expected to turn out well, and carefully selected from various makes as shown by experiment, to give the best results with the shutter. Varnished deal boxes with twelve wide grooves each, holding two plates back to back, were used for packing. This is by far the safest method, and the least trouble in changing the plates after exposure. Four of these boxes held eight dozen plates, and the other two dozen were in a couple of changing boxes made by Hare, so that a trip of two days would be taken without fresh filling up.

To prevent any doubt as to whether or not a plate had been exposed, I placed a small half-inch patch of the autotype gelatine paper, with a number for reference, on every plate as it was taken out of the changing box, and this remained on until the development was completed. My changing lamp had a piece of white glass (the same size as the dry plates) covered with three thicknesses of oiled ruby paper; and the light was supplied from a carriage candle regulated by a spring to keep it to the proper height. I started for Edinburgh, July 28th, and remained there two days, visiting both Queen's Ferry and Leith. My next move was to Loch Awe, making an excursion by boat to Ford, at the other end of the Loch, and also to the Falls of Cruachan and Pass of Brander, Kilchurn Castle, Dalmally, and Inverary. From there I proceeded to Oban, where I found plenty of views with moving figures and life, both by sea and on the esplanade, for shutter work. A large black dog, showing his eagerness to go into the water after a stick, was here one of my best subjects. This situation was very central as a starting-point for Staffa and Iona, Dunolly Castle, Loch Nell and Falls of Lari, Connell Ferry, and Dunstaffnage Castle. Continuing my route by steamer up the Caledonian Canal to Banavie (where I was obliged to stay one night), I next stopped at Drumnadrochet. The people getting off and on the boat at the Lochs very well helped to use up my plates.

THE ANIMATED DOG, OBAN.

From Drumnadrochet (a drive of fourteen miles) brought me to Strath Affaric, the principal inducement of my visit there being the beautiful silver birch trees that I had several times looked at, with a longing wish to appropriate, but had never photographed. Here I stayed a week, making excursions to Glen Affaric Lodge, twelve miles up the Glen, and never feeling satisfied that I had taken sufficient views of the birch trees that grew so artistically by the roadside amongst the heather. Glen Cannick, that reached to the inn door, had equal enticements, and I really left it with great regret. But as my next stay was to be at

GLEN AFFARIC.

Struy, only seven miles off, and had heard that Glen Strath Farrar was by all accounts still more beautiful, I resolved to judge for myself, and now can safely say that Strath Affarie and Strath Farrar combine more beautiful scenery than any glen I had ever before visited, and that, upon the whole, the latter has in some particulars the advantage. The Hotel forms an interesting view, with the river Farrar only separated from the house by the roadway. From Struy I had a carriage to Beauly, so as to get the train to Strome Ferry. There was not much to be done at Strome Ferry, but it was necessary to go there, so as to get to Balmacara, a ten-mile drive over the hills.

GLEN FARRAR, STRUY.

HOTEL AND WATER, STRUY.

I exposed many plates here, especially on the windings of the road by the side of the Bay, and also secured very good negatives, from a small boat, of the Hotel reflected on the water. I tried the fishing, but neither cod or whiting would bite, so I had to content myself with my camera. Sir Alexander Matheson's, on Loch Carron, can be visited by one of the roads from Strome Ferry, but as the day was wet, I travelled by the shorter road, and made the trip to his place an excursion of itself. I was glad to leave my heavy luggage at Balmacara, and only take what was necessary for Portree by steamer, and call for it again on my way back. Portree has plenty of fishing boats, and the Bay is good for views, as is also Prince Charlie's Cave, seven miles by row-boat. The boatmen were promised pictures of the Cave, and they will get them shortly. I wished to go to Sligachan by carriage, twenty miles there and back. I bargained with the landlord to let me have a horse that was not lame. A quarter of a mile's drive, however, was quite sufficient to furnish proof that he had given me a lame horse which was cruel to drive, so I sent the chaise back without going any further. From Portree I returned to Balmacara, took up my luggage, and had a carriage to Glen Shiel Inn, fifteen miles, crossing at Dornie Ferry. I had good horses, and this was a beautiful drive. On going into the parlour at Shiel Inn, I came face to face with a framed print of the hotel that I had myself taken about twenty-seven years previously. It was a good colour, notwithstanding its age, and only looked a little yellow at the edges, where the print came in contact with the mounted cardboard. It had been toned with Australian gold neutralized with carbonate of lime, washed two or three hours, and hung up to dry the same evening—the plan I have continued to follow ever since.

BALMACARA.

Glen Shiel has beautiful high hills all around, and is a very retired and out-of-the-way place. This was either the fourth or fifth time I had visited the inn; one great inducement to do this being the sea trout which are to be caught in the river when there is sufficient water. From Shiel I drove thirty-six miles to Glen Moriston, resting the horses at Cluny and Torgoyle Inns. This Glen, before making this trip, I had always held up as supreme for its beauty of birch and heather; and I still feel that it must always retain a very high place on the ground of fine scenery. A salmon ladder and rocks by the bridge over the Moriston river furnish plenty of materials for some good negatives.

This finished my photographic amusement, and I had only to return home by a twenty-seven mile drive by the side of Loch Ness to Inverness, and rail to Edinburgh and London. The excursion was a most enjoyable one of sixty-one days, and I brought home by far the best lot of negatives I have ever secured. Although I carried five other view lenses of different length of focus, an 8 by 10 rapid with the 2nd or 3rd largest stop and shutter, or with the smallest stop and a longer exposure, proved to be by far the most serviceable to me on this trip, and was seldom taken out of the camera.

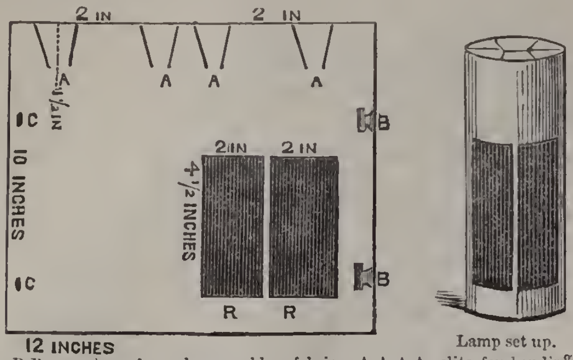
A PORTABLE LAMP FOR TOURISTS.

BY T. G. WHAITE.

A really portable and safe lantern, and one a few ounces in weight, is still a much-felt want. The tin and glass affair, with oil-can constantly leaking, is not a desirable piece of apparatus to pack between clothing when travelling.

The one I have designed is light, portable, instantly set up, and occupies no more space in the portmanteau than a pocket-handkerchief, and can be made in half-an-hour by anyone possessing a pair of scissors and the necessary materials.

The sketch on the next page is about one-fourth the size necessary. Procure a piece (12 inches by 10) of the thin sheet brass used for making stencil plates. With the scissors cut out at *one end*, as per sketch, two openings $4\frac{1}{2}$ by 2 inches; the narrow strip between the two openings is for the purpose of preventing the coloured medium from tightening across the opening and approaching too near the flame. Round these openings a number of small holes should be pierced; this can easily be done with a sewing-machine and a broken needle sharpened for the occasion. This will enable you to sew on the *outside* the golden fabric, which should be of two thicknesses; if the ruby fabric is preferred, one thickness will be sufficient.



Lamp set up.

R R, openings for ruby or golden fabric. A A A A, slits for bending over top. B B, hooks. C C, eyes.

At one end cut the brass as at B, and at the other end as at C, forming hooks and eyes to secure it when set up. The slits at the top are cut in the form of W and two V's; these are for the purpose of bending over, to prevent the light showing at the top; a child's night-light, or short wax candle, is then all that is required. There is no bottom to the lantern, and when standing on a table or shelf no escape of unsafe light; and I do not find it necessary to provide air-holes, the air finding its way in freely somehow. I have made them of Willesden paper and thin cardboard; but the brass is so safe and durable, and can, with a silvering solution, be silvered inside, and thus form a good reflector. The cost is small, and occupies, when flattened out, no more space than a panel mount.

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REFLECTING TELESCOPES FOR PHOTOGRAPHY.

BY A. AINSLIE COMMON.*

The simplest form of the reflecting telescope is that in which only one reflecting surface is used, known as the Herschelian; or, as Sir John Herschel, in his work, "The Telescope," calls it, the "Simple Reflector." The remarks he makes on this form are well worth most careful consideration in connection with the use of the reflecting telescope for photography.

All other forms have the second or third mirror only for the purpose of bringing the image formed by the large mirror where it can be more conveniently used. Of these, the Newtonian is the simplest and perhaps the best, as here the second reflection does not alter the size of the image, but only diverts it to the side of the tube. In the Cassegrain or Gregorian form the use of the convex or concave mirror enlarges the primary image more or less. Modifications of the Cassegrain form can be made by replacing the small convex mirror by a flat or very slightly curved mirror, in which case, although there is much loss of light, the image is kept nearly the same size as in the Newtonian. There is also the "Brachy" form, where the Cassegrain is used obliquely, but this is practically a Cassegrain. In all these telescopes, except the first and last-mentioned, the second mirror requires support of a kind that acts most injuriously on the image, causing rays to come from stars which, in the case of stars as faint as eight magnitude, show quite distinctly with such long exposures as are needed in photographing the nebulæ or clusters of very faint stars. In addition to these well-known forms of the reflecting telescope, there is the arrangement of three reflectors as a telescope indicated by me in the May number of the *Monthly Notices* of the Royal Astronomical Society, and also the application of the Coudé principle, treated of at length by M. Lœwy in the June number of the *Bulletin Astronomique* (1884). As far as I know, there has not been any practical application of the Coudé principle to the reflector. The need of three reflections would involve great loss of light, and for this reason alone would render it unsuitable for photography, where so much depends on the power of the telescope to bring together, as much light as possible on the surface of the sensitive plate. Apart from this great loss of light there would be enormous difficulties in making such a telescope of even three-foot aperture, indeed, I am very doubtful if it could be done; there is the difficulty of keeping the different mirrors free from flexure and in proper adjustment; there is the fact that the form of mounting that must be used to carry the ponderous mirrors would be that most unfavourable to the good performance of the whole as a telescope in regard to the atmospheric disturbance due to the mounting; and last, though not least, the position of the external plane mirror would be so exposed that it would not stand many nights' work. With the flat mirrors of a Newtonian telescope one has much difficulty, as a slight rise in temperature will dew them at once, and under ordinary circumstances they become very soon so dull that they require re-silvering many times more frequently than the large mirror. Certainly the large plane mirror would conserve its heat better than the small flat of a Newtonian; but from the exposed position it would occupy, it would certainly be a source of continual trouble. There is only one good thing in such arrangements, and that is that the observer has not to follow the eye-piece, which only rotates, and does not change its position. For general observational work this becomes of importance. For comet-seeking, for which I believe this telescope was first used, it is difficult to imagine a more suitable arrangement than that brought again to the notice of astronomers by M. Hermite in *L'Astronomie*, October, 1884, though his proposition to dispense with a tube or to use a fixed one, would make a difficulty at the eye-end, where the image would rotate, as it would in the case of a fixed telescope with a mirror moving in front, after the manner of a siderostat. For photography, all these latter forms of telescope are not admissable; even for large fields, when a refractor specially made was used, it would be better to use it as a simple equatorial than to lose the light by two additional reflections. Considering carefully the different reflecting telescopes enumerated above, there does not appear to be anything that can be more simple than the Herschelian, and nothing more suitable, judging from what has been done, than the Newtonian; nor does there seem anything in any other form that offers greater advantages than these, either on the grounds of simplicity, easy manipulation, possible increase of size, and, what is of vital importance, smallness of first cost. It is on one or or the other that I should entirely rely as the photographic telescope of the future. Whether the Herschelian form would be better in practical use than the Newtonian, or, rather, whether the reflecting surface could be made as good in this case, would only be shown by actual trial; if it could then, for the reason already mentioned, the image would be the best, and the best kind of telescope for the purpose of photography would be found.

(To be continued.)

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Correspondence.

LENSES FOR PORTRAITURE.

Sir,—In connection with the remarks of yourself, Mr. Debenham, Mr. Wheeler, and Mr. Burton, on this subject, I should like to quote what Sir David Brewster said regarding this matter in 1856. The quotation is from a paper read before the Photographic Society of Scotland, and reported in "Sutton's Photographic Notes," Vol. I., page ix. (second edition).

"For taking buildings and landscapes, large lenses are not necessary; but they have been introduced for the purpose of taking portraits quickly when the light is faint, or when the sitter cannot sit steadily for a sufficient time. The effect of these large lenses is to give hideous representations of the sitter; and it is doubtless from this cause, principally, that photographic portraiture is so extremely defective, exaggerating every feature, and producing pictures which vary greatly with the camera, and the lens or the lenses which belong to it. The only remedy for these evils is to use small lenses, and when the sensitiveness of the photographic process is increased, we may hope to work with lenses not larger than the pupil of the human eye."—Yours, &c.,

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* *Nature.*

C. Bender.

Sir,—In endeavouring to popularise scientific knowledge by giving our results in the imperfect form of rules, hardly so to be framed as not to admit of exceptions, it is not surprising if some of these exceptions appear much more important to one person, than to another whose practical experience may run in a different groove.

On the value of equality in exposure, without dark corners, there will probably be little practical difference of opinion, though it is, of course, far less important in a single portrait than in a group. But it is just the group in which speed is most requisite, and equality of exposure more desirable; while freedom in posing has too often to be sacrificed to optical difficulties. No doubt a large aperture admits more stray light than a small one; but its admission is usually considered an evil, and is carefully guarded against. Whether diffused flare be a practical evil or an advantage, I will not venture to pronounce—no doubt readers will form their own opinion; but I think I may say theoretically, that the serious practical evil of flare, whether diffused or condensed into the annoying patch modern workers are forgetting, appears only where large parts of the subject are strongly illuminated—such as the sky in out-door views, or perhaps white margin round a picture we are copying. Then the stop is seen as a disc of brilliant light to an eye looking in that direction behind it; and this brilliant spot, falling on the lower part of the back lens, is reflected back to the upper part of the front one, and, striking obliquely a concave surface, is collected and deflected according to the usual laws of catoptrics, and thrown into some convenient place among the shadows in which it can appear to the greatest possible disadvantage. Some time ago I carelessly used, as back lens of a doublet, an uncemented combination. As front lens it would have done no harm, but as it was, it spoiled an excellent 24 by 18 plate. Flare does not trouble us in photographing an interior with a Petzval lens, as I occasionally had to do with wet collodion. Of course halation round a window is a totally different thing, though a very high window in front of a lens liable to it might produce a mild case of true flare.

As I had no knowledge of Mr. Debenham's lecture, or of the discussion following it, except from the reports in your columns, I trust any misconception of mine may be excused. But it may be seen that I considered it so unlikely that he would have overlooked altogether the point to which I took exception, that I attributed any insufficient theory to bystanders rather than to the lecturer. It is clear that he did bear it in mind, and though I failed to see it, I trust I yet lost no other matter of interest. In reading your report of it again, I note his just remarks on the excellence of Petzval lenses, and of the importance, especially in copying, of not sacrificing flatness of field too much to an accuracy of marginal definition useless without it.

I am sorry I must postpone, for this week, any account of my proposed modification of Petzval lenses; as, to make it intelligible to ordinary readers, some explanation of its action is required, and this is a busy time with me. I will say, however, that while I have too much respect for the science and skill of our opticians to suppose what I may suggest to be unknown to them, I think that—all lenses being more or less compromises—it is we who should be the best judges as to the qualities we prefer to sacrifice, or to retain. And it is by discussion in the photographic press that such an intelligent demand should be created that must precede supply.—I am, dear sir, yours truly,

W. Wheeler.

THE NEW QUICK PRINTING PAPER.

Dear Sir,—Every one being interested in this new paper, I should like to give my experience and opinion. I have tried about 100 prints in lots of 12 at a time, using several commercial makes. I give from two to fifteen inches to direct daylight through a small window in dark room, the window having a south light. I have a large window, three feet by two feet six inches, and on this I have two or three thicknesses of golden fabric, and find it quite safe, and a light quite as good as could be wished. You can see to read the finest print. I use the developer as per Marion's rules, and wash the prints well in three changes of water; then in alum for fifteen minutes. I then tone at once in a hypo and gold bath—viz, 40 ounces hypo, to which I add 4 or 5 grains of gold. This bath keeps well, and can be used over and over again, which is much better than making fresh every day, and I find it tones quicker and much better than the one said to be used in the printed rules. I then wash well in running water all night, and think the prints are then quite safe. Amateurs will do well to note this toning bath, as they save time, and you save one washing, and have a toning bath that keeps well. You can add new hypo and gold now and then. I may as well say I have got some good slides from chloride plates with this developer and bath, but find it very slow, but a nice brownish colour.

I do not think for a moment that this paper will take the place of albumenized paper. Of course it is a great thing for those who wish to print quickly or by gas light, but it has many disadvantages.

1st. You cannot double print a sky in so as to know what you are doing.

2nd. If you expose to daylight a batch of eight or nine from same negative, you will not get the same colours in all your prints; some will be red, and some greenish-coloured.

3rd. The tones are not as good as albumen prints.

4th. The trouble is more, as you have to develop as well as tone, and for those who are not well up in developing, there will be a great trouble (I refer to amateurs and young men who are just learning the profession); and then, when done, you are never sure of the colour the print will be. Of course if you can afford to buy lime-light or electric, you can always tell your exposure; but I am speaking as an amateur who wants to print a few for himself. One does not like to have to take three or four prints from his negative when one would do, and I am sure that silver albumen is the best and cheapest for amateurs who only want one or two prints from each negative, unless they are busy during the day. Otherwise, this new paper is just what is wanted, as one can print off eight or twelve with gas-light (time from twenty to fifty seconds), and develop them; and this is where this paper comes in, and is of very great use, and I look upon it as one of the best things found out since dry plates; but as for saying it will do away with the silver prints, I don't think it can ever do so, for the reasons I have named. I use the paper myself, and find it very handy, and should not like to be without it. I had a lot of trouble at first, and did not succeed till I took to the gold and hypo bath; but had I to print for sale or to send to an exhibition, I should print on silver or platinotype paper, not on the new quick paper.

The thing to find out now is how to double-print, and how to get all your prints a good colour, even if you expose two or three seconds over or under.

These remarks I make for those who wish to try, and not to abuse or speak in favour of the paper: it is good for some things, and bad for others, and I always think beginners should have the experience of those who have tried. Should this paper prove to be permanent, then it would be a great step ahead.—Yours truly,

A. Dresser.

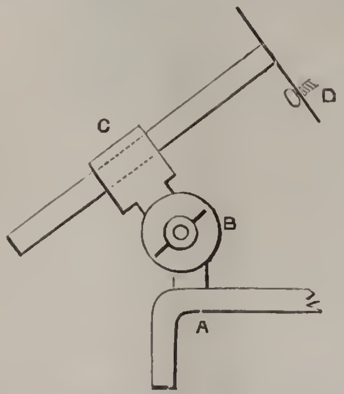
Proceedings of Societies.

Photographic Society of Great Britain.

A technical meeting was held in the small room attached to the Gallery, 5a, Pall Mall East. Mr. John Spiller, Vice-president, in the chair.

Mr. Sands exhibited a camera with duplex focussing arrangement, also a metal case for holding sensitized paper, this case being constructed like a single drawer; but to ensure absolute protection against the ingress of light, a cap is provided which fits over the open end of the sheath enclosing the drawer.

A camera clip, constructed by Mr. Shew, was next handed round. Instead of being provided with two studs like that of Mr. Beard (see page 17), it has a fixed hinge-piece, B, connected with a split socket, C, the arrangement being such that one tightening screw serves not only to fix the hinge-piece, B, but also to tighten the sliding rod in the socket, C, so that a universal motion is secured without unshipping any parts. In other respects, the clip shown resembles that already described.



Mr. William Cobb exhibited a camera by McKellen, of Manchester; after which, prints developed on gelatino-bromide paper were handed round by Mr. Kidd and Mr. Ince.

Mr. Wollaston showed a negative which had been developed with a commercial developer, sold already made up in one solution, and supposed to contain pyrogallic acid. Opinions differed as to whether the negative, or one developed at the same time with an ordinary pyrogallic and ammonia developer, was the better.

Mr. Arnold Spiller said that concentrated pyrogallic developers which will keep have been made, but not come into general use. He instanced the developer recommended by Cramer, which is made up as follows :—

Sulphite of soda	3 ounces
Bromide of ammonium	½ ounce
Bromide of potassium	1½ ounces
Pyrogallic acid	2 ,,
Distilled water	32 ,,

Dissolve and add :—

Sulphuric acid	120 minims
Strong ammonia	3 fluid ounces
Water to make up to	40 ,,

For use, mix one part with eleven of water.

The advantages of using Russian leather for making the bellows of the camera were then discussed, and it appeared to be the general opinion that when the genuine article is secured, there is very little fear of attacks by insects, even in tropical climates.

As an illustration of the kind of daylight—or rather, day-darkness—we have been having in London of late, Mr. J. D. England showed two transparencies which had been made on gelatino-bromide, one having had an exposure of half a second at a distance of one foot from gas burning at a No. 4 burner, and the other twenty seconds to daylight at about 11 a.m. on the previous Tuesday. No difference was noticeable.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 22nd inst., Mr. W. E. Debenham in the chair.

Mr. C. J. Collins was introduced to the meeting by the Chairman, who alluded to the interest taken by that gentleman's father in the affairs of the Association.

Mr. Collins then showed an improved portable tripod, capable of expanding from 2 ft. to 4 ft. 10 in., having both sliding and folding joints in each leg for rapid adjustment to any desired height, the joints becoming locked when adjusted. The legs were secured to the top by hooking on to rivetted bolts which passed through the head, and were tightened with a fly nut, the head being recessed to receive the bosses of each leg.

The Chairman thanked Mr. Collins, and said the tripod was very firm, and an improvement on many he had seen.

Mr. A. Cowan handed round a modified camera—half-plate size—sent by Mr. G. Hare. The novelty consists in enlarging the frame to form a recess for the front board, thus reducing the thickness three-quarters of an inch, and doing away with the hinged tailboard; the slides are made to slip in at the top, and are clipped at the base. The camera, with its various swing movements, permits focussing from seventeen inches to that of the shortest lens in use.

The Chairman said it was a very neat and compact camera; he thought a necessary disadvantage of all cameras like the Kinnear was the circumstance that the lens could not be raised to the top of the plate.

Mr. D. Hubert suggested the Society purchasing collodio-chloride paper from Dr. Liesegang with a view to further experiments, and bringing the collodio-chloride process into general use, as he thought such beautiful results as he had seen in Germany could not be obtained on the best albumenized paper, which cost about the same price.

The Chairman said the process was well known, having been introduced in England twenty years ago; many firms had tried it, and obtained good results.

Mr. A. L. Henderson used to make opaltypes by the process; some specimens sealed up years ago had altered in tone a little, so he did not consider prints by that process absolutely permanent.

Further discussion on Mr. Hubert's suggestion was postponed until the following meeting.

Mr. A. Haddon said the opaque marks shown on plates by Mr. Henderson at the previous meeting were made up of a series of lines denser than the background, and between the lines the film was less dense. He suggested coating the strips of cardboard with gelatine to prove whether the marks were due to light or chemical action, as the ink being covered would then have no influence.

The discussion which followed failed to elicit anything beyond what has been already published.

Mr. J. H. Trinks said he had recently put some over-exposed negatives in boiling water to clean off, and found, after the layer of gelatine had gone, a positive image remained. Why did this occur? Following the subject up, he said he could make certain of a perfect image with freshly developed negatives, but had never yet succeeded with old plates. He was seeking a fine grain for a photo-mechanical process.

Mr. A. Cowan made plates some time ago without alum in the emulsion, which were exposed through the glass; in every case the image, after removing the gelatine, was sufficient for transfer on crayon paper. Mr. Warnerke patented a similar process.

Mr. W. K. Burton said over-exposed plates developed to get density might be considered to possess two images, a positive and a negative image. Where the image was reduced, bromine was liberated, and increased the restraining power of the developer. At other places, the developer was not so restrained. Very little bromine acted as a restrainer.

Mr. J. Barker referred to the images developable on collodion plates where mercurial intensification had been previously employed.

Mr. Haddon remarked that the image was positive on the front, and as the developer passed through it became spent, which resulted in a clear positive image at the back.

Mr. Henderson suggested that Mr. Trinks should expose through the glass as mentioned by Mr. Cowan, and after fixing, lay the negative in a vessel of water, face uppermost, and heat the water to dissolve a large portion of the gelatine.

Mr. Trinks replied that he could easily get a grain all over the picture by passing the plate through boiling water. Mr. Haddon showed a plate in which grain was only seen in the image, the rest being clear. He would try Mr. Henderson's suggestion.

Dr. T. Charters White and Mr. J. Hubert were elected members of the Society.

Hyde Amateur Photographic Society.

On Wednesday, January 21, the above Society held its meeting in the Mechanics' Institution, there being a goodly number of both members and friends present.

After the usual routine of business, a lantern exhibition of views and other work done since the formation of the Society took place. The transparencies had been worked up on various makers' plates, and comprised wet plates of members' own preparing, gelatino-bromide plates, and gelatino-chloride plates, a variety of colours or tones being obtained with the different processes, and as the various tones were shown, discussion was entered into as to which was the best.

The exhibitors of plates and views were Dr. Sidebotham, Mr. F. W. Cheetham, Mr. George Satty, and Mr. Edward McLean, the views being views from Warwick, Kenilworth, the Isle of Man, Marple, Matlock, Wales, and Hyde.

The views were exhibited by Dr. Sidebotham and Mr. F. W. Cheetham. The lantern was one of Dr. Sidebotham's, and was an oxy-hydrogen triple dissolving view lantern by W. C. Hughes, of London.

Mr. Jno. Pennington exhibited and described a new camera by S. D. McKellan, of Manchester.

This Society is doing good work, and seems to be firmly grounded.

Newcastle-on-Tyne and Northern Counties' Photographic Association.

An optical lantern demonstration under the auspices of the above Association took place on Monday evening, the 19th inst., in the Lecture Theatre of the Literary and Philosophical Society's Institute. The spacious hall was crowded in every part by an appreciative audience. Professor Herschel, M.A., F.R.A.S., occupied the chair.

In briefly opening the proceedings, the Chairman said that at the commencement of the session, Mr. J. F. Maling and Mr. Garland each offered a silver medal for competition by members of the Association, for the best transparencies for exhibition by optical lantern. Several members had since been hard at work preparing slides, and the object of the demonstration that night was to show in a public manner the slides (over 140 in number) sent in.

The lantern was under the charge of the Rev. J. F. Hardwick, and Messrs. Allison and J. P. Gibson gave brief descriptions of the views.

First came a series of slides by "Zeta" (Mr. Goold), part collodion and part gelatino-chloride, amongst the former being a fine set showing various portions of the Albert Memorial, London; these were well-defined, and would be recognized with pleasure by many. Amongst the latter, Cragside (the residence of Sir William Armstrong), Ravensworth Castle, and several views in Jesmond Dene, on the Ouseburn.

"Northumbrian" (Mr. J. P. Gibson) followed next with views on the Allan and Gelt, "The Old Houses, Hexham," "An Autumn Evening on the South Tyne," and other choice subjects. Mr. Gibson had also divided his between wet collodion and gelatino-chloride; the latter, in the opinion of some experts, being the better of the two.

"Richmond" (Mr. H. J. Templeton) sent in eighteen slides (all wet collodion) of good quality; two comic slides, "Mischief," and "Consequence," being particularly good.

"B. P. S." (Mr. Proctor) sent nine slides, the best of these being two scenes on the Derwentwater.

"Dry Plate" (Mr. Gray) followed with eleven slides, views in "Killiecrankie Pass," "Dilston Bridge," and views in Jesmond.

Next came "A Tyro" (Mr. Freeman) with views on the Wear and Derwent, and several Irish and Welsh; all gelatino-chloride.

"Mercury" (Mr. Laws) sent eighteen slides (all wet collodion) of uniform excellence, the best being "Room where George Stephenson was born," and some views taken, it was stated, on a tricycling tour.

Eighteen gelatino-chloride slides by "Chloride" (Mr. Pike) were next put on the screen, followed by eighteen—also gelatino-chloride—by "Cullercoats" (Mr. Galloway), views on the Wansbeck, and at Cullercoats Blaydon Burn, and several farm scenes; amongst the latter, "The Pet Lamb" was exceptionally good. These concluded the competitive portion.

Mr. Auty sent two slides of his "lightning" pictures for exhibition only.

Mr. Gibson then stated that two gentlemen—Mr. Pollitt, President of the Manchester Photographic Association, and Mr. Woodward, an amateur of considerable experience—had sent a few slides on collodio-albumen and wet collodion plates for exhibition, which he thought they might take to be of the finest quality. He thought that although theirs might suffer by comparison, it would be only fair to the audience to show them. They consisted of instantaneous photographs of Swans, "View at Saal," Derbyshire, "The Spinning Girl," "Peak Cavern," Derbyshire, "View at Sawsworth," Macclesfield, and two representing grotesque carvings on Chester Cathedral. Mr. Payne contributed a few very fine slides of terriers.

Mr. Payne, on behalf of the judges (Rev. T. F. Hardwich, Mr. Allison, and Mr. J. B. Payne), then announced the awards. He said they had had great difficulty in coming to a decision with regard to the second medal; three or four sets were criticised again and again before they could come to an agreement. Finally the medals were awarded—Mr. Maling's to Mr. J. P. Gibson, for slides, "Old Houses, Hexham," "Blasted Oak on the Allan," "The Iron Gates on the Allen." Mr. Garland's were awarded to Mr. P. M. Laws, for "Room where George Stevenson was born," "Old Mill in Jesmond Dene," "Head of Loch Lomond," all on wet collodion slides; these were again placed on the screen in the order named.

In proposing a vote of thanks to the Judges and Mr. Gibson, Professor Herschel said he thought they were also indebted to the competitors for so good a collection of slides; he congratulated the members on the results obtained, and remarked that they had little to fear from outsiders, as some of the best slides shown that evening were the work of their own Society.

In determining the merits of the transparencies submitted to them for examination, the Judges employed an oxy-hydrogen safety jet of the mixed gases kind, sent to them by Messrs. W. H. Oakley and Co., of London. This jet is made on the principle invented by Mr. Broughton, of Manchester, and is said to give absolute security against all danger of explosion.

Liverpool Science Students' Association.

On the 23rd inst., the President (Mr. A. Norman Tate, F.I.C.) in the chair, a paper on "Geological Photography" was read by Mr. Osmund, Mr. W. Jeffs (who illustrated his remarks with a selection of photographic views) showing geological features in Leicestershire and Yorkshire.

The author stated that in no science more than in geology was there greater need for ample and accurate pictorial illustration. He urged the use of photographic representations of natural scenery and certain landscape features in class-teaching, where without such method of illustration it is often difficult to convey to students correct ideas of the meaning of several geological terms in common use. In astronomy the camera had been brought into requisition with valuable results. By means of improved lenses, accurate charts of the heavens can now be taken which will embrace therein "stars of a magnitude smaller than that shown on the best existing charts or maps, pictured in their proper relative positions and magnitudes" (vide *Nature*, vol. xxxi., No. 785). What has been done for astronomy could be equally well applied to geology. It was possible that in the future the equipment of a field geologist would not be considered complete without the addition of a camera. Its use would be of great service in those cases where, in consequence of the rapid weathering of a rock-surface, it was desirable to preserve the original appearance of a section. In addition to depicting rock-sections, photography was well adapted for illustrating the work and effects of the sea, of rivers, glaciers, and the numerous other denuding agents by which the earth's surface is carved into a varied and ever-changing outline of hill and valley. The author referred to the advantages possessed by the Memoirs of the Geological Surveys of America and Canada, in which photographic views are freely inserted with other excellent illustrations; and, in conclusion, expressed the desire that, in the near future, we should be able to possess a complete series of photographic views, illustrating the scenery of our own country from a scientific standpoint, together with representations of the phenomena necessary for the elucidation of various geological problems.

Temple Bicycle Club.

The third annual photographic social took place at the Eyre Arms, on Tuesday, the 27th inst., some 400 gentlemen being present, among whom were most of the well-known 'cyclists, the chair being taken by Major-General Christopher.

Close upon 300 slides—the work of members, and which were taken on tricycle tours, &c.—were shown by means of the lime light by Mr. C. G. Cutchey, and during the interval, some capital songs and recitations were given by Messrs. King, Braine, Smith, and Lay. Among the slides shown were some good studies of Burnham Beeches, by Messrs. H. and J. H. Bashall; views on the River Thames, from its source downwards, by Messrs. F. Chapman and J. B. B. Wellington—the latter showing a very artistic bit of Pangbourne Weir, as well as several instantaneous sea views and studies of animals; views in Norway by Mr. A. Bashall, and Germany, by H. Hernu. Messrs. Troup exhibited some good groups of 'cyclists, and various other slides by Messrs. Green, Coldwell, &c., were shown. The programme concluded with portraits of well-known 'cyclists, which were received with rounds of applause as each was recognized.

The Club is to be heartily congratulated on a grand success.

Talk in the Studio.

South London Photographic Society.—The next meeting will be held at the House of the Society of Arts, John Street, Adelphi, on Thursday, February 5th, at 8 o'clock. Messrs. Morgan and Kidd will give a demonstration of their New Rapid Contact Printing Process, the Presentation Prints for 1884 will be ready for delivery, the Artistic Competition Pictures for last year will be exhibited, and the Hon. Secretary will introduce and explain Kershaw's Instantaneous Shutter.

Photography at Ryde.—It is pleasing to note that the members of the Royal Family still frequent the studio which is identified with the name of the late Mr. Jabez Hughes, as on Saturday last, the 17th inst., Messrs Hughes and Mullins took portraits of Prince Arthur and Princess Margaret of Connaught. On Thursday, the 22nd inst., Princess Beatrice drove into Ryde and gave Messrs. Hughes and Mullins a sitting.

Lecture on the History of Photography.—On Tuesday evening last, at a meeting of the Turnham Green Literary and Scientific Society, Mr. W. R. Matthews discoursed on the "Rise and Progress of the Photographic Art." He told his hearers how Fabricius, who lived in the sixteenth century, called attention to the fact that horn silver (silver chloride) darkens when exposed to light; but practical photography is a thing of the present century, and the outcome of the labours of Niepce, Daguerre, Talbot, Herschell, and others; while to the various photo-mechanical methods, which are now becoming so generally used, one must look for much of the future usefulness of camera pictures. The more modern methods were practically illustrated, and numerous specimens were exhibited, among which may be mentioned some photographs obtained by a long exposure of clean pine boards under negatives, the wood becoming gradually darkened under the action of light. Some parts of the grain of the wood generally prove to be far more sensitive than others, and it was mentioned that paper made from pine wood-pulp gradually darkens by the action of light; hence such paper should not be used as a basis for photographs of any kind.

A Photographic Exhibition at Dundee.—The Dundee and East of Scotland Photographic Association will hold an exhibition next year, the opening day being fixed for February 6th, 1886. Gold, silver, and bronze medals will be offered for competition.

The Stanley Show of 'Cycles.—The eighth annual show of bicycles and tricycles opened on Wednesday last, at the "Wheeleries," a temporary building on the Thames Embankment. Our readers will be specially interested in the considerable variety of "Carrier" tricycles exhibited.

A Photograph in Court.—A young woman in California recently sued the young man she had been engaged to for breach of promise. Everything went on well. Her attorney showed the usual letters; read the gush for the amusement of the audience in the court-rooms; gave the amatory statistics—the number of times he used "darling;" the number of times he "wanted to kiss her," "look in her dear eyes," and "hold her in his arms in a fond embrace." The lawyer was sure that he had "caught on" to every man on the jury. The defendant was an amateur photographer. His sole response was a photograph of the young woman sitting on a sofa with another fellow's arm about her waist. This was unexpected. The amateur photographer, suspecting all was not right, pretended to go out of town one evening, leaving his instrument properly arranged with clockwork for taking a picture in the girl's house. Verdict for the defendant.—*Detroit Free Press.*

Photographic Club.—The subject for discussion at the next meeting, on February 5th, will be "On a Standard Density for Lantern Slides."

To Correspondents.

*** We cannot undertake to return rejected communications.

Magnesium.—1. About ten shillings per ounce. 2. From any dealer in photographic materials.

J. F.—Probably your best way will be to engage yourself as assistant to a professional photographer; but without knowing something of your present qualifications or your capabilities, it is impossible to conjecture how long it will take you to qualify yourself for independent work. State your need through the medium of an advertisement.

J. Daly.—Either the unvarnished film or the surface of the varnish may be brought into condition for the work by friction with a very small quantity of powdered resin, applied with the tip of the fore-finger.

A. E. R.—You cannot do better than to apply to the Autotype Company.

A. de Noter.—Write to Mr. Eastman, at the Eastman Dry Plate Company, Rochester, State of New York, U.S.A.; or to Mr. S. Fry, of Kingston.

Edward Rose.—Instead of having a number of separate shutters to fit into one frame, it is generally considered more convenient to use two adjustable pieces like butterfly-wings, which can be so placed over the opening as to modify its shape according to the requirements of the subject. This arrangement was described by Colonel Stuart Wortley in a paper read before the Photographic Society, and printed on page 39 of our volume for 1879. Colonel Stuart Wortley also pointed out that the advantages of the system can only be realised when the shutter works horizontally.

W. F. Stanley.—Your letter has been sent on to the firm referred to.

London Express.—Our own experiments lead us to the conclusion that it will keep far better before washing than afterwards, but in either case we should expect it to be unharmed by being set aside for two or three weeks.

Medico.—The views are magnificent, and had we not so thoroughly illustrated the subject, we should ask your permission to use one of them as a supplement.

Paco.—1 and 2. The former is to be preferred. 3. As far as we know, it is not at present in the market, but we will make enquiries. 4. A shutter working so quickly should not be used with a very light camera, neither should it be fixed on the hood of the lens. Nothing is superior to one of the simple "drop" type, the extra speed being obtained by putting on tension with india-rubber bands. 5. We do not know. 6. Considerably slower. 7. About the same.

W. J.—There is no remedy except to use thick boards. Gelatine is suitable.

H.—Do not purchase, but make it yourself. A piece of lead wire—which can be obtained from dealers in horticultural fittings—is mounted in an ordinary pencil case.

J. G.—It is well not to keep it too long, but if half a grain of carbolic acid and half a drachm of alcohol are present in each ounce, it can be kept for several weeks. Add these to the finished emulsion.

J. R.—We can suggest no other cause. See Notes on page 57 of the present volume.

R. T. W.—It has been posted.

D. P.—The appliance can occasionally be obtained second-hand, or possibly you may meet with some old stock in the hands of dealers. On page 111 of the Year-Book for 1884 you will find directions.

S. Lagenheim.—1. Probably by the first person who made a positive on glass. 2. Only by searching through the back volumes of the News.

H. C.—The remaining portion of Captain Waterhouse's series on Photo-lithography will give you the information you require.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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EFFECTS OF LOW TEMPERATURE.

There is a topic above all others an Englishman can converse on under any circumstances, irrespective of condition or creed, viz., the weather; and few avocations are influenced by atmospheric changes to the same extent as the photographer's; yet the variable conditions have their uses, though it may be a trifle uncomfortable for those who have to work in them. At the present time we not unnaturally expect a little severe weather, when lowness of temperature is certain to give trouble in several departments; carbon printers, plate coaters, and workers in gelatine generally, not being among the exceptions.

In the studio there is no longer any necessity for thawing the negative bath, encasing the collodion-pourer in warm clothing, or boiling the developer, in order to obtain an image which, when finished, appeared to be more or less embellished with ice patterns, and the beauty of which might be considered doubtful. Those days of worry have happily departed, and we now find a necessarily increased exposure to be the only real drawback in negative making during cold weather; even that need cause but little inconvenience if development be less restrained. The extent to which restrainers may be employed for the purpose of checking over-exposure has often been pointed out in these columns; the reverse applies with equal force when short or under-exposure becomes a necessity. There is much gained, both in time and quality, by keeping the developer at a temperature of 65° F. Ammonia is an exception to this rule, owing to its volatile nature; it may be added to the heated pyro solution immediately before development commences with greater advantage.

That cold slows the action of light on a bromide plate is not an unnatural conclusion to arrive at, and a similar action is familiar to all who have practised the collodion processes. The cause in its scientific aspect has, however, been conclusively shown in a series of experiments conducted by Captain Abney, recorded on page 315 of our last volume, and need only here be referred to. Captain Abney found, upon warming a plate which registered 18° on Warnerke's sensitometer, that the plate became more sensitive, and registered 24° when exposed under the same standard phosphorescent plate. Pursuing his experiments in the contrary direction, he found cold, induced by the application of ice, &c., slowed the sensitiveness in the same proportion as heat accelerated it, or, employing Captain Abney's own phrase, "Cold diminishes sensitiveness by causing the amplitude of vibration of the molecules to be obstructed." These experiments, of course, operate independently, in a measure, both of season and direction of air currents, each of these latter exerting an influence on plate coating and drying, negative making, and printing operations.

Silver printing has not lost any of its unpleasantness in cold weather; still, judging from results obtained by the modified gelatine processes, albumen can scarcely be expected to carry us through many more winters; until the arrival of that panacea, the usual precautions already given in these pages must be enforced. A few points may be reiterated here for the sake of convenience. Sensitizing takes place less quickly when the temperature of the bath and apartment is below 60° F., than at or beyond that reading; therefore, the usual time of floating may be doubled at this season without any corresponding disadvantage. The temperature of the drying apartment should not be allowed to fall below 50° F., as cold tends in a great measure to loosen the sensitive coating of albumen from its support, and in the after process of washing this becomes apparent. We have frequently seen prints, the surfaces of which had become partly detached in washing from no other cause than allowing crystals of ice to form on the surface after withdrawal from the sensitizing solution. The use of preserved paper does away with the annoyance to some extent, but not altogether, for albumen prints exposed to a low temperature on removal from the washing apparatus, become excessively tender, and if permitted to reach freezing point, will not bear anything but the most careful handling. Toning and fixing solutions each perform their functions in a more satisfactory manner if they are heated to 70° F., beyond which limit it is not wise to go. The water employed for washing prints before and after toning should also be of equal temperature. Hyposulphite of soda is more easily removed in water slightly heated, and those who have to perform that task find it more agreeable, hence the work is effectively performed. Speaking in general terms, equal temperatures tend to the production of equalr esults, and these exigencies are easily met by a proper system of heating. Printing indoors at this or any other season is entirely out of the question for photographers who have any reasonable quantity of work to perform. And here again "Jack Frost" delights in obstruction by solidifying the condensed vapour on the glass surface of the printing-frame, and thereby causing uneven results; in fact, during a severe frost we have seen a perfectly opaque coating appear on the printing-frames within half-an-hour, thus causing considerable energy among the printing staff, as a large number of frames were exposed. We need hardly say that removing the frames to a warm room for a few minutes melted the coating and allowed the glass to be repolished without in any way injuring either negatives or prints.

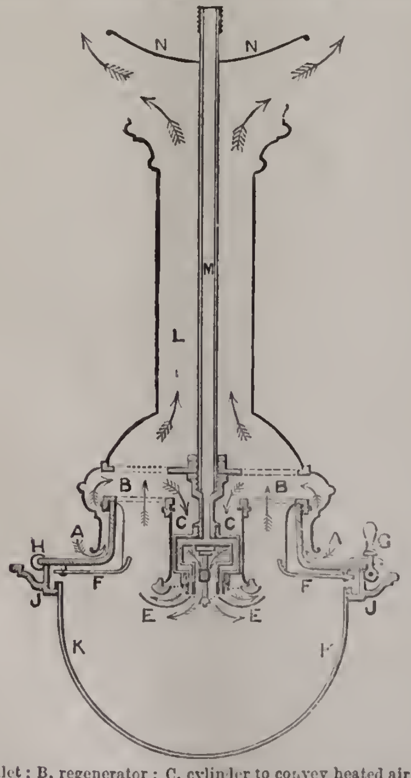
THE WENHAM GAS LAMP.

In the days of wet collodion the idea of photography by the light of gas or that of an oil lamp would have been considered a very wild one, but the gelatino-bromide process has changed all that; and instead of looking upon a gas flame as being next door to non-actinic from an everyday worker's point of view, it is nothing extraordinary for a photographer to regularly make portrait negatives and also his prints by gas light.

Nearly five years ago (1880, p. 338) an account was given in the Photographic News of a visit to the studio of Mr. P. M. Laws at Newcastle-upon-Tyne, and our readers will remember how, by the aid of a Wigham burner of sixty-eight jets, Mr. Laws found no difficulty in making a carte negative with an exposure of eight seconds, or a cabinet negative in sixteen seconds. Mr. Laws simply uses a reflector something like a large Dutch oven lined with strips of mirror, and to diminish the glare he passes the light through a screen consisting of strips of blue glass set in a frame.

Mr. F. H. Wenham, who is not only known as one of the early photographic workers, but as a pioneer in many important branches of industry, has recently devised a form of gas lamp by which a very much increased return of light can be obtained for the gas burned; and what is, perhaps, of more importance from a photographic point of view, the light is far whiter than when the gas is burned at any ordinary jet.

The essential characteristic of the Wenham lamp is the heating of the air and gas before they react upon each other, and the following sectional diagram will show how the system is carried out. The part marked in the diagram as the regenerator is a channelled and perforated plate of cast iron, which becomes considerably heated, and through the passages of which the air passes before reaching the burner. The gas is warmed to some extent in passing through the tube, M, but still more during its passage through the part of the apparatus immediately over the burner, D; the gas duct branching out into several tubes at this point, and all of these tubes are in the stream of hot air as it comes from the cast iron regenerator.



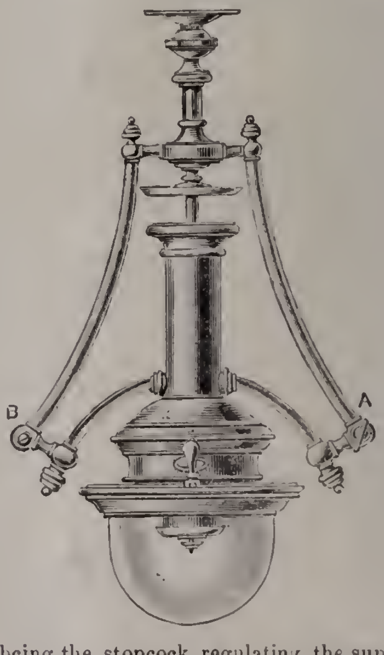
A, air inlet; B, regenerator; C, cylinder to convey heated air to burner through perforated discs; D, burner; E, flame; F, reflector; G, ring-fastener; H, hinge; J, ring to support dish; K, glass dish; L, chimney; M, gas supply pipe; N, heat disperser.

A few data as to the performance of the lamp in comparison with an Argand burner will be interesting.

Taking the light at an angle of 45 degrees with the vertical line, it was found that, in the case of the smaller Wenham lamp, a light equal to eight and a-half standard candles was obtained for each cubic foot of gas burned per hour; while, with the larger lamp, a much greater economy is realised, the light amounting to over eleven standard candles for each cubic foot of gas burned per hour. A trifle over two and a-half candles (2·6) is the return of light obtainable when gas (in each instance ordinary London gas, of 16-candle power for a burning rate of five feet per hour is referred to) is burned at an ordinary argand burner. These results, which are the outcome of determinations made by Dr. Hopkinson, Mr. George Livesey, and Mr. F. W. Hartley, show a gain in lighting power of about four-fold by the use of the new burner: rather under four-fold in the case of the smaller size, and nearly five-fold in the case of the largest size.

As far as we know, no exact trials have yet been made to determine the suitability of the light of the Wenham lamp for portraiture, but judging from a rough experiment made with Warnerke's actinometer, we should estimate that by using four of the large lamps with suitable reflectors, it would be possible to obtain a full-length portrait in from five to six seconds.

The external appearance of the lamp may vary according to circumstances, but it is essentially a suspension lamp, and the following cut will give a good notion of a usual form, A being the stopcock regulating the supply of gas. For studio use the lamps might well hang on light cranes, the connection with the permanent gas fittings being made by flexible pipes.



For printing on the new rapid paper, the lamp in question appears to be extremely well adapted, as a large number of printing frames can be laid on a table so as to receive the unobstructed radiations from the lamp. It is also interesting to note that the production of prints on ordinary albumenized paper by the lamp in question is not altogether an impossibility, but an exposure of about twelve hours would probably be required.

PHOTO-TINT BLOCKS BY MR. DALLAS.

Now that processes for making printing blocks by photographic agency are attracting much attention, and the blocks themselves are being so largely used by publishers, it is desirable to place before our readers examples of the process which has been worked successfully by Mr. Dallas during the past fourteen years. Mr. Dallas terms his process "Dallastint," and does not publish any details concerning it.

The first block is from a photograph of a cockchafer's antenna, the negative having been made on a wet plate by Mr. F. Greening, of the Royal School of Mines.

ANTENNA OF COCKCHAFER.

A JAPANESE VASE.

The second block is a photograph of a modern Japanese ware, also made on a wet collodion negative.

USE OF THE ROYAL ARMS.

The following list of photographers and opticians who hold warrants of appointment from the Lord Chamberlain, with authority to use the Royal Arms, has been published in the *London Gazette*:—

London.

Photographers.—John Thomson, W. Downey, Hills and Saunders, Alexander L. Henderson.

Opticians.—A. W. Dixey, Horne and Thornthwaite.

Provincial.

Photographer.—Henry Joseph Whitlock, Birmingham.

Optician.—Alexander Alexander, Exeter.

Scotland.

Photographer.—George Washington Wilson, Aberdeen.

Optician.—Thomas Wedderburn, Edinburgh.

THE INTENSIFICATION OF GELATINE NEGATIVES.

BY H. CHAPMAN JONES.

The methods that are now available for the intensification of gelatine negatives leave little to be desired. The replacement of ammonia in the mercury-ammonia method by sulphite of soda has made a clean method still cleaner, a fairly quick method even more rapid, besides adding the advantages of greater permanency, and more certainty as to the final result. The use of the sulphite gives an image in metallic mercury, and this can be made a new starting point in the operations if necessary, for reduction (by a very weak cyanide of potassium solution*) or further intensification. This intensification of the mercury image is just as easy and certain as the intensification of the original (or unintensified) silver image would have been by the uranium method; and if pushed to the end, the density obtained appears slightly greater in the former case. As each atom of silver gives an atom of mercury which has twice the reducing power of the original silver atom (for by the action of the uranium and ferricyanide a mercuric salt results), one would expect to get a double quantity of uranium ferrocyanide deposited by the double method of intensification, but the experiment does not seem to justify this conclusion. A small increase of density is apparent, though perhaps this appearance is deceptive; however, experiment shows that it is certainly not *less* dense by the previous change of silver into mercury, and the chemistry of the changes indicates that the density ought rather to be increased.

So that if a thin negative has to be dealt with, one cannot go wrong in applying to it the mercury and sulphite method—this may bring it up to printing density; if not, follow with the uranium method; and if this fails, it must have been a considerable error of judgment that led to any attempt to improve the original.

The uranium intensifier is not appreciated as it ought to be, on account of its supposed tendency to fog; and if the formulæ usually given for it are followed by the photographer who is not also a chemist, probably he will never get a clean result. The following observations on this and other allied matters may perhaps be useful to such.

1. The mercury solution may advantageously be a saturated solution, and, after use, poured back upon the excess of solid contained in the stock bottle. Rinse the negative after its application, but a thorough washing is of little advantage.

2. The sulphite of soda need not be so pure as is necessary when used in the developer. A fair commercial article is quite good enough. It may be dissolved in from five to ten times its weight of water. After dissolving, make the solution slightly acid with citric acid—sulphurous acid is better, and should be used if at hand. This prevents the possibility of any alkaline compound acting on the bleached negative in a similar way to ammonia. The same bulk of solution may be used for two or three or more negatives, but if the action flags, it must be reinforced or replaced by fresh. After use it must *not* be returned to the stock bottle.

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* Dr. Eder. See current Year-Book, page 100.

3. The uranium method of intensification must not be proceeded with till every trace of sulphite is removed from the film, or fogging will certainly result. Allowing to soak for, say, five minutes in each of about six changes of water will probably be sufficient washing; but a more certain method is to wash rather less thoroughly if time is an object, then to soak for about ten minutes in water to which ten to twenty drops of the ordinary peroxide of hydrogen has been added. This converts the remaining sulphite into sulphate, which is without effect on the after processes. Change the soaking water two or three times after the peroxide of hydrogen, and then lay in the uranium solution.

4. The uranium solution may contain from one to two per cent. of the salt, or a stronger solution may be kept, and a few drops added to the bulk of water required, till the yellow colour is visible.

5. The ferricyanide of potassium should be kept solid. For use, take a crystal or two the size of a pea, and wash them in a current of water for a few seconds till they are perfectly clean and of a clear ruby colour. Then put a dram or so of water upon them, and agitate till the water is yellow. Pour the solution so obtained into a developing cup, add to it the uranium that has been soaking the film, and re-apply. Do not hurry the action, but add more ferricyanide solution as required. When the action is complete, wash as usual.

6. If the action of the uranium intensifier does not go thoroughly through the film, the detail in the shadows will be fully intensified, while the high lights will only be partially intensified. The brown ferrocyanide of uranium may be entirely removed from a negative by a dilute solution of carbonate of ammonia. This may save a negative that has got fogged with the uranium intensifier, *if the uranium has acted only slightly.* Where it has acted thoroughly, a mere ghost of the picture remains, unless the uranium intensifier has been preceded by the mercury and sulphite process, when the image remains as a white mercuric salt. This may be blackened with ammonium sulphide, but such procedure is not practically useful.

After intensification with mercury and sulphite, the image may be again bleached with mercuric chloride, and blackened with sulphite; but there is a very slight if any gain in density by the operation, though theory seems to indicate that the amount of mercury should be doubled.

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NOTES FROM NEW YORK.

Presentation Prints—Mr. J. T. Taylor on Lenses—
A New Camera—Improved Methods of Developing
Dry Plates—The Photographing of Materialized
Spirits.

At the regular meeting of the Amateur Society on the 13th inst, a resolution was passed authorizing a presentation print to be issued and presented to each member at the close of the first year of the existence of the Society—April 1, 1885. Special rules and regulations are specified as to how the committee charged with the matter shall act. It is a subject that is likely to awaken much general interest among the members.

Mr. J. Traill Taylor, of the *Photographic Times*, gave an interesting talk on "Photographic Lenses and their Functions," with copious illustrations on the blackboard. He appeared to possess a very complete and thorough knowledge of the subject in hand. He showed a new lens, made by Morrison, in which the lenses were considerably separated from each other. He was applauded by a vote of thanks, and afterwards was elected unanimously as an honorary member of the Society.

A compact and novel camera for instantaneous work, the design of Mr. H. V. Parsell, and made for him by W. T. Gregg, was shown. It was in the form of a doctor's portable medicine chest, neatly covered with black leather, and provided with a leather handle. The size of picture was 2¼ inches square, and the total weight of the apparatus, with six double plate-holders, loaded, was only 2 lbs. 3 oz. In outward appearance it had no resemblance to a camera; the exposures were made by a snap shutter, ingeniously arranged to work in the lens tube in the place occupied by the diaphragms. A wide-angle lens, with a fixed focus for objects within six and fifty feet, was adopted, and a supplementary lens-finder employed, making it very easy for the operator to take a shot without being suspected of carrying a photographic apparatus. The neat and well-made appearance, and lightness of the box, were very favourably commented upon.

Mr. A. D. Fiske showed a print from a negative of trotting horses going at great speed, which was extraordinarily good, because of the detail brought out in difficult places. His method of development was peculiar, and consisted in using strong solutions of pyro and ammonia, supplemented by rubbing the film on the shadow portions with the finger, and in prolonging the development for from ten to twenty minutes. He noticed that a scum formed on the surface of the film soon after the developer was applied, and by simply rubbing over the film with his finger the scum disappeared, and permitted the developer to act more energetically. Whether the scum would appear on different kinds of plates was not stated. It will form a subject of much interest for future experiment. A camel-hair brush did not have the same effect as the fingers.

Mr. George Ripley had noticed that taking a plate out of the developer and breathing on it caused an accelerating action, and thought Mr. Fiske's results might be due to the heat transmitted from the fingers to the surface of the film. A mode of development which he had lately adopted was to have beside him a weak soda or potash solution, and when the high lights appeared well out in the original pyro and soda developer, to at once transfer the plate, without washing, to the free soda solution. He claimed that there was enough pyro left in the film to add sufficient density to the shadows, and the plate could be left for a long time—half-an-hour or more—in the soda solution without danger of fogging. The resulting negative would be very equal; the high lights would not be too dense, and the details in the shadows would appear with ample density and crispness.

Since my last letter, the first number of *Anthony's Bulletin*, in a new and handsome cover, has appeared, and contains an excellent likeness of its new editor, Prof. Chas. F. Chandler. Prof. Chandler has the reputation of being a man of progress, and under his inspiring hand we may look for an improvement in photographic journalism in this country.

I learn that a short time ago Mr. F. C. Beach, accompanied by Mr. J. Traill Taylor, went to photograph what were alleged to be "materialized spirits," using extra sensitive dry plates, and the magnesium light. Mr. Beach, being a confirmed sceptic in this line, doubted the ability of the spirits to withstand the intense glow of the magnesium light, as it was customary to view them by a light so dim that a person's face ten feet away could not be distinguished. But from prior assurances it was fully understood that the power of the "spirits" was great enough to endure the effects of the light, and that no disappointment would occur. A good look at the medium showed that she was a tall, solidly built woman, dressed in an ordinary loose morning wrapper. She was supposed to sit in a chair in a small curtained place in one corner of the room, and while in a trance state, unbeknown to her, beautiful angelic forms might materialize and show themselves at the division in the curtain, and possibly walk out and shake hands with members of the circle.

When the focus was obtained by using a lamp, and the lights were extinguished all except a small gas jet as large as a pea, surrounded by greenish tissue paper, some preliminary singing occurred. At its cessation a voice—alleged to be a man's voice—came from the curtained corner; but to any one of common sense, was distinctly that of the medium's lowered and strained to imitate a male voice, for her voice was naturally a contralto. A few moments more of singing was followed by a separation of the curtains, showing a large sized form (far from being graceful or angelic), which looked exactly like a woman in her white petticoats. It was whispered about that it was the spirit of Aspasia, one of the oriental band.

After a moment's silence, word was passed that "Aspasia" was ready; the magnesium tape, consisting of four pieces twisted and four inches long, held by pliers in front of a tin reflector, was lighted by a match, and suddenly glowed with its full intensity upon the non-angelic spirit form. To Mr. Beach's surprise the form kept perfectly still during the glow of the light, retiring from view as it was extinguished.

Mr. Taylor at the same time successfully operated the camera-shutter. The figure of the alleged spirit, as seen by brilliant light, proved conclusively to be none other than the medium herself, divested of her wrapper and draped with one or two white veils. The shape of the face, the colour of the eyes and hair, corresponded precisely with hers as she appeared before she retired into the cabinet.

The evening was spent in successfully photographing the same large person under the guise of three other different spirit forms. Different attitudes were taken at each exposure to represent tall or short spirits, but it was observed that the same large arms and hands were to be seen in each case, the same gown, the same stockings.

So far as it applied to photographing actual alleged materialized spirit, the experiment was a success, the only failure being in the development of the first negative of "Aspasia," through some fault of the operator. Three other excellent negatives were made, which bear out the opinion expressed above, as to the genuineness of the "spirits." They appeared to be so well pleased with the earthly photographic apparatus that they hoped another attempt to secure their likenesses would be made, and I learn Mr. Beach contemplates trying it again soon. Since the days of Mumbler, who would produce a photographic ghost of your dead relative on the same plate as your own portrait, I have not heard of any experiment such as I have described, as having been made. I am told that Crookes attempted something of the kind, but have never seen any of his results.

That the human senses can be so easily deceived and made to imagine that they discern in the ordinary form of a woman, angelic spiritualistic forms, is one of the mysteries of our nature. My explanation of it is, that a great many people take pleasure in being fooled.

N.Y., January 21st. THE NEW YORK AMATEUR.

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Review.

PHOTO-MICROGRAPHY. By A. Cowley Malley. (*London: H. K. Lewis*, 136, *Gower Street.*) Second Edition.

LESS than two years ago we noticed the first edition of this excellent work (1883, p. 140), and we are pleased to note that its success has been so great as to necessitate such an early publication of a second edition.

The author, in bringing out his second edition, changes the title from micro-photography to photo-micrography, this change being especially bad, as the new title does not index in the same place as the old; but he seems to think that his present title is less ambiguous than the former.

The art of photographing microscopic objects has been indifferently termed micro-photography and photo-micrography, although these terms are occasionally applied to the production of minute photographs adapted for examination under the microscope. If it were practicable to induce writers to apply each term exclusively to one of these two branches of work, it would be better to confine the term photo-micrography to the art of producing minute photographs. Micrograph is a suitable term for a minute copy, and micrography for the art of producing micrographs. When the micrographs are produced by the aid of photography, the circumstance is sufficiently indicated by attaching the syllable *photo* as a hyphened prefix.

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HYDROXYLAMINE AS A DEVELOPER FOR THE RAPID PRINTING PAPER.

BY ARNOLD SPILLER.

IN my paper on the "Hydroxylamine Developer" (PHOTOGRAPHIC NEWS, vol. xxviii., p. 794), I recommended the use of this compound for the development of gelatino-chloride, and remarked that "the solution will probably prove useful for the development of gelatino-chloride prints, for I find that by backing a thin transparency of the dichroic kind with paper, a picture possessing a beautiful warm brown tone is obtained." On the introduction of the new chloride paper I hastened to try it in the way suggested, and I am glad to say that my prophecy has proved quite true. Perhaps the greatest disadvantage to the employment of the new process is the necessary use of the iron developer, which spoils the toning-bath, and is very liable to stain the "whites." To wash out the iron, an extra bath, containing alum, is introduced, which necessarily lengthens the process. With the hydroxylamine developer the employment of the alum bath is entirely obviated, for the solution produces the purest high-lights even when mixed for some hours; and I also find that, by using the old hyposulphite toning-bath, the latter is not decomposed by the developer. I may mention that this method is applicable to all the commercial papers, and also that prepared by the excellent formula given by Mr. Wellington (page 36). The exposure is apparently the same as when using the iron developer.

The following solutions are recommended:—

A.—	Hydroxylamine hydrochloride ...	15 grains
	Alcohol	1 ounce
B.—	Caustic potash	1 dram
	Water	1 ounce
C.—	Potassium bromide	20 grains
	Water	1 ounce

The developer is prepared by mixing half a dram each of A and B, and from 15 to 30 drops of C, with one ounce of water. The undeveloped prints are placed directly in the above mixture; the image should appear in about fifteen seconds, and be fully developed in two minutes. The prints are next washed during ten minutes in three changes of water, and then, to tone and fix, they are placed for from ten minutes to half-an-hour in a bath composed of the following:—

Hyposulphite	5 ounces
Chloride of gold	10 grains
Water	20 ounces

In conclusion, I may remark that although hydroxylamine is rather costly at present, four ounces of the developer will develop about a dozen cabinet prints.

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A Dictionary of Photography.

BACKGROUNDS. (*Continued*). Such screens as may be used to make a background for portraiture and group photography must next be considered; these screens being sometimes fixtures like the wall of a building, or a partition, but in by far the greater number of cases they are moveable; lightness and portability being important qualities.

Perhaps the simplest background which can be constructed consists of a light wooden frame, covered with a tightly stretched sheet of cloth or fabric, and in ordinary cases this may be about seven feet square, but in many instances five feet across is considered sufficient, a curtain serving to make additional width when a group is to be taken.

Occasionally the photographer can select material of the required tint, but more often he finds it necessary to tint or flat his backgrounds to suit his own tastes; and the following directions given by Herr Hartmann in an early volume of the Photographic News will be found to be thoroughly practical.

"For the basis of a background it is best to employ frames such as painters use for their pictures, and the woodwork must be strong enough to resist warping.

"The materials which are the easiest to paint are coarse canvas, shirting, and twill. It is fastened by means of nails, driven in only half-way, and after it has received its preliminary coating (of which more anon), it is carefully examined to see if there are any signs of contraction. If this has not taken place sufficiently, which is very often the case with shirting that is dressed hot, a few of the nails are withdrawn, and while the material is still drying it is stretched anew. Twill and linen are better in this respect, and by reason of their roughness can be painted upon more easily; but then, on the other hand, they are heavy. For the distemper or ground pigment, whiting, light ochre, umber, and cassel brown, are most suitable.

"The whiting must be softened in cold water before being mixed, as also the ochre and umber, the latter, because of its tendency to swell, being allowed to remain immersed for a longer time. Cassel brown is purchased already ground in water, and if once allowed to dry, it becomes stony and insoluble, and consequently altogether useless. When mixed with whiting it gives the most beautiful warm grey tones, and consequently I employ it very frequently.

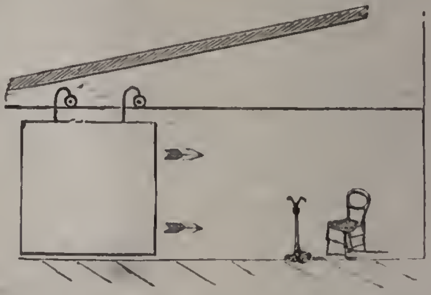
"As binding material for the colours, I employ a warm solution of glue, containing about one pound of glue to a gallon of water, but the quantity of glue or size cannot be accurately defined, as it must be settled by experiment; still the character of the preliminary ground has a good deal to do with the amount of glue to be employed. A thin solution should be taken first, and mixed thoroughly with the colours ground in water, and then a trial should be made with the same brush and upon the same canvas which are hereafter to be used. If there is too little glue, the colour dusts off, or may give when rubbed with the hand; if there is too much, spots will be observed, and then more colour and water must be added, and a second trial made. When the mixture is right, the surface will be even and uniform. The proper degree of thickness is soon found in working; the addition of water doing little harm, especially when it is luke-warm.

"The colour is applied with the brush in an even manner, and if on the first trial it is found that the colour sinks into the stuff too much, as is always the case with stout linen, it is necessary to give a preliminary coating of whiting and strong glue-water, the same being very well mixed to ensure a clean surface. The coating must be allowed to get perfectly dry before you proceed to colour the background, but if there has been much glue applied to it, it becomes hard and smooth; if it has received but little, it will absorb more hereafter, and then the colour should contain an additional quantity of glue. To secure a fine ground, the canvas, after the preliminary coating has dried, may be rubbed with pumice to remove any loose fibres, and, after it is thoroughly dry, it may be uniformly coated with soft soap and water; in this way the most uniform tints may be secured."

Having now described the method of making a plain background, let us quote Mr. Ashman's directions for making a graduated background in which the tint shades off uniformly between two extremes; and a portion of Mr. Ashman's instructions are also applicable to the making of plain backgrounds.

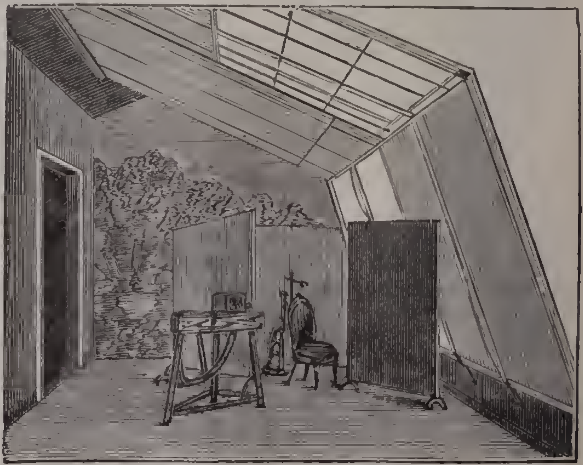
"I will commence by supposing the photographer to have his canvas or other material already stretched; this must be brushed over with a solution of common size, about three-quarters of a pound in one gallon of boiling water (this is to prevent the colour from going through); allow the ground to get thoroughly dry, during which time you can make the following preparations:—Rub very finely on a slab equal parts of blue black and whiting; this we will call No. 1. Rub one part of blue black in two parts of whiting; we will call that No. 2. Rub one part of blue black with three parts of whiting; we will call that No. 3. Rub one part of blue black to four or five parts of whiting; we will call that No. 4. Boil one gallon of water with half-a-pound of golden syrup or treacle and a piece of size about as large as a man's hand, for a quarter of an hour, then cool; this we call No. 5. Mix Nos. 1, 2, 3, and 4 with a little cold water in separate vessels, adding a sufficient quantity of No. 5 to attain the proper consistency for use: any suitable shades will do, but I think that the best blue-black and whiting answer the purpose very well. The different shades being now ready, take a quantity of the darkest (No: 1) and lay over that part of the ground that is required the deepest, commencing at the top and working downwards; then follow with Nos. 2, 3, and 4, blending them into each other, according to the effect you require, with a brush known as a badger, used in graining, &c.; after which allow the ground to dry. When thoroughly dry it will be found difficult to injure it, and on rubbing the surface with the finger there will be no reflection or greasy appearance as in flatted backgrounds; but, as a still greater preservative, it may be brushed over with cold water containing a portion of alum; this allows of washing the ground with soap and water without the slightest injury. It will be found better to give it two coats of the alum solution."

Various methods are in use for mounting flat backgrounds for use in the studio. Sometimes they are made to rise from the floor like window sashes, the exact balance required being obtained by counterweights and cords; and at other times the frames are made to slide sideways in horizontal grooves. Mr. Bassano, in his Old Bond Street studio, has a background no less than eighty feet wide; this being mounted on two perpendicular rollers or revolving pillars, on each side of the apartment; of course, as it is rolled on one it is rolled off the other. Schaarwachter, of Berlin, hangs his backgrounds one behind the other on wheels, so that any one can be easily drawn behind the sitter as shown. The frames do not touch the floor, and the two wheels run on a stout wire (a separate wire being provided for each screen). A narrow skirting-board covers the gap between the background and the floor.



SCHAARWACHTER'S ARRANGEMENT FOR SHIFTING BACKGROUNDS.

It is not an uncommon thing, however, for an experienced and able worker to strongly object to any arrangement for shifting backgrounds which in any way interferes with freedom in their use, and an arrangement like that shown in the subjoined cut, in which each background stands on independent feet, and can easily be placed wherever the photographer may wish to have it, is a very general one with portraitists of eminence.

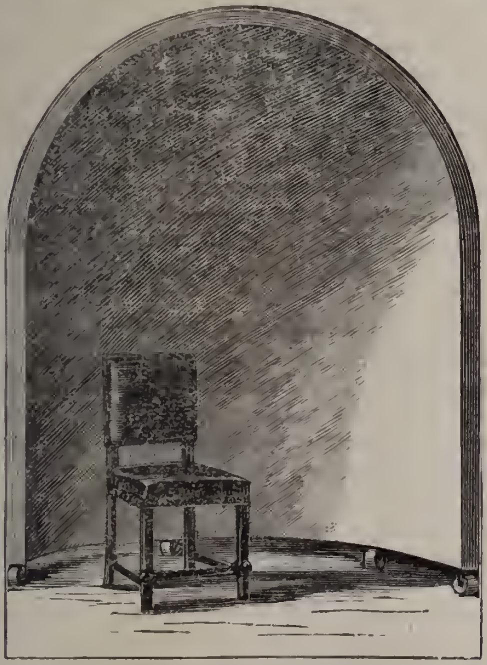


STUDIO OF LANDY, AT CINCINNATI.

Coming after the plain background, and its very near neighbour, the uniformly graduated background, may be mentioned the alcove background, which has been so successfully used by M. Adam-Salomon and other masters in the art of photographic portraiture.

The following description of how to make a niche background, contributed to the Photographic News (1874, page 139) by Mr. A. Asher, of Edinburgh, is thoroughly practical, and, considering the small amount of work really involved, every portraitist should possess this useful appliance. Mr. Asher says:—

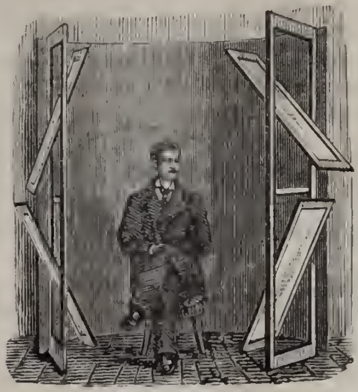
"The framework, of wood, is circular-shaped, arched across the front, and dome-shaped from front to back of top circle. The dimensions for bust or three-quarter portraits may be about six feet wide in front, two feet deep in middle of circles; height four and a-half feet at sides, and six and a-half feet at top of arch in front. Any joiner can easily design and make the framework. Thin laths, similar to those used in Venetian blinds, and which are easily bent to the dome shape, are nailed close together on to the framework, any inequalities being easily pared away. When the laths are all fitted and nailed down, give them a coat of strong glue size, which allow to dry; then cover over with cotton cloth, not too thick, using strong flour paste both on the cloth and over the laths. Lay on the cloth as smoothly as possible, taking care not to let the edges of the cloth lie upon the joinings of the laths. When dry, give a coat of oil paint, any suitable colour (the paint assists greatly in binding the cloth and wood well together). When the paint is dry it may be size-coloured to any shade desired. If one coat of size does not cover solid, give another, having as much glue size in it that it will not rub off with the finger when dry. A few large castors screwed to the bottom of framework render it very portable, a touch bringing it into any desired position. The trouble or expense of producing this 'niche' background will never be regretted by anyone adding it to his accessories."



ASHER'S ALCOVE BACKGROUND.

A somewhat similar concave background, but without the dome-like top, has been devised by Mr. F. Waller, of Baltimore, and he thus describes it:—

"In the first place there is a circular platform of five feet diameter and ten inches high, neatly carpeted, on large rollers and provided with handles for running it about. The background frame is seven feet high, and is exactly half of a circle five feet in diameter, so as to fit closely around the platform. It has three rollers, one at the centre and one on each side. It is not attached to the platform, because it allows of greater freedom detached, though they will both move easily together. At each side of the frame is a hinged skeleton door, in which is an upper and lower swinging screen controlled by thumb-screws. These doors are two feet wide, and extend from the top of framework to the top of platform, clearing it so as to swing in or out. The woollen background—cloth is used, of light colour—in stretching it draw only from the top and bottom, when it will take the form without wrinkles. It should be rendered opaque by being covered on the back with dark muslin. The slide screens are covered with white muslin only. The side screens may be used as light screens, to cut off or soften the light, or as reflectors to the shadow side. By the double arrangement the full flood of light may be directed upon the face, and the lower part screened. This is a great advantage for light draperies; for very black draperies they may be reversed."



WALLER'S CONCAVE BACKGROUND.

The concave backgrounds just described, are rigidly set; but Herr Luck, of Vienna, has recently designed one which may be made to assume any required degree of concavity, or may even be used flat; and, moreover, the arrangement is so portable, as to be very easily moved from place to place.

Fig. 1 shows the front of the screen, and fig. 2 the back. In fig. 2 the background is set up flat, in fig. 1 it is in its concave position. The frame-work of the background, which is supported on two feet, *a a*, consists of a row of wooden supports, *b b b b*, which above and below are fastened to two flexible steel bands, *c c*. The cross support, *d*, which may be turned in a vertical direction upon its pivot, makes the background a flat one when in the position indicated in the sketch (fig. 2). If you desire to make the background concave, the cross-piece, *d*, is shifted from its position and turned, and then the cords, *e* (fig. 1), are drawn as tightly as may be required to give the background the required bend. These cords, *e*, are, as indicated on fig. 1, fastened to the background both above and below, and, passing through pulleys, *f f*, are thus easily manipulated. There are convenient hooks at the side of the background frame for receiving the cords, so that after the necessary concavity has been secured, there is no risk of motion.

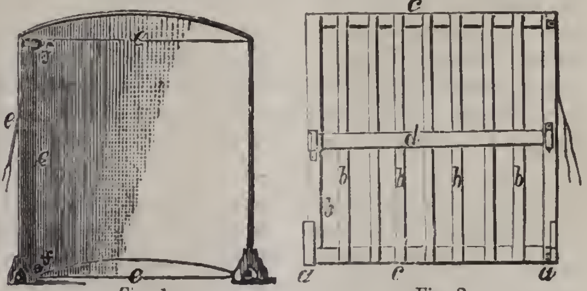


Fig. 1 *Fig.* 2

LUCK'S ADJUSTABLE CONCAVE BACKGROUND.

* * *

Notes.

The influence of civilisation on the eye-sight is a very bad influence, if we may believe Mr. Brudenell Carter. Lecturing at the Society of Arts the other day, he not only recapitulated his views as recently given in our columns (1884, p. 614), but added many interesting notes.

It is in the elementary schools that one must look in order to find the seeds from which the after-mischief springs; and Mr. Carter recently intimated to the London School Board that he would be willing to make an exhaustive investigation regarding this matter if facility were granted him. The Board, in a boorish and characteristically ungrammatical letter, declined the offer, but without thanks.

An investigation as to the influence of retouching and dark-room work on the eyesight would probably yield results of much value.

The negative retoucher, it must be remembered, executes very finely detailed work on a transparent medium strongly illuminated from behind; while the dark-room worker may pass the greater part of the day in a badly-ventilated apartment, illuminated with a ruby light so faint as to appear darkness to a person just entering.

Either of these occupations must, one would think, be bad for the eyesight, but they are often combined; the same individual dividing his time about equally between the retouching desk and the dark-room.

The new printing paper proved of value the other day, when the detectives wanted some prints of their latest capture. A photographer received a negative with an urgent request for a large number of copies; the original of the portrait being, according to the statement of the bearer of the negative, on the point of leaving the country, and desired to present each of his numerous sorrowing friends with a likeness. Whether the printer believed this story or not, may be left an open question; but he produced the photographs in a remarkably short space of time, and charged a tolerably high price for them.

Another dynamitish story, but this time not really photographic. One of the electrical members of the British Association took with him to Canada a dynamometer, for the purpose of illustrating a paper he intended to read at Montreal. Having performed his experiments, and read his paper, he went off, dynamometer and all, into the States. Uncle Sam's Custom-house officers, however, are very keen after anything that looks capable of being made to pay duty, and our friend was asked the nature and purport of his mysterious apparatus. Thoughtlessly he answered, "Dynamometer," and minute inspection by the official revealed the words "Dynamometer—Siemens Bros. Patent," on the dial. Report says it would have gone hard with our philosopher (who had not been long enough in the States to estimate at their true value the statements he had heard as to the incorruptibility of American officials) but for the intervention of a friendly telegraph clerk.

There would seem to be some ingenious paragraphist at large who, when other topics run short, contrives to make of photography a peg on which to hang some novel specimens of his inventive "lining." The latest "discovery" is, that enterprising photographers now place a pair of small and shapely feet at the disposal of such of their fair patrons who may desire to have a portrait taken without putting their own feet in it. The result of this insidious temptation is said to be that already many spinsters—both old and young—whose "under-standings" are large, have availed themselves of the proffered pedal substitutes, thus consenting to a piece of deception which, if discovered, would literally leave them (in their portraits) no leg—or, at any rate, no foot—to stand upon.

One thing is inevitable. If the standing reproach which can be founded on the above act of deceit is really well grounded, we may be sure that "enterprising photographers" and vain sitters will not be contented with false feet only. They will forthwith proceed to other "extremities," and the well chiselled fingers we may expect to see in certain likenesses of the future will also be as false as the hearts or the hair of the ladies who avail themselves of the obliging artist's "helping hands."

A camera with its tripod-stand seems to have been the means of saving the life of that plucky young African traveller, Mr. H. H. Johnstone, who has just returned from the Mount Kilimangaro district. He was out one day with his servants, collecting specimens, and procuring negatives, when suddenly the alarm was raised that a large band of unfriendly natives were approaching. The young Englishman at once called his sixteen men together, and prepared, as he thought, to sell his life dearly. On came the savages, whooping and yelling and brandishing their spears until they were about fifty yards off. Then they halted dead, and stood silent. Looking to see the cause of the halt, Mr. Johnstone saw that midway between him and his foes stood his camera on its stand, its brass eye-piece pointing towards the savages. He had in his hurry left it where he had pitched it; and the strange natives, taking it to be a fetish of some sort, or an article of deadly magical powers, were afraid to approach it. And, in fact, they never did pass it, but presently withdrew, leaving the young traveller unharmed.

"But it is not a bit like you: the attitude is altogether absurd," said the wife when the photographs arrived. "I fancied so," responded her husband; "but M. D'Areslyde trotted me round his place and showed me how his pictures had taken medals in all parts of the globe, so we may conclude it is the best that can be done."

It has been said, over and over again, that to obtain a pleasant expression the photographer should put the sitter on good terms with himself. We are not sure that the recipe should not be the other way about. A somewhat "uppish" young gentleman went the other day to have his portrait taken, and having flung himself on a chair, bid the photographer take him as he was—"None of your fancy, artificial poses, you know." His extreme cleverness rather nettled the photographer, who observed that, "with his legs sprawling all over the place, the picture wouldn't be a very artistic one." "What's it got to do with you, if *I* like it?" remarked the uppish one. The photographer said it had to do with him, since the result concerned his reputation. This view of the matter had not occurred to the sitter, and, with a very ill-grace, he consented to conform to something like the laws of pictorial art; but what with his ill temper, and the photographer's wounded dignity, a very sorry production resulted. The worst of the business was, that, in showing the photograph, the young gentleman said not a word about his own behaviour, but threw all the blame on the unfortunate photographer. Really, side by side with the request, "Payment at the time of sitting," which, of course, every prudent photographer has inscribed in letters of gold somewhere on his premises, should be the request, "Sitters who wish to look pleasant are respectfully desired to conciliate the operator"!

In these days no one can tell who will not turn out to be a celebrity, and as a celebrity is nobody unless his photograph can be purchased, it behoves every photographer to take especial care of portrait negatives, no matter how apparently worthless. A case in point happened immediately after the battle of Abu Klea. General Stewart's photograph was at once in demand, but was unprocurable. It so happened, however, that a lady who knew the general, went to photographer at the West End, and said she was sure she had seen among his specimens the much-desired portrait. This set the photographer to work, and, sure enough he found four spoiled prints, the negative having been destroyed. Copies were immediately made of the prints, the result being an immediate order from the trade of 10,000.

Experts may sometimes be deceived. "Yes," said one the other day, looking at the portrait of a well-known M.P., "it's a good photograph, but see how tremendously it has been retouched, and clumsily retouched, too. Why, you can see every mark of the pencil." "Indeed," said a friend of the M.P.; "it's a pity, then, they havn't succeeded in touching out the small-pox marks." "What?" replied the expert, examining the photograph again; "why they are small pox-marks, after all." And so they were. The gentleman in question is pitted to an unusual degree, and the spots really look like retouching marks. But, as a matter of fact, the photograph had not been touched at all.

Mr. Blackburn's lecture on Monday at the London Institution on "Some pictures of the year," suggests the beginning of a new era in the popularization of art. Mr. Blackburn illustrated his remarks with photographs of some of the works from last year's Salon and Royal Academy Exhibitions, thrown upon a screen by the oxy-hydrogen light. There is material in our National Gallery for a multitude of lectures to be illustrated in this way; but the policy pursued by the authorities renders this impossible at present. It is to be hoped that at some time common sense will prevail at their councils.

The request of a private in a regiment stationed at King William's Town, in South Africa, who wrote to the Kingston Board of Guardians recently, enclosing his photograph and asking to be supplied with a wife from the Workhouse, suggests an idea which a speculator with brains and capital might turn to account. In England we are over-burdened with women. They would like to get married, but husbands are few and far between. In the Colonies the contrary is the case. White women are at a premium, and the male colonist who desires to enter into matrimony finds it very difficult to do so. Why not, then, establish a matrimonial agency in England, and, by means of photographs, open up introductions between those in the Colonies and at home who wish to marry? We fancy there would be no lack of business. To facilitate matters, the agency might have its own photographer on the premises, and, of course, give a guarantee that the photograph in each case is a truth-telling likeness.

If a staid daily contemporary is to be believed, pet-dogs which wish to be in the fashion, now go in for mutual observance of the social amenities, and actually leave cards on one another, and mark the recurrence of birthdays and other interesting anniversaries by the giving useful or ornamental presents. These latter consist of fancy collars, anklets, and bangles—for dogs now wear such ornaments, and there is a canine jewellery shop in Paris—prettily trimmed summer and winter coats, and (as photographers will be especially glad to note) photographic likenesses of their doggie friends. This custom of exchanging dogs photographs is indeed already general in Paris, and photography will doubtless therefore come to the dogs in this city also ere long, with undoubtedly happy results. And surely there is no more fitting vehicle for the conveyance of canine good wishes than a dog-*carte*.

A firm advertising a certain cure for toothache adopts a very effective plan. On the cards setting forth the curative powers of the remedy, are pasted two photographs side by side, one representing a person with his face tied up in all the agonies of pain, and the other smiling and contented, after the application of the cure. There is nothing remarkable in this; but what is worthy of note is, the extremely realistic look of the martyr to toothache. The print in this case has not been freed from hypo, and looks yellow, faded, and altogether ghastly. The other photograph, on the contrary, is a good print, of a pleasant tone, and fine whites. The contrast is highly suggestive.

Patent Intelligence.

Applications for Letters Patent.

1175. Arthur Henry Loring and Nele Loring, 47, Lincoln's Inn Fields, London, for "Improvements in the production of photographic pictures."—Dated 27th January, 1885.

1343. James Thomas Payne, 22, Southampton Buildings, Chancery Lane, W.C., for "An improved combination mount for photographs and other like articles."—Dated 30th January, 1885.

1406. John Urie, 33, Chancery Lane, London, for "Improveprovements in photographic printing and in apparatus therefor."—Dated 31st January, 1885.

Patents Sealed.

912. Robert Gallaud-Mason, of Hambleton House, Promenade, Douglas, Isle of Man, Schoolmaster, for "An instrument to be called the 'micro-photoscope.'"—Dated 8th January, 1884.

Specifications Published during the Week.

3510. Henry Bratt Sharp, of No. 5, South John Street, Liverpool, in the County of Lancaster, Optician, for "Improvements in portable legs, supports, or standards for the stands for cameras, stereoscopes, telescopes, theodolites, music, easels, surveyors' staffs, and other like purposes."—Dated 18th February, 1884.

The claim appears to consist in the use of the spiral or portable walking stick in making tripods or other supports. The spiral walking-stick, as our readers are probably aware, consists of a strip of thin steel wound into a spiral like a paper spill, and secured by a cap at the larger end. Such a leg can be compressed into a length corresponding to the width of the steel, or can be drawn out to three feet or more; and the length can be adjusted within a considerable range; but the steel spiral is very easily damaged by careless handling or rough usage.

Patent Granted in America.

311,057. Richard Brown, Robert W. Barnes, and Joseph Bell, Liverpool, County of Lancaster, England. "Method of preparing pictures and photographs for photo-engraving."—Filed Aug. 1, 1883. (Specimens). Patented in England March 15, 1883, No. 1380, and in France, April 21, 1883, No. 155,029. See Photographic News, 1883, p. 602, and 1884, p. 218.

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THE PREPARATION OF HYDROCHLORIDE OF HYDROXYLAMINE.

BY ARNOLD SPILLER.*

At a recent Technical Meeting of the Society, the subject of the preparation of hyroxylamine salts was discussed, and in consequence of some of the members not succeeding with preparations of their own, I was requested by the Chairman to communicate to this journal full details of the mode of manufacture. In now complying with the request, I wish it to be understood that as the operations are somewhat difficult and dangerous, I should strongly advise those who have little or no knowledge of chemical manipulation to be content with the commercial product.

The method which I am about to describe was devised by Dr. Divers, and depends on the formation of hydroxylamine hydrochloride by the direct action of hydrochloric acid on mercury fulminate. For the following details my best thanks are due to Dr. H. Foster Morley, M.A., who also sent me two excellent specimens of his own preparation.

To prepare the fulminate, place 160 grams of metallic mercury (quick silver) in a large beaker or other convenient vessel, and then pour in a mixture of 1,600 grams of strong nitric acid (sp. gr. 1·42), and 320 cubic centimetres of water. The vessel is gently heated on a sand-bath, in the open air, till the whole of the metal is dissolved. The beaker containing the warm liquor is taken off the heating bath, and 1,600 grams of methylated spirit are mixed with 160 c.c. of water, and half the mixture poured directly into the mercury solution. In a few minutes the liquid will begin to boil with the evolution of red fumes; the rest of the spirit should then be poured in, when the red fumes will give way to white clouds, and, at the same time, a black precipitate will be formed. The whole mixture is now left to stand over night—still out of doors—when it will be found that half the liquid has boiled away, and that a heavy compound consisting of mercuric fulminate is produced. The liquor is next poured away, and the vessel filled up with water. After the sediment has settled, the liquid is again poured off, and this process of washing by decantation repeated.

To obtain hydroxylamine from the fulminate, the latter is rinsed into a porcelain evaporating dish, the water drained off, and 160 grams of pure hydrochloric acid (sp. gr. 1·17) poured over it. The whole is evaporated to a small bulk out of doors, as the fumes of prussic acid which are evolved are very poisonous. When the liquid is reduced to about one-third its original volume, it is diluted with about 500 c.c. of cold water, and then sulphuretted hydrogen passed through till the whole of the mercury is precipitated as sulphide. The liquid, after filtration, is evaporated to dryness in a dish over a saucepan of boiling water, and the residue of the hydrochloride of hydroxylamine, if required of special purity, may be crystallized from methylated spirit. The latter operation is, I think, hardly necessary for photographic purposes, as any slight impurities would not seriously interfere with the process of development.

The following tests for identifying hydroxylamine compounds and the impurities liable to be met with in commercial products may be of value. *Caustic soda* or *potash* blackens silver chloride or bromide in the presence of hydroxylamine.

Fehling solution.—Alkaline cupric tartrate forms, with hydroxylamine, in the cold, a red precipitate.

Tincture of iodine is decolorized by hydroxylamine. Hydroxylamine compounds boiled with solution of *caustic potash* or *soda* yield ammonia.

The chief impurity present in commercial hydrochloride is ammonium chloride; this may be identified by stirring a few drops of saturated solution of the compound in a watch-glass with a little alcoholic solution of platinic chloride, when lines of crystals formed at the points of friction are the result.

* * *

ON THE RAPID PRINTING PAPER.

BY LEON WARNERKE.*

The rapid printing paper I intend to describe this evening meets a great want, felt especially in these dark winter days, to print from a negative, rapidly and quite independently of the time of day, or of daylight.

Paper of this kind is quite new as regards its manufacture, having been introduced only quite recently, but the principle involved in its manufacture is not new; it has been already introduced before this Society, and two years ago it was shown to illustrate a Cantor lecture at the Society of Arts, by Captain Abney. Eder and Pizzighelli fully describe it in their book on "Gelatino-Chloride." Notwithstanding this being a well-known process, it had not found any practical application until the firm of Messrs. Marion and Co., with their usual energy and enterprise, offered to the public paper of this description. The necessity for this article appears to be so urgent, that in no longer time than a fortnight afterwards several other manufacturers also announced the production of rapid printing paper.

The new printing paper is produced by covering white paper of the finest quality with sensitive gelatine emulsion. Like for many other photographic processes, only the finest quality of paper can be utilised, which must be as textureless as possible. I find that 10 kilo. Saxe photographic paper is perhaps the best for the purpose. As regards the emulsion, chloride of silver answers very well, also it may be modified by the addition of other salts of silver, such as bromide, iodide, oxalate, citrate, and others; however, as vigorous black tones are of importance, chloride of silver will be found to be the best base. Only very colourless gelatine must be used, in order to preserve the whiteness of the paper.

The spreading of the emulsion on the paper in one uniform homogeneous layer is not an easy matter. Special machinery must be used to produce it on a large scale, but for amateur use, when only a small quantity of the paper is required, it is dipped in hot water to drive all air bubbles from the pores; it is then squeezeed to the glass plate, previously levelled on a stand, and a suitable quantity of the emulsion is poured on. As soon as the emulsion is set, the paper can be taken off and arranged for drying, either by hanging or otherwise, or it may be dried whilst on the glass. The temperature of the room must be taken into consideration during coating, as if cold the glass plate must be warmed. The addition of glycerine to the emulsion will prevent cockling of the paper if the atmosphere is too dry.

Paper prepared with emulsion can be kept a very long time before it is used, if preserved from light and damp. For printing, it is put behind the negative in the printing-frame, the same as albumenized paper, and exposed to the light; but from this point all the manipulations become different from the usual practice. The image produced by the action of light is generally invisible, and consequently practice and experience alone will dictate the length of exposure. Either daylight or artificial light may be used for printing, and the time of exposure will also depend upon the density and colour of the negative. A few seconds' exposure to diffused daylight, or about thirty seconds at a short distance from a good gas burner, will be found to be sufficient with a good clear negative. If the negative, however, is stained yellow, like some which are developed with pyro, then the exposure must be increased very considerably, comparatively a great deal more than a practical printer would allow for silver albumenized paper. On prints taken on this paper a great variety of colours can be produced; public taste or fashion, as hitherto, will possibly be in favour of warm photographic tints.

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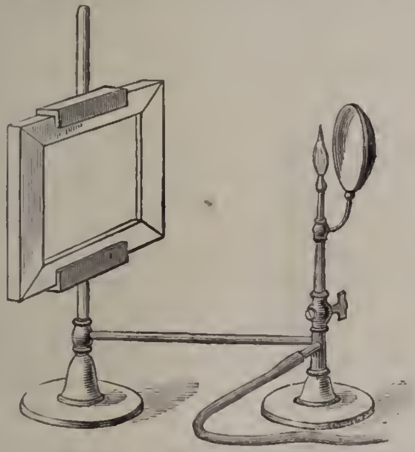
* Read before the Photographic Society of Great Britain.

To produce warm tones, a long exposure is absolutely necessary, increasing the above exposures to about thirty seconds to daylight, or three minutes to gaslight, or, what is very convenient, about two inches of magnesium ribbon, burnt at one foot distance from the negative.

I have designed a convenient arrangement for exposure of the negative. A printing frame is placed in the carrier, and exposed to the light of a gas burner kept at a fixed distance, behind which is a spherical reflector. The same frame may be used for other purposes, to which I need not refer more particularly at this moment.



(To be continued.)

HOW TO TAKE AIM WITH THE CAMERA.

BY J. HAY TAYLOR.

From the fact that various amateurs who visit Florida appear to put themselves to an unnecessary amount of trouble in getting their camera directed to the object that is to form the centre-piece of their picture, I conclude that a certain number of landscapists, especially those who aim at taking instantaneous shots at passing objects, may not have studied the subject from the mechanical point of view.

When one is using a square camera, it is well to know that by placing the eye at any of the four corners next to him, and looking along the edge, the object which is seen in that line of vision will, if the exposing trigger be pulled when it is in sight, be eventually found to be in the centre of the negative.

Suppose such an object to be a yacht careening over the waves, a seaside or lakeside village, a hamlet, or solitary house, or even a pedestrian toiling along the road, by "taking a sight" at this along either edge of a square camera, that object will be infallibly found to be in the centre of the plate upon developing the negative. When the lens is under the operation of a snap or other quick-acting shutter, actuated by a trigger, it is unwise to employ a stand, as the photograph can much better be taken when the camera is held in the hand.—*Photographic Times.*

Correspondence.

BEARD'S CAMERA CLIP.

Sir,—The moment I saw this clip, when the model was produced by Mr. Beard at the meeting of the Photographic Society of Great Britain, I was convinced that the device was the very one that I had been wishing for ever since I commenced the practice of taking photographs not only from the tricycle, but generally; and now that I have been able to secure one, and have tried it, nothing would induce me to be without one again.

By the aid of the clip, the tripod, which has always been an abomination to me, and to others as well, I fancy, can almost entirely be dispensed with, not only by the 'cyclist, but by every photographer, no matter how or where he may pursue his avocations.

The first point about the clip is the clamp. This has a range of some four or five inches, so that it can be attached to anything, from a hedge-stake to a five-barred gate; from a wire fence to the bulwarks of a ship; from the car of a balloon to the turret of a ruined castle; from a bough of a tree to the framework of a tricycle or a window-sill, or the rail of an omnibus. In short, it is almost as varied in its prehensile scope as is a monkey's tail. When screwed home *the clamp holds the whole clip and the camera as firm as the main structure to which it is attached*, the parts being exceptionally strong and rigid, and the binding screw very powerful.

Projecting from the body of the clamp are two points, one at the top, and the second at the end of the clamp. This enables the top piece carrying the camera to be attached when the clamp is secured to the attachment supporting it, either vertically or horizontally. I am not very well posted in the technicalities of mechanics, and perhaps the term "points" hardly expresses the nature of the arrangement. They are really "studs" with a groove half way, and upon these studs the upper portion of the clip is socketed. A binding screw keeps the socket firm, and by loosening this screw the whole affair with the camera can be turned round to any point of the compass.

Immediately below the base support, which takes the place of the ordinary tripod head, is yet another adjustment, which works fore and aft, and enables the camera to be pointed lower or higher, just as may be desired—either to the moon, or down to the ground. In short, the whole affair is admirably contrived, and, being made so strong, is absolutely rigid, and is, moreover, simplicity itself in its adaptation to circumstances.

The camera screw, so often astray when wanted, is kept permanently ready in the base-board by means of a washer, and all that has to be done is to screw the screw into the hole in the base-board. In practice, however, I shall keep the upper portion of the clip fixed to the camera, and the lower, or clamp portion, screwed in position on the handle-bar of my "Carver" tricycle, and all that will have to be done when a view comes in sight will be to take the camera from the carrying case, place the socket upon one of the studs, and tighten the binding screw; focus will be then taken, and the plate exposed. The process will then be reversed, and the journey pursued. A view will thus be taken in a very few seconds; or, if the "view" cannot be secured from the road, the whole clip will, by a turn of the thumb-screw, be released from the tricycle handle-bar, and carried to, and attached, to the gate, or the fence, or the post, or the wall, as the case may be.

I am glad to learn that Mr. Beard, acting upon the advice of his friends, has taken steps to protect his idea, as such a piece of ingenuity certainly gives its producer every ground for seeking to secure some tangible recompense.

Mr. Beard is a fellow-member of the Photographic Society of Great Britain, and his address is No. 90, Fort Road, Bermondsey, S.E. Henry Smith.

[Mr. Beard applied for a patent on the 27th of last month (see page 73). No claim he may have made in this can in any way protect the apparatus already described by him at the meeting of the Photographic Society, and figured in our columns (page 17). —Ed. P.N.]

CANVASSING FOR ORDERS.

Sir,—About a fortnight ago a man, respectably dressed, called upon me, to ask if I would engage him to canvas for us, having told me he had been canvassing for a firm in London, and that he had come to live in Sheffield, and wished to be employed. We did so, giving him a full-plate portrait framed, a few card specimens, and a cheque book, stating particulars, price, and the deposit he was to receive, viz., full-plate portrait framed, and twelve cards, for 12s. 6d., and that he was not to receive more than 2s. on account of each order. This is the way he did business. Instead of showing our full-plate specimen, he must have left that at home, and canvassed with an oil-painted one very much larger, such as we charge 35s. for, telling them it was only for one month. Of course, he must soon have cleaned out all his cheques. But I need not tell you we have not seen him since. The worst of it is, he has got portraits of deceased people to copy, which cannot be replaced. At the address he gave they know nothing of him.

Thinking, perhaps, you would kindly notice this in your next, for the benefit of the trade, I am, yours truly,

W. H. Dodds.

6b, *Norfolk Row, Sheffield, January 28th.*

[Strange as it may appear, there are many photographers who actually constitute persons—of whom they have no konwledge, or concerning whom they have made no enquiries, to act as their representatives in business matters. As the above is a type of many letters which we receive, it is inserted, and it should serve to indicate to photographers the need of ordinary caution in appointing agents. It is difficult to estimate the extent of liabilities which may be incurred in this way.—Ed. P. N.]

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Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 29th ult., Mr. A. Haddon in the chair.

An announcement was made relating to the forthcoming exhibition at Dundee, Feb., 1886.

The Chairman re-opened the discussion on positive images shown by Mr. Trinks at the previous meeting; opinions differed as to whether an insoluble layer of gelatine was present or not.

Mr. L. Warnerke held that it was, and instanced his patented process; and Mr. Henderson considered the deposit to consist of metallic silver, coarse particles of bromide having precipitated during setting.

The discussion then turned on the value of substratums.

Mr. Warnerke had noted a peculiar kind of spot always in the same position on certain plates. No indication of the cause could be perceived when the plate was re-polished. Upon taking a cast of the plate in Spence's metal, indentations were readily observed. A substratum of insoluble gelatine effectually prevented the re-appearance of the spots complained of.

Mr. A. Mackie had also noticed similar spots appearing in the same plate on each successive coating.

Mr. W. Cobb found the spots would appear with or without a substratum.

Mr. J. H. Trinks enquired the best method of converting the image on a bromide plate into chloride.

Mr. F. W. Hart suggested soaking the plate in chlorine water.

Mr. Trinks then read a description of an etching process published by H. W. Vogel (Year-Book, p. 113), wherein the image was converted into chloride and transferred to a copper plate.

The Chairman pointed out how reduction of silver would take place through each point of the image becoming an independent chloride of silver battery, and by this means an etching would result.

Mr. D. Hubert read a communication from Dr. Liesegang in reference to the collodio-chloride process, in which he stated that he could get any colour from deep chestnut-brown to blue-black with the ordinary gold toning bath; but he preferred slightly toning with gold and finishing in a hypo and gold bath combined. He also found by that means he could tone from three to five times the number of prints the same amount of gold would tone in his sulpho-cyanide bath.

Mr. A. L. Henderson thought that method of toning ordinary silver prints might give more permanence.

Mr. W. E. Debenham said the method spoken of by Dr. Liesegang was not uncommon—he had often employed it—and Dr. Liesegang's objection to extra gold with sulpho-cyanide was really an advantage.

Mr. W. B. B. Wellington passed round some admirable examples of rapid printing on paper made according to his published formula on page 36 of the Photographic News (present volume) and toned with the ammonium thio-cyanate bath recommended by Mr. Ashman on page 43 of the current Year-Book. He found toning much easier by this means, and the prints retained their colour when dry.

The Chairman said he could thoroughly endorse all Mr. Wellington had said regarding that method of toning, and handed round prints on Marion's paper, one of which he had thrown away as useless, but had afterwards obtained a good colour through treating it with this bath. He also passed round prints made by Morgan and Kidd on their new rapid paper, and announced that those gentlemen would give a demonstration of their method of printing on the 19th inst.

Mr. C. J. Collins was elected a member of the Society.

Glasgow Photographic Association.

A meeting was held in the Religious Institution Rooms on Thursday, the 22nd ult., Mr. A. Robertson in the chair.

The question-box contained an enquiry which led to a committee being appointed to make arrangements for the annual supper.

The routine business having been finished,

Mr. Goodall gave his paper on "Printing on Gelatino-Chloride Paper," which was illustrated by experiments.

Mr. Lang said he had been using a new developer for prints—namely, tartrate of iron, made by dissolving ferrous hydrate in tartaric acid; he developed some prints before the meeting with satisfactory results.

Mr. Paton exhibited some very fine prints done on "Alpha" paper.

Mr. Urie, Jun., showed some which he had printed by means of a machine driven with clockwork; they were very uniform.

The Chairman intimated that the next meeting would be a lantern night, and requested members to bring their transparencies with them.

Liverpool Amateur Photographic Association.

The ordinary meeting of this Society was held at the Free Library, on Thursday, the 29th ult., Dr. Kenyon, President, in the chair.

The Secretary having read the minutes of the annual meeting (which were duly confirmed), vacated his post, expressing his regret at giving up duties which, though onerous, had been very pleasant.

The Chairman, after gracefully acknowledging the way in which the kindly co-operation of the officers and members of the Society had lightened his duties, withdrew in favour of Mr. J. H. Day, the President for 1885.

The Rev. T. B. Banner then, in the course of an address to the Rev. H. J. Palmer, on behalf of the Society, said, he was to ask Mr. Palmer to accept a slight token of the members' esteem and goodwill. They regretted very much losing their Secretary, who for many years had given to the Society the energetic labours not only of an ardent and able photographer, but of a kind-hearted gentleman. It was largely owing to him that the Liverpool Association held, at the present moment, a position inferior to none in the photographic world. For reasons such as these their feelings must be those of sorrow at the loss of so able a helper. But, on the other hand, they could not but rejoice at the cause of Mr. Palmer's removal from Liverpool. Without entering upon political questions, they would all agree in praising the Premier for appointing to a large and important living one who would devote himself earnestly to the great work before him. Mr. Banner then asked Mr. Palmer to accept from the Society a M'Kellen's treble patent camera, 9 by 7, with an illuminated address, stating that this token of esteem was not given by any section of the Association, but was an expression of warm appreciation of his services on the part of all the members; and concluded by reading the address.

Mr. J. H. T. Ellerbeck, after referring to the difficulty of expressing adequately the Society's appreciation of Mr. Palmer's services, minutely explained the working of the camera, pointing out its excellent workmanship, and the able manner in which utility, convenience, and portability had been combined.

The Rev. H. J. Palmer then thanked the Society for their presentation. He expressed himself as overwhelmed with gratitude to Mr. Banner for his kindly appreciation, and to the members for the camera, &c., saying that while it would be affectation in him to deny having tried in every way to further their interests, he had been already more than repaid as he looked back to the delightful companionship he had enjoyed during the past few years, and to the many friendships commenced that would end only with life.

Messrs. A. J. Cumming, W. A. Duncan, F. J. Gardner, T. D. Mason, and J. C. Nicholson were elected members of the Association.

Mr. J. H. Day then delivered the inaugural address, of which the following is an abstract :—

In the few observations it is my privilege and pleasure to address to you, it is not my intention, nor do I consider it my particular duty, to attempt any scientific *resumé* of the advances which have or have not been made in the various ramifying branches appertaining to matters photographic during the year just past away—one, in some respect at any rate, to be remembered gratefully as having been, perhaps, the most favoured so far as regards the elements which it has been our good fortune to enjoy for a number of summers past; and yet it has struck me as rather surprising that, notwithstanding this fact, and in spite also of the very great accession to the ranks of our Association within the last twelve months, the prize competition of November, 1884, as compared with the contests of seasons gone by, instead of registering an increase in point of numbers, showed, on the contrary, a decided falling off. Not, however, I venture to think, in the quality so much as in the quantity of the exhibits. The system of friendly competitive rivalry has so far fully justified the hopes entertained of it by its promoters, by stimulating us to aim at something better and higher than microscopically mechanical perfection alone. For it must always be borne in mind that sharpness of focus, though so very generally desirable, is by no means the sole object to be attained, and stands a long way in the rear of such absolutely necessary elements to the success of a picture as choice of subject, grouping, correctness of lighting, balance of light and shade, and motive. There has been a good deal of animated discussion of late, bearing closely upon the question of the title of photography to be styled one of the arts; but I must confess it seems to me a difficulty made of a very simple matter. Photography, as I understand it, is an art just in so far as the photographer proves himself an artist; the lens, the camera, the sensitive plate, the so-called secrets of the dark-room, are but a means to an end. It is my impression that a very large proportion of the labour of many of our members is allowed to run to waste to the profit of but few besides the makers of plates and chemicals, and that many plates are spoiled and a great deal of disappointment results from the want of a little system to begin with. Complaints, by no means few, are constantly cropping up here and there amongst us; first the plates are at fault, then the lens must be wrong, the pyro will not give any density worth speaking of; in nine cases out of ten, negatives are thin, fogged, useless, and perhaps it would be better to draw a veil over the number of melancholy blanks of failures. It is a mortifying experience (and it has been mine, as it may have been yours) on returning home after an afternoon's jaunt, fagged and footsore, may be, after many a weary tramp and scramble over hill and dale, borne down by the inevitable luggage, in search of those treasured "bits" we are all so anxious to possess, to find, as the image develops itself under our fingers, the heads and shoulders of our latest group rearing their towering and gigantic figures into the skyline and over the tops of a distant Snowdon. When this occurs, we recognize the unpleasant fact that we have exposed two pictures upon too crowded an area of gelatine; in simple words, have drawn the same shutter twice, and spoiled perhaps half an afternoon's work. This carelessness, though irremediable at the time, is a lesson once learned not easily forgotten, and we generally resolve that such a *fiasco* will not be allowed to occur upon another occasion, by carrying a note-book, and, having previously numbered our slides with good-sized plain figures (if they were not so marked before, as they should have been by the makers), and religiously registering upon the spot every exposure as it is made. The labour lost consists in part, I venture to think, of a certain amount of want of system to commence with. How many of us ever think of testing our lenses and plates before going afield? Is it not a fact that a large proportion of our numbers go out expecting to obtain a negative purely on the chance of hitting an approximately correct exposure? Mr. So-and-so brings home first-rate pictures on an exposure of one second, and he only uses a cheap single lens; so why should not I, with my portable symmetrical of the latest pattern, also succeed in producing good pictures? This may be considered an exaggeration, and so it is, in a measure; but it conveys my meaning, and working in such a slipshod fashion can mean nothing in the end but failure, and is in any case experience bought in a very dear market. The lenses and plates, especially the former, must be tested if you want passable, and both, if you wish to produce first-rate, work. Perhaps our failures are the strongest incentive I can offer as a plea for thoroughly testing our paraphernalia. The apparatus being in order, the next most necessary thing to do is to ascertain the rapidity of the lens. Time of day, quality of light, subject, colour, depth of the shadows, and so forth, must of necessity all be taken into consideration; but difficulties of that kind are much easier to overcome when once we know precisely what our lenses are capable of under certain circumstances. A very general opinion seems to be prevalent that there is a greater margin of latitude permissible, both in the exposure and development of gelatine over collodion plates. I cannot, however, imagine why it should be so, and, so far, have not found my experience to vary from my opinion. The action of the light now takes seconds in place of minutes to accomplish the chemical change in the sensitive film —a change which, by the way, is not even yet thoroughly understood by chemists—but it is only a relative difference at best. There was as much latitude in minutes with collodion as there is in seconds and fractions of seconds with gelatine films; and an error of exposure in either case is bound to detract to a greater or lesser extent from the perfection of the resulting negative, and however many "dodges" may be employed to save it, the weak points will not fail to manifest themselves in the print, if too subtle to be detected in the negative itself. If what I maintain is correct, it will completely explain the want of density and "sparkle," which are the most frequent complaints lodged against gelatine; but who can wonder that brilliance is wanting if wrong exposure is at the bottom of the matter? And does it seem probable on the face of it that any amount of cooking will bring up a negative which has received a miscalculated exposure to start with, to the level of one the exposure of which has been correct?

At the close of the address members were informed that the enlargements for the presentation prints from members' negatives were on view, six in number; each member having the right to choose two.

Donations for the library were announced from Mr. W. A. Watts and the London Stereoscopic Company.

Mr. B. Boothroyd, after a preliminary pen-and-ink lantern slide illustrating the fact that "One touch of nature makes the whole world kin," exhibited about fifty lantern slides made by contact from quarter-plate negatives taken during a recent "first visit to Switzerland." The slides were partly on Fry's new lantern plates, and partly on Edwards' chloride plates. The former fully proved the capabilities of gelatine-bromide with carbonate of soda development to compete with any mode of making lantern slides. The greatest admiration was evoked, not only at the beauty of the scenes chosen, but at the artistic choice of the point of view from which they were taken, and the capabilities of a quarter-plate camera, in able hands, were shown to be very great. Mr. Boothroyd deferred the reading of his paper to the next meeting.

Mr. Newall then showed a few fine transparencies on Fry's plates, developed with soda, and Mr. P. H. Phillips, placing an exposed chloride plate in a specially prepared tank, filled with ferrous oxalate, in the lantern, afforded the members an opportunity of seeing the development of the transparency on the screen. It was then removed, and "hypo" being substituted for the developer, it was cleared, and the resulting transparency did not seem to have in any way suffered from the effects of the limelight, being quite free from fog.

Newcastle-on-Tyne and Northern Counties Photographic Association.

An associated *conversazione* of learned institutions was held on Thursday, January 22nd. in the Wood Memorial Hall, and the Rooms of the Literary and Philosophical Society, and the Durham College of Science, when a special exhibition of photographs was made by the above Association, and included contributions from Mr. Auty (seascapes and studies), Mr. Gibson, of Hexham (landscapes), Mr. Goold (landscapes), Mr. Galloway (studies), Mr.

McLeish (river scenery), Mr. P. M. Laws (landscapes and studies), Mr. Sawyer (large heads finished in colours and monochrome), Mr. Bacon (large direct portraits and enlargements), the Autotype Company (some very fine carbon work), and contributions from Messrs. Mawson and Swan, J. Pike, and others; graphoscope album and stereoscopic slides from Mr. Garland and Mr. Anty; and from Mr. Downey a large French stereoscope, with some fine glass stereo slides. Dr. Berwick exhibited in this department his apparatus for taking micro-photographs, personally giving demonstrations of this interesting work to numerous groups of visitors.

The specimens shown, both negatives and prints, were much admired.

The Glossop Dale Photographic Society.

The large room of the Glossop Town Hall presented a very brilliant scene on Tuesday evening, the 27th ult., on the occasion of the first Annual Soiree and Exhibition of the Glossop Dale Photograph Society. The Society, though of very modest proportions so far as the number of members is concerned, prosecutes its aims with much earnestness, and those practically acquainted with it manifest an enthusiasm and love for the art which is highly commendable, and we think it may be asserted, without fear of contradiction, that of the numerous visitors who patronized the Soiree few, if any, anticipated the treat in store for them. The Society was established in November, 1883, and that it has a legitimate claim to existence was abundantly manifest by the numerous and creditable productions of the camera at the hands of its members presented to public view on the 27th ult. The object of the exhibition was to make the public acquainted with the character of the Society and its operations, as well as with the advances made in the photographic art generally; and the spirit the members put forth in attaining this end resulted in a collection of pictures and photographic appliances of rare excellence, both as regards variety, number, and artistic worth. The pictures were placed on screens of maroon cloth round three sides of the room, and also upon an improvised screen in the centre, while in addition there were stands containing specimens of cameras, stereoscopes, transparencies, albums, &c. The room in addition was beautifully decorated. The floor was covered with crimson cloth, the windows draped with similar material and lace curtains, and flags were arranged in trophy fashion at intervals on the walls, while the platform was adorned with a number of exotic and other plants kindly lent by Messrs. W. E. Rowcliffe and R. G. Hawke, members of the Society. The room thus formed an admirable lounge. The opening ceremony took pace at 19.45, when there was a large and fashionable company present.

The President (Captain Partingdon) then delivered the following address on the subject of Photography.

The word photography is derived from Greek words signifying to delineate by light. In point of fact, it is neither to the light nor to the heat of the solar rays we are indebted for the beautiful results of photography, but to a principle existing in combination with the light and heat of the sun, to which has been applied the name of actinism—a term also taken from a Greek word for a sunbeam, and signifying the influence of the sun's rays without involving the assumption of any theory on the subject. To illustrate the composition and coloured refraction of the sun's rays, suppose a beam of solar light is admitted into a darkened room through an aperture, and that it is made to pass through a glass prism instead of being refracted as a whole and appearing still as white light, which it does when the refracting surfaces are parallel, it is lengthened out and exhibits the well-known solar spectrum, which is commonly divided into what are termed the seven prismatic colours, blue, yellow, red, with the compound colours of orange, green, violet, and indigo. The order of succession is invariable; thus the red ray deviates least from the direct path, and the violet ray the most. Hence, the violet end of the spectrum is the most refrangible, and the red the least refrangible. The chemical power is found chiefly in the violet rays, and it is this chemical property that is taken advantage of in influencing photographic impressions. Scheele was the first to show that the rays of the sun were able to effect chemical changes, more especially on silver salts. He was followed by others, viz., Senabier, Count Rumford, and Ritter, who was the first to notice that certain solar beams not possessing luminosity, but having a remarkable effect in inducing chemical metamorphoses, existed in sunlight. Little, however, was done regarding photography, until Thomas, youngest son of Josiah Wedgewood, in 1802, published his method of producing sun pictures by coating white paper or enamelled leather with a solution of nitrate of silver, and exposing the coated surface to sunlight under a painting on glass. However, he did not succeed in fixing the impressions, although assisted by Sir Humphrey Davey. Nicephore Niepce, a native of France, was the first who succeeded in fixing the image in the camera obscura, and if we take photography to mean not simply the superposing of an object upon a sensitive sheet, and allowing the sun's rays to print the outline of that object, but rather the reflecting of any image in nature in the camera and fixing it after the image has passed away, then Niepce was certainly the first photographer. It was as early as 1816 that Nicephore Niepce first produced a veritable photograph in the camera; but, in this instance, the lights and shadows were inverted, viz., the whites in the original object were depicted in black in the picture, and *vice versa*. Niepce seems to have devoted a deal of time and attention to this matter, for we find that in 1823, seven years after he produced his first photograph, he had succeeded in producing a really permanent impression. This was done by means of an asphaltum, termed "bitumen of Judea," which is soluble in certain oils in its normal condition, but becomes insoluble after exposure to the action of light. A metal plate covered with this bitumen and exposed in a camera forms an image on the surface of the bitumen, which, after washing over with oil, leaves that part undissolved where the impression exists. Several specimens of these photographs are still extant in the British Museum and the Louvre. It was not until after this date that Daguerre appears to have made photography his study. The two investigators were made known to each other by a relative of Niepce showing a bitumen picture to Prof. Chevalier, of Paris, who remarked that Daguerre had been making experiments with the camera, but apparently with little success. Daguerre was a painter of some eminence, and director of the Diorama of Paris. Niepce and Daguerre worked together and greatly developed the process, hence the term Daguerreotype; but to Niepce the honour of discovering photography seems to have been given. In England, the subject was first pursued by Henry Fox Talbot. His first experiments were begun in 1834, with a view of rendering permanent the image produced in the camera on the paper parchment by the sun. A paper was read by him to the Royal Society, in 1839, on a process by which natural objects may be made to delineate themselves without the aid of the artist's pencil. This mode of photography was termed the Talbotype process. Talbot seems also to have discovered that pyrogallic acid greatly improved prepared paper to receive impression by exposure, and developed the effect of the sun's rays. Many substances have been used for the basis of the picture. Glass seems to have been largely used, and when coated with albumen or gelatine has many suitable qualities for receiving and retaining good impressions. Prepared paper covered with a suitable film, and other substances, now form the bases and media in practical photography. This is a short history of the introduction and development of this art, which has become an important, useful, and interesting branch of business. Photographic portraits have an interest and charm for most people; we see this in our public streets, where specimens are exhibited. In our homes, where our albums are generallay placed in conspicuous places for friends to inspect and admire, or otherwise criticise, we notice the gentler sex very beautiful to look at, and exceedingly charming, yet how much more attractive we should think them if proportionately good and considerate! In the sterner sex we have less of the fine symmetry and delicate facial expression and form, but yet much to interest us. This is exemplified in the photos. of our leading persons in all branches of business or professions. By means of photography we know great and leading persons, without ever seeing them in the substance; we get ideas of what they are like which we could never dream to get in any other way. By photography we are able to see at little cost specimens of the loevliest spots on earth, and choicest views of the grandest piles of architecture in the world, sights that forty years ago the greatest traveller could not relate or impart with the same vividness as we see them now. Photography will also remind us of the constant change that takes place in ourselves if only we at times have our likenesses taken, and compare one with the other. Photography, I have no doubt, has an elevating influence on the moral tone of the people by showing the beautiful and grand with less of the hideous than really exists. We have also more of the choice character of persons put before us than we have of the opposite, and so with the scenery of the country. Photography also aids us to remember those we wish to keep in memory, provided they have been thoughtful enough to leave their shadows behind them.

The company then devoted their attention to the objects exhibited, which were the theme of general commendation. Indeed, the character of the exhibition was a great surprise, and gave unmitigated satisfaction. The pressure upon the limited space for promenading was somewhat great in consequence of the large number of visitors, but this was relieved by the withdrawal of many to the Council Chamber, where a lantern exhibition was arranged, and which attracted as many spectators as could be conveniently accommodated, two distinct displays being given in the course of the evening. These consisted of a series of views taken by Mr. W. J. Chadwick (of the Manchester Photographic Society) in the course of a week's tour in the Isle of man.

In the meantime that section of the company who were in the picture exhibition had their aural senses charmed by selections of vocal music by an efficient glee party, whose performances were interspersed by instrumental and vocal duets and solos by various ladies and gentlemen. On the north side of the room were some very fine views of nature, as seen in the marvellous characteristics of the Yosemite Valley, representations of Indian architecture, scenes in Japan, and portraits of Japanese character, from the Mikaido down to the lowest coolie. The latter were the work of a native photographer, and, as well as the others we have named, were collected by Mr. Charles Harris, F.R.G.S., in a tour round the world. Mr. Harris was present, and gave a very interesting account of some of the wonders of the Yosemite Valley. Other selections exhibited were by the Platinotype Company; there were also specimens of the Autotype process, the most conspicuous of which was an enlarged excellent portrait of the Princess of Wales. Some combination pictures, just back from the Northampton exhibition, were very clever and admirably depicted, and were a source of much interest. There were also photographs by Messrs. Brothers, Chilton, Coote, Leigh, Pollitt, and Rev. H. V. Macdona (of the Manchester Photographic Society), as well as some by members of the Derby and the Hyde Societies. The great attraction to practical photographers was the apparatus, &c., which occupied a stand in the body of the Hall. Here were exhibited cameras, &c., by Messrs. J. F. Shew and Company, Marion and Company, and others, including the new patent camera by S. D. McKellen, of Manchester, which created much interest. Great interest was also shown in the "Miniature" camera and the "Alpha" prints by Messrs. Marion and Company; while the case of lantern slides by Cowan exhibited a range of tones truly marvellous. The Stereoscope, kindly lent by Mr. Chapman, of Manchester, was very largely patronized. The soiree was brought to a termination at 23 o'clock by the singing of the National Anthem, and the company dispersed to their homes thoroughly pleased with the treat they had experienced through the instrumentality of the Society.

The exhibition was open the following evening (Wednesday), for the express benefit of the working classes, at the nominal price of 6d. The "working classses," so-called, however, did not avail themselves of the opportunity of seeing the collection of photographs, &c., the attendance being very scant indeed.

North Staffordshire Amateur Photographic Association.

A meeting of this Association was held on Wednesday, January 14th, the President, Mr. C. Alfieri, in the chair.

The presentation prints for the past year, subject, "After the Storm," by Messrs. Valentine and Son, of Dundee, were handed to the members. Mr. John Emery, sen., was elected a member of the Association.

The experiment of circulating albums containing specimens of the work of members of the Society having proved a success, the Hon. Secretary was requested to procure additional albums for this purpose.

An exhibition of lantern slides having been determined upon, members were invited to contribute, and the President was requested to obtain some high-class slides from some of the leading London makers, and to undertake the arrangements for the exhibition generally.

After an interesting chat upon matters photographic, the meeting was adjourned to the 28th January, on the evening of which day the members of the Association, together with gentlemen connected with other local scientific societies, assembled in the Museum Hall of the Mechanics' Institution, Mr. Alderman Hampton presiding. After a few prefatory remarks by the Chairman, a large collection of very fine uncoloured slides, illustrative of the scenery of the Thames, were thrown upon the screen. A number of transparencies made by the President and the Hon. Secretary were also shown, and were highly appreciated by all present; the photographs being all pronounced very creditable to the gentlemen who had produced them.

The second part of the exhibition consisted of a first-rate selection of coloured and uncoloured slides illustrative of scenery in the Highlands of Scotland and elsewhere, lent by Mr. Chatham Sexton, and a capital series of studies of sheep and cattle, contributed by Mr. P. Fincham. Both sets of slides were much and deservedly admired by the members and their friends; some instantaneous pictures (by Mr. Fincham) of swans and other aquatic birds eliciting the warmest commendation.

The pictures were described by the President, who, in a brief address, explained the objects and scope of the Association, and testified to the pleasure it afforded him to see so many of its friends present.

A vote of thanks to the President and Council for their interesting entertainment was moved by Mr. Hampton in a felicitous speech, and seconded by Dr. Spanton, who remarked that it was a source of the greatest pleasure to him to see so many scientific societies in the district, all doing such excellent work.

After a cordial vote of thanks to the gentlemen who had contributed slides for the entertainment, and also to Messrs. Hammond and Smith—the former of whom had lent the lantern, and the latter manipulated it—a most enjoyable evening was brought to a close.

Notts Photographic Association.

The usual fortnightly meeting took place at the Nottingham Institute, on the 2nd inst., the President, Mr. George Shepperley, in the chair.

An exhibition of photographs, kindly lent by various firms of dry plate makers, was held and thoroughly enjoyed by members present. Several other firms had promised exhibits, but they did not arrive. After as thorough an inspection of the very fine collection as time would allow, and numerous questions having been answered by Mr. J. Collings, who had kindly undertaken the task of getting them together, that gentleman read the concluding paper of a series on "Development," after which a hearty vote of thanks was unanimously accorded to those who had so materially contributed to the evening's instruction and enjoyment.

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Talk in the Studio.

Photographic Society of Great Britain.—The annual meeting will be held on Tuesday next, February 10th, at 8 p.m., when the report of the Council will be read, the financial statement made, the election of officers take place, and other business transacted; after which the discussion upon Mr. Warnerke's paper, read at the last meeting, will be taken.

The Derby Photographic Society have decided to hold a *Conversazione*, and Exhibition of Photographs and Apparatus, in St. James's Hall, Derby, on Friday evening, Feb. 20. The programme is a varied and attractive one, and in the list of patrons are given the names of the Mayor of Derby, Sir Henry Wilmot, M.P., T. Roe, Esq., M.P., Rev. Canon Abney, Colonel Hon. R. H. de Montmorency, and John Bailey, Esq., J.P.

Society of Arts.—On Thursday evening, March 12th, Mr. W. K. Burton will read a paper on "Recent Improvements in Photographic Development." before the Applied Chemistry and Physics Section of the Society of Arts.

Mr. Valentine's Snow and Frost Pictures.—We are pleased to note that several of these, including that which we presented with our New Year's number, have been reproduced as wood engravings in the *Art Journal*. Notwithstanding the excellence of the reproductions, Mr. Valentine has some reason to be dissatisfied, as, by one of those extraordinary mistakes which sometimes arise from the almost unconscious association of ideas, the name of another photographer was mentioned as the producer. It is needless to say that a correction appeared in the following issue of the *Art Journal*, but, as Mr. Valentine remarks in a letter to us, "It is very hard for another photographer to get the credit of one's work, as in the meantime the numbers containing the mis-statement had gone everywhere."

Portraits of Colonel Burnaby.—At least two photographs of this gentleman have been produced, and have been brought into prominence by his recent melancholy death: an excellent cabinet by Mr. Fall, of Baker Street, which shows the Colonel in full regimentals, and with his characteristic smile admirably caught by the camera; also a carte portrait by Mr. Thomas Donovan, of St. James Street, Brighton.

Proposed Copyright in Architectural Designs.—The *Vossische Zeitung* makes the impracticable proposal to vest the right of selling photographs of a new building in the architect; the protection to hold good for three years. If this were the case, a photographer taking a street view in a new neighbourhood might have several hundred actions at law brought against him.

Death of M. F. Joubert.—Although the reputation of M. Joubert rests principally on his skill as a line engraver, his name will be also remembered in connection with photography. He patented (1860, No. 149), and worked commercially a method of making enamel photographs by what is termed the dusting-on process, and in 1862 he read a paper on the subject before the Photographic Society of Great Britain (see Photographic News, 1862, p. 125.) He was probably the first to work the Collotype process commercially in this country, and it may be mentioned that the well known process of coating engraved plates with steel is due to him.

The Chemistry of Silver Compounds.—J. M. Cabell has made four experiments in which very carefully cleaned pure silver was exposed under certain varying conditions to a current of pure hydrogen sulphide (sulphuretted hydrogen), which was first carefully dried. The results tend to show that, in absence of water, hydrogen sulphide does not act on silver at the ordinary temperature. J. D. Bruce finds that when dilute solutions of silver nitrate and potassium hydroxide, in 90 per cent. alcohol, are mixed at the ordinary temperature, in quantities containing equivalent amounts of the two substances ($AgNO_3$ and KHO), the usual granular brown precipitate of silver oxide is formed. When, however, the mixing is effected at very low temperatures, the precipitate which forms is flocculent, and has less and less colour as the temperature is lowered, until, at about —50° F., the precipitate is almost white. This white precipitate soon becomes coloured, and, at —40° F. is already pale brown. The white precipitate is presumably *silver hydroxide* (silver hydrate), and is slightly soluble in water.—*Journal of the Chemical Society.*

How Not to Make Chloride of Gold.—Let not the amateur photographer attempt to make chloride of gold from the attractive looking jewellery formed of what in trade is known as "rolled gold," as he will be disappointed in the results. Rolled gold is thus manufactured. An ingot of brass is cast, and while it is yet hot a thin layer of gold alloy is poured upon it. When the ingot thus covered becomes cold it is forced between steel rollers until a long thin ribbon is produced, of which the proportion of gold and brass is, of course, the same as that of the ingot. The percentage of gold is often reduced very low—sometimes to 2 and 3 per cent. This rolled gold in cheap bracelets and watch chains lasts for ten years.—*Photographic Times.*

Influence of the Light of the Sun on the Germs of Microbia—E. Duclaux.—The author's results show that the light of the sun is a hygienic agent of great power, being at least fifty times more efficacious than its heat in destroying mischievous germs.—*Chemical News.*

The Monitograph.—The camera obscura as an aid to the artist in tracing the outlines of a view is almost a thing of the past, it being so much more satisfactory to allow the image to impress itself on a sensitive plate. Notwithstanding this, *La Nature* gives a drawing and description of an ingenious device which shows the image non-reversed and upright on the ground glass screen, so that a sheet of tracing-paper can be laid over the glass and the pencil be immediately brought into use. The apparatus—which is called the Monitograph, and is the invention of M. Mallen—is provided with two reversing pinions behind the lens.

Photographic Club.—The subject for discussion at the next meeting, on Wednesday, Feb. 11, will be "On the Working Capabilities of Cheap Lenses.

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To Correspondents.

*** We cannot undertake to return rejected communications.

W. Wheeler.—We are sorry that there is no alternative but to leave it over till next week.

K. K.—1. Mix solutions of nitrate of silver and oxalate of ammonia, collect the precipitate on a filter, and dry it in the dark-room. If the nitrate of silver is in excess, the precipitate will be far more sensitive than if the oxalate of ammonia is in excess; but in the latter case the material keeps better. The best way of drying is to scrape the wet oxalate off the filter, to spread it on a clean dinner plate, and to place this over a saucepan of hot water. Oxalate of silver has been known to explode when strongly heated, but drying as above suggested is quite safe. 2. There is no advantage in using the ammonia.

Thos. Stokoe.—Your snow scenes are excellent, especially that showing the reflections of the trees in the brook.

R. C. Poulter.—Write to Mr. W. Cobb, Wellington Street, Woolwich.

Photographer.—1. A patent is granted for a new process or invention, but copyright can only be secured in relation to literary or artistic work. 2. The registration of a design only protects the general configuration, and in no way protects the working parts of an apparatus. It is impossible to judge as to whether your arrangement can be protected by mere registration, unless we know more about it; but under any circumstances it would be well to take the opinion of an experienced patent-agent.

Will o' the Wisp.—You can obtain white fire from any dealer in fireworks; but as there is considerable difficulty in arranging for its transit by rail, and much variation as regards quality, you had better prepare it yourself. Full directions for making the mixture, and a drawing of Mr. Frewing's easily-constructed pyrotechnical lamp, will be found on page 166 of the Year-Book of Photography.

Frd. W. Gregory.—The device is an excellent one, and, as you say, saves a great deal of trouble. Something of the same kind is figured on page 682 of our volume for 1884.

Edgar Gael.—The pictures were taken by Mr. W. Barry, of Hull. See Mr. Frewing's paper about the pyrotechnical light, on page 166 of the Year-Book.

Recram.—You cannot do better than have them done by the ink-photo process of Sprague and Co. The address is 22, Martin's Lane, Cannon Street, London.

A. B. C.—1. See page 200 of the Year-Book of Photography, also page 187. The iron or cyanotype process, as described, is equally applicable to calico or or linen.

G. C. Hindley—1. The ordinary solution of the strength you mention is intended. 2. Blacken by immersion in a solution of sulphide of ammonium—one part of the strong preparation and five or six of water.

J. R.—1. Do not let the temperature rise above 100 degrees Fah. 2. See the Year-Book, page 179.

W. D. V.—It is extremely annoying, but there appears to be no remedy. We can sympathise with you, and also with the person who made the mistake. The matter is referred to in another column.

Alpha.—Captain Abney's paper on the subject is to be found on page 746 of our volume for 1884.

H. H. Smith.—Collodion films can be, and have frequently been, used for the purpose; but gelatine is to be preferred, because, other things being equal, greater sensitiveness is obtained.

F. L.—The decolourization of an old printing bath, by shaking with kaolin, is not always satisfactory when the solution is highly coloured; a better method is to add two or three drops of a five per cent. solution of salt to every ounce of the liquid; place the bath in the sun for a few hours, and then filter. If the silver bath be made up with about five per cent. of spirits of wine, and always kept in the dark, the discolouration will be greatly hindered, as the organic silver compound is insoluble in alcohol.

A. N.—The curved lines in the copy are due to your using a single lens, which, like the portrait combination, is unsuitable for the purpose.

P. Gray.—Carbonate of ammonia is an extremely unstable salt; in contact with the atmosphere it crumbles into a powder consisting of the bicarbonate; thus the salt should be always preserved in a well-stoppered bottle.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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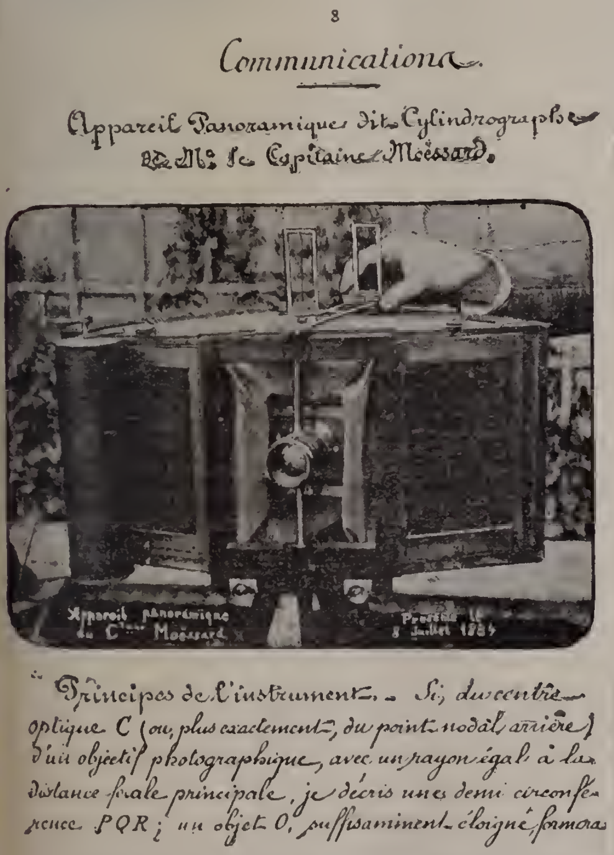
THE CYLINDROGRAPH.—A PANORAMIC CAMERA, DEVISED BY CAPTAIN MOËSSARD.

In the first number of the Journal of the newly-formed Photographic Society of Versailles (see page 63), there is a description of Captain Moëssard's new panoramic camera, and while reproducing the illustration by the Meisenbach process, it seemed to us worth while to give our readers a phototype copy of the whole of the page upon which the photograph appears.


Appareil panoramique
du C^{taine} Moëssard
8 Juillet 1884

8

Communications.

Appareil Panoramique dit Cylindrographe de Mr le Capitaine Moëssard.

" Principes de l'instrument. — Si, du centre optique C (ou, plus exactement, du point nodal arrière) d'un objectif photographique, avec un rayon égal à la distance focale principale, je décris une demi circonférence PQR ; un objet O, suffisamment éloigné, formera

The *Bulletin de la Société Versaillaise de Photographie*, as we have stated in a previous number, is printed by autographic lithography, and silver prints are used as illustrations.

Many forms of the panoramic camera, in which the objective rotates on a vertical axis, have been devised, the apparatus best known in Great Britain being that of Harrison and Johnson; but for simplicity of construction, it appears to us that Captain Moessard carries off the palm.

The camera consists of two nearly semi-circular pieces of wood, one of which forms the top of the instrument, and the other the bottom, as indicated by the block. The lens (a doublet) is attached to an axis which turns, as shown, on the flat side of the camera, a flexible front serving to keep the light from entering. The sensitive surface is a film bent to a curve corresponding to a radius equal to the equivalent focus of the lens, and to confine the action of the lens to a narrow vertical strip, a pair of cardboard screens are attached to the lens frame inside the camera. The dark slides are made of a flexible material, so that they are flat when out of the camera, and the draw screen is a curtain which is wound off on a cylinder shown on the left-hand side of the photograph.

The exposure is made simply by moving the lever connected with the objective round the arc at the back of the instrument, and the inventor points out that it is easy to adjust the exposure by varying the speed.

The apparatus of Captain Moëssard appears to be excellently well adapted for use with the gelatino-bromide paper which is now put in the market for negative making.

OUR SUPPLEMENT.—"EARLY SPRING AT FITZROY FARM," BY E. DUNMORE.

"An admirable picture, truly," we can almost hear a critic saying; "but look at the subject; who could not make a good photograph with such a subject before him?"

Our imaginary critic, who can see nothing in it but what anybody else could have done, would perhaps have been compelled to take a somewhat more enlightened view of the case had he been at a recent meeting of the Photographic Club, when the photographs taken by the members at the out-door gatherings were exhibited. Among the subjects chosen, "Fitzroy Farm" seemed to occupy by far the most prominent place, and it seemed as if every member of the Association had taken several negatives of this locality.

Among the numerous pictures shown were productions of almost every degree of goodness or badness, but there were not very many that could be fairly described as "execrably bad;" smaller, however, was the number of very decidedly good pictures. Prominent among those of this latter class we noted two, but these bore no name. They proved, however, to be the work of Mr. Dunmore, the Secretary of the Club.

We much wish we could reproduce the whole series of photographs, good and bad, just to shame our supposed critic; but this is impracticable. We may, however, let our readers know what Mr. Dunmore has to say.

"This photograph was taken in April, 1884, about midday, and is one of the most picturesque spots near London. The subject is 'Early Spring, Fitzroy Farm, Highgate.' During the summer this locality is a favourite one with artists, and sketches made here often form the basis of more important works that are hung on the walls of our exhibitions.

"The negative was taken on a plate prepared according to Abney's formula with iodide. The only deviation in making was, that the bromide and iodide were dissolved in water, and sufficient hydrochloric acid added to slightly decompose them, so that the solution was sherry colour before adding to the silver nitrate. The plate was kept twelve months in slide before exposure; there was a little fog round the edges, but nothing of any consequence, and the plate was of an average rapidity. The development was by pyro and ammonium well restrained with bromide of potassium."

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COLOUR IN DEVELOPED IMAGES.

BY W. E. DEBENHAM.

The question of the variety of colour that may be obtained in the deposit of silver reduced by a developing agent has recently acquired considerable prominence from the introduction, as a commercial article, of paper prepared with the object of replacing the usual albumenized paper as the medium upon which to produce photographic prints for the daily work of the portraitist. The subject has, of course, been frequently mooted before; notably when Dr. Eder introduced a working formula for gelatino-chloride, and it was then remarked that with a given emulsion, tones might be produced of a great variety of colour by giving longer or shorter exposure to light, and a development suited to the exposure that had been given. The striking colours of Mr. Wellington's transparencies on gelatino-bromide were also dependent upon a similar variation of time, exposure, and development; and now, with the rapid contact printing papers, a like difference of colour in the developed image is observable between those prints that have had what appears to be a minimum exposure, and those in which the exposure has been prolonged.

It must be noted at the outset that this variety of colour is not to be obtained with every emulsion and any plate by the mere process of long exposure, and a proportionately short stay in the developer.

Dr. Eder, when giving his formulæ for gelatino-chloride, observed that when the ammonia process of preparing the emulsion was employed, the tones obtained would be of the blacker character only. Let any one try with an ordinary commercial gelatino-bromide plate to get rich warm, red brown colours, and he will meet with disappointment. Mr. Wellington's gelatino-bromide plates for transparencies were prepared with a highly acid emulsion, and the gelatino-chloro-bromide paper of the same experimentalist is prepared similarly, that is, with a large quantity of acid. Generally speaking, the conditions favourable to rapidity have been found unfavourable for the production of warm colours in the developed image, but this must not be taken as an absolute rule. I have found, for instance, warmth of colour more easily obtained with emulsion made up after Mr. Wellington's formula than with another decidedly slower one.

Starting, then, with an emulsion which is capable of giving good warm colours—provided that an exposure has been given more than would be sufficient to bring out the details, if the development were carried on to the full—the question has arisen:—

To what is the warmth of colour due? Is it owing to the continued action of light upon the plate or paper, or to the more or less lengthened stay in the developing solution? That it is to the latter an experiment which may be repeated by anyone will, I think, be conclusive. Two strips of prepared paper were exposed so as to have four images upon each; the duration of the exposures on each strip was twenty, forty, sixty, and eighty seconds; and the distance from the gas flame which was used as the source of light was such, that the shortest exposure just sufficed to bring out the image with a somewhat prolonged development. The exposed strips were placed together in the developing dish, and from one of them the separate pictures were torn off, and placed in the washing water as they were developed, the eighty seconds one of course being first, and the twenty seconds one last. The print with the long exposure and short development was very red in colour, those which had had intermediate exposures were of different browns, and the twenty seconds print black. The other strip was left in the developing solution until the shortest exposed one was sufficiently developed, and then all the warmth of colour had disappeared from the long exposed prints, and they appeared as black in tone as the less exposed prints, but of course very much overprinted. Length of exposure to light appears only to affect the colour of the image by permitting the print to be removed from the developing solution at the red or warm coloured stage.

It is the fashion to admire very warm toned pictures, and—perhaps owing to the difficulty which has been hitherto experienced in producing them by development—there seems to be a tendency to get prints of a very red colour, as if to show how far this colouration could be obtained. In the prints, however, that have come under my notice possessing this characteristic in a high degree, there has been rather a blankness or absence of detail in the lights, whilst those which seemed to have registered all the gradations the most truly, were those which had the appearance of having been only exposed for a moderate time to the action of the light, and had then received full development.

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A TALK ABOUT LENSES.

BY W. WHEELER.

What is the best lens for copying? Well, as a general rule, the very best you have—the best definition, marginal as well as central, the most equal lighting, the flattest field. But is not this what we always want? Not so; at least, not unqualified by other conditions. For copying we want the best definition, far more necessary here than in original work; but we do not need great rapidity. We want the best marginal definition and the flattest field, but it is not necessary to combine with this a wide angle of view. On the contrary, a long focus, in proportion to the size of plate, is a clear advantage in every way; the object to be copied can be better lighted, and the image is more equally brilliant. As the angle of view diminishes and the extreme pencils have a less oblique incidence on the lens, all oblique errors—confusion, astigmatism, convexity of field, and any uncorrected distortion—diminish with it, and in a very rapid ratio. We have generally room enough, and when working at home there is not much difficulty in either fixing the lens in the wall of a dark chamber, which itself becomes a true camera, or by some inexpensive addition to an ordinary camera obtaining a sufficient length. But if our copying is on a large scale, then the lens desiderated is found to be a very expensive one; and if very large, it is perhaps even unattainable. Now, therefore, the problem is before us. What is the cheapest mode of constructing an efficient lens of very long focus, excellent definition with a moderate stop, flat field, and free from sensible distortion?

I believe it will be found that a Petzval lens of small aperture and long focus (say ten or twelve times the aperture of front lens), so arranged as to favour marginal definition, if even at some sacrifice in the central pencils; and a flat field, even if at some sacrifice in both respects, will be more efficient at a given cost than any other construction. Whether any improvements may be made by further modifying some of the forms and portions of the lenses, we will enquire later on. But first let us see how it is made, and readers may perhaps like to unscrew their back lenses and follow my description.

So far as I am aware, the construction has always included a front combination in which the anterior lens is crown or plate glass; the form of the whole cemented combination being plano-convex in the earlier forms, or a shallow meniscus in later ones. This form, very similar to the telescopic object glass made on Clairaut's curves, is the easiest to adjust, and the cheapest to construct; slight errors in workmanship interfering less with the correction of direct aberration than in the doublet form of a deep meniscus with anterior flint lens and deep interior curves, as this is again more favourable to oblique pencils. In the back combination, the flint concave presents a convex side to the stop, and a deep concavity towards the double convex crown or plate-glass behind it, which it achromatises. Of course the whole set of curves and distances are so arranged as to balance the direct spherical aberrations, and that, as is well known, to extreme perfection, as is proved by the large aperture permitted.

To understand this, we will first remark that the amount of aberration to be generally expected may be conveniently summarised in the approximate rule that "the aberration at any surface varies nearly as the cube of the refracting angle." Thus, if all the refractive power of any lens is exerted at one side only—as, for instance, on the convex side of a plano-convex lens, the plane side of which, turned to parallel rays, transmits them without deviation—and we reckon that refractive power as equal to 4; then, if equally divided, as by divergent incidence, or convergent emergence at that plane surface, they will equal 2 at each surface. Now the cube of 4 is 64, while twice the cube of 2 is 16, only a fourth part, so that equally dividing the refraction in place of throwing all on one surface, reduces the aberration to a fourth of its value. Though this is not quite exact, the ratio varying both with the glass and with the curve, it is yet a good approximation, expressing very well the general mode of dealing with aberration by altering the proportions of the curves, and the general advantages of dividing the refractions. For if the original error is small, errors of workmanship and adjustment are of less consequence. As to errors of obliquity, which no adjustment can entirely correct, division of refraction, and avoidance of violent curves is still more important, though, unfortunately, they divide differently; a divergent bundle of convergent pencils, or a convergent bundle of diverging ones, being an inevitable arrangement, and, as we shall see, it is in the judicious management of oblique aberrations that flatness of field is obtained.

We may now see that the excellent central definition of the Petzval lens is attained easily, because none of the curves are violent in relation to the form of the transmitted pencil. The general advantages of this form in correcting direct pencils, and those of doublets in the transmission of oblique ones, may be now seen by simple inspection. A general comprehension does not really need any very recondite study or elaborate calculation; abundantly necessary, and highly complicated as are these investigations and calculations to combine all the required conditions to the best attainable compromise, and deduce working formulæ. I venture to hope that an intelligent appreciation is more generally attainable than is sometimes supposed. For if we place a doublet to copy any picture, we may see that a bundle of rays starting from any point near the margin of the object, to be converged by the lens to a corresponding point in the image, passes through each surface favourably as regards the obliquity of its incidence, the ideal condition being that the axis or central ray of each pencil shall have a direct perpendicular incidence and emergence. If a stop be used in the centre, we can see at once by inspection that each bundle of rays passes through a small circle on each lens, harmoniously placed at each surface with regard to its general direction. No elaborate demonstration is required to perceive this, or to perceive how inharmoniously the corresponding small circles on the back lens of a Petzval combination appear, as the pencils spreading out from the stop fall obliquely on the surfaces of the flint lens. Of course this favourable incidence is not everything in a doublet, or else a globe lens would be as good as a wide angle rectilinear. But to return to our direct pencil: in a Petzval back lens we see that a central pencil, rendered convergent by the front lens, enters first a convex surface whose direct action on it is almost *nil*, and emerges from a deeply concave one still not very unfavourable to the direct action. Then, having generally been rendered moderately divergent, it passes through a lens convex on both sides, which form is seen by inspection to be favourable for dividing the refractions, and thus diminishing the aberration of a pencil which, diverging at incidence, is converged at emergence. No one surface presents so violent an angle as to throw the refraction wholly on one side, except the deeply concave one; whereas in other constructions, we may see the refraction strongly divergent at one side and convergent on the other of the same lens. Here all the direct aberrations are comparatively moderate at each surface; and this, no doubt, is the secret of its combined excellence and cheapness in proportion to aperture.

(*To be continued.*)

THE NEW RAPID PRINTING PAPER.

Note on the Exposure.

BY WALTER D. WELFORD.

It may, perhaps, appear rash on my part to write anything about the new process which is to revolutionise photography, so far as the multiplication of copies is concerned, the thing being so new, and, as I believe, so capable of improvement. But I have had rather a unique experience, and the relation of it may aid those who have either not yet tried the process, or who have but slightly dipped into it. An order was in view, 500 4×3 prints to turn out in four days, and I knew it meant using the new process. First assuring myself that paper was really obtainable in this town, I accepted the order and felt happy—for a time. The instructions revealed no great difficulty, and thirty to thirty-five seconds' exposure to a good gas light, with negatives of ordinary density, appeared an easy matter. To ensure "ordinary density," I developed with ferrous oxalate, and took care the negatives should be well exposed, and thin. From the instructions it seemed to me that under-exposure would likely be the cause of failure, so instead of thirty-five seconds, I gave the first trials sixty seconds. On developing they came up, as I thought, well, and until placed in the toning-bath things were going as merrily as a marriage bell. But the bath had no effect, and the results were of a very pretty olive green—not at all bad to look at, but, as I had to match prints on albumenized paper, of no earthly use. "Double the exposure will do it," said I, and the next night I gave two minutes to two and-a-half. What made me trust the paper so implicitly I know not; but true it is, I exposed over 150 prints. One maker's instructions stated that the prints would take three to five minutes to develop, and as I was certain my first trial did not exceed that, I felt sure doubling the exposure would obtain the brown tone. When I set to work, however, I was horrified to find exactly the same results. The toning bath was blamed at once; still, neither fresh baths nor fresh chemicals had any effect, and I felt considerably fixed. Application to the makers of the paper brought me no comfort, as they merely stated they could not understand it, and asked me to send a sample of the paper; and though a piece was at once sent—of course the time made it imperative—I should find the fault out myself. Everything received its due share of blame—the poor alum, iron, and potass were blackguarded, the gold I declared suspicious, and even poor acetate soda had more sins heaped upon its head than it could bear, the small stock I had going down the sink. To be brief, I tried in desperation from the same negatives, 5·7 and even ten minutes' exposure, and to my great delight managed to obtain the long-looked-for bricky-red. The millennium had arrived.

The point of the above notes is, that the makers are much understating the requisite exposure; they are much too modest and afraid of exaggeration. But, joking apart, in my opinion they are doing their wares and themselves much harm by endeavouring to make out the necessary exposure to be so extremely quick. Moreover, I can see no object in it; surely five minutes is quite fast enough for anything. This is where the majority will fail. Even an under-exposed print will develop fairly fast, and it is only when toning is attempted that the first suspicion of failure will dawn. The natural consequence is, the experience of many may be summed up: "I can manage the development all right, but cannot get the tone I should like." Doubt will not be cast upon the exposure, but upon the toning. Perhaps it would be better to explain what I mean as to an under-exposed print developing fairly fast. A print that, when finished, will give a cold grey tone, appears quite as quickly in the developer as anyone would be led to expect from the detailed instructions issued.

To those who have had the opportunity of seeing the process worked by an experienced hand, I am writing nothing new. But these I take to be few, and the majority of your readers, among which I know are many amateurs, will have to be guided entirely by what they read. Therefore plead I for more explicit instructions with the sample boxes. It is useless to state—"Stop the print as soon as it becomes as dark as required, because it loses nothing in subsequent operations." The actual tone of the print is the point. If, in order to get the detail out, one has to develop until the print is purple-black, the toning bath will not aid in obtaining brown tones. More exposure must be given in order to obtain the same detail with less development.

Just one more fling at the poor manufacturers, and I'll leave them to their own consciences. They draw particular attention to the wide range of tone obtainable on this paper. Those who have experimented appreciate this to the full extent. The range is all there; what is wanted is some decent certainty of obtaining a dozen prints alike in tone. When this is granted, we shall love the makers more. My experience points to ferrous-oxalate diluted with water for brown and red tones, and next to that ferrous-citrate. The latter solution, too, in the hands of amateurs, has the very great advantage of lasting much longer.

In conclusion, I may say that three different brands of paper and four different developers have been used in my experiments.

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Reviews.

The Year's Art, 1885. By M. B. Huish and D. C. Thomson. (*London: Sampson Low, Marston, Searle, and Rivington.*)

To the artist, "The Year's Art" is as essential as the "Year-Book of Photography" is to the photographer; but every photographer will do well to obtain the artists' annual.

The present issue of the "Year's Art" is considerably enlarged, and among the matter of especial value to the photographic fraternity may be mentioned five plates of selections from the Royal Academy Exhibition of 1884, and over a dozen plates giving similar selections from other art exhibitions of the past year; including the Water Colour Society, the Institute of Painters in Water Colours, the Grosvenor Gallery, and also the exhibitions of some half-dozen foreign and provincial art societies.

The work under hand is a comprehensive art directory, giving names and addresses of professional artists in Great Britain, artist's calendar, engravings and books published during the year, legal decisions, and obituary; besides a concise but comprehensive guide to museums, galleries, schools, clubs, unions, charities, and institutions connected with art.

Practical Physics. By R. T. Glazebrook and W. N. Shaw; 487 pages, price 6s. (*London: Longmans, Green, and Co.*)

We have here just such a text-book as we may suppose to be well suited to meet the requirements of the majority of our readers; neither so superficial and popular as to be read through almost as one would read a novel, nor so abstruse as to offer serious difficulties to a man of average education.

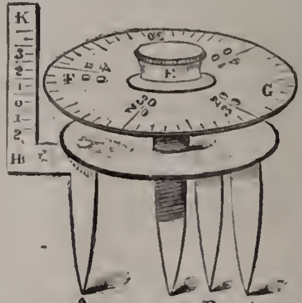
The fact that physics as taught in the present day is so far quantitative as to be almost summed up in the one word "measurement," is strikingly called to mind by a glance over the work; and by way of giving our readers a sample we cannot do better than to quote the authors' description of the spherometer as ordinarily used in measuring the curvature of a lens.

"The instrument consists of a platform with three feet, whose extremities form an equilateral triangle, and in the middle of the triangle is a fourth foot, which can be raised or lowered by means of a micrometer screw passing perpendicularly through the centre of the platform. The readings of the spherometer give the perpendicular distance between the extremity of this fourth foot and the plane of the other three.

"It is used to measure the radius of curvature of a spherical surface, or to test if a given surface is truly spherical.

"The instrument is first placed on a perfectly plane surface—piece of worked glass—and the middle foot screwed down until it touches the surface. As soon as this is the case, the instrument begins to turn round on the middle foot as a centre. The pressure of the hand on the screw should be very light, in order that the exact position of contact may be observed. The spherometer is then carefully removed from the glass, and the reading of the micrometer screw is taken.

"The subjoined figure will help us to understand how this is done. A B C are the ends of the three fixed feet; D is the movable foot, which can be raised by turning the milled head at E. This carries round with it the graduated disc F G, and as the screw is turned the disc travels up the scale H K. The graduations of this scale are such that one complete revolution of the screw carries the disc from one graduation to the next. Thus in the figure the point F on the screw-head is opposite to a division of the scale, and one complete turn would bring this point opposite the next division. In the instrument in the figure the divisions of the scale are half-millimetres, and the millimetres are marked 0, 1, 2. Thus only every second division is numbered.



"But the rim of the disc F G is divided into fifty parts, and each of these subdivided into ten. Let us suppose that division 12 of the disc is opposite to the scale at F, and that the milled head is turned until division 36 comes opposite. Then the head has been turned through 24 (36—12) larger divisions; but one whole turn or fifty divisions carry the point D through

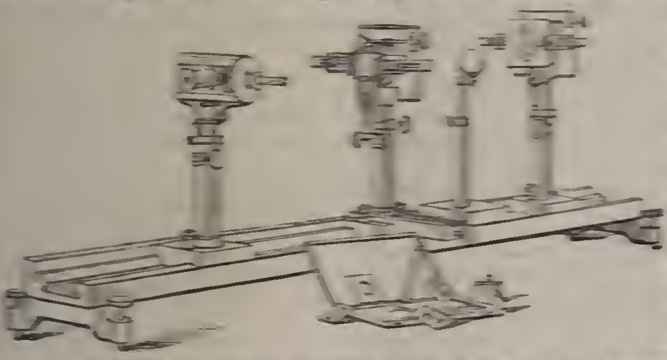
1 mm. Thus a rotation through twenty-two divisions will carry it through from 1 mm. to 75 mm."

For the details of some calculations and examples we must refer to the book itself.

The optical bench is an essential to the experimentalist with lenses, and in the following words it is described by Messrs. Glazebrook and Shaw:—

"The optical bench consists essentially of a graduated bar carrying three upright pieces, which can slide along the bar; the second upright from the right in the figure is an addition to be described later. The uprights are provided with verniers so that their positions relatively to the bar can be read. To these uprights are attached metal jaws capable of [illegible]. Those on the first and second uprights can rotate about a vertical axis through the centre, and also about a horizontal axis at right angles to the upright; they can also be raised and lowered.

"The second upright is also capable of a transverse motion at right angles to the length of the bar, and the amount of the motion can be read by means of a scale and vernier. The jaws of the first upright generally carry a slit, those of the second



are used to hold a bi-prism or apparatus required to form the interference bands.

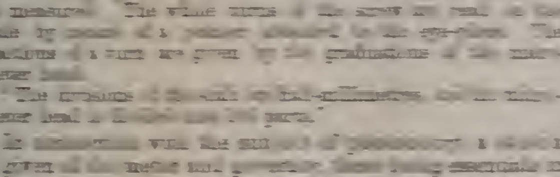
"To the third upright is attached a Ramsden's eye-piece, in front of which is a vertical cross-wire; and the eye-piece and cross-wire can be moved together across the field by means of a micrometer screw. There is a scale attached to the frame above the eye-piece by which the amount of displacement can be measured. The whole turns of the screw are read on the scale by means of a pointer attached to the eye-piece. The fractions of a turn are given by the graduations of the micrometer head.

"The divisions of the scale are half-millimetres, and the micrometer head is divided into 100 parts."

In connection with the subject of photometry a sketch is given of the meter and governor, these being essentials in connection with the examination of the illuminating power of gas; and it may be mentioned that in using gas as a light for printing photos, it is very advisable to use the governor, if not the meter also.

We quote the description of the arrangement:—

"The gas is passed from a gas-holder, where the pressure can be altered by altering the weights on the cover, through a meter M, which measures the quantity of gas passed through. One complete revolution of the needle corresponds to [illegible] a cubic foot of gas, so that the numbers on the [illegible] passed over in one minute give the number of cubic feet of gas



which pass through the meter in an hour. The gas enters at the middle of the back of the meter, and leaves from the bottom, passing thence to a governor G, which consists of an inverted bell, partly filled in water, and counterpoised so that the [illegible] attached to the top is very close to the conical opening of the entrance pipe. Any increase of pressure of the gas in the bell raises the bell, narrows the aperture, and diminishes the supply until the pressure falls again. By this means the pressure of the gas at the burner is maintained constant."

Messrs. Glazebrook and Shaw are to be congratulated on having produced a good working manual for the physical laboratory.

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SYSTEMATIC RECOVERY OF GOLD AND SILVER IN SILVER PRINTING.

BY [illegible]*

In a photographic publishing business such as mine, the quantities of gold and silver used are so large that it is imperative that the recovery of residues be conducted in a systematic manner. The fact that by the system in use in my establishment I have been able within the past year to recover nearly two-thirds of the total value of gold and silver used, will I hope be sufficient excuse for the subject chosen.

I shall commence with the different operations in sensitising, toning, and fixing, taking them in their due order, and describing the means used for preventing waste, and recovering the large proportion of metal not actually used in forming what is known as a silver print. The sensitising bath is made of the strength of 60 grains to the ounce, and is used slightly alkaline. The sheets of paper are floated for two minutes, and are then drawn over a glass rod fixed in such a position over the [illegible] that [illegible]. When treated this way there is only [illegible] of the sheets [illegible]. In practice I use three trays large enough for full sheet of paper, and by the time the last sheet is taken from the bath, the first one is ready to be surface-dried between sheets of soft blotting-paper; it is then suspended by one corner in a room heated with hot water pipes for ten or fifteen minutes, the drying being completed in a metal [illegible] box heated by gas. The first saving of silver takes place here by the means described; there are no droppings of silver bath, but the blotting pads are periodically burnt, and the ash saved. After the paper is cut by means of a guillotine knife to the required sizes, a number of sheets being cut at one time. This answers two purposes: first, a clean cut edge is got for the print, which minimises the risk of tearing during washing; and second, the cuttings fall at once into a box preparatory to being reduced to ash. The various cuttings, spoiled prints, &c., are burnt once or twice a week in an iron pan, [illegible], and the ash is allowed to accumulate for a few weeks, and is then sent to the refiner. To illustrate the value of some of the different residues as I proceed, I shall give the sum received for them. In a given time I used £[illegible] worth of nitrate of silver; from this I received as value of paper ash the sum of £[illegible].

I now come to the washing of prints preparatory to toning. For this purpose I use zinc trays [illegible], and [illegible] by pipes with [illegible], which are in the open air. [illegible] I consider of the utmost importance. [illegible] chloride of silver [illegible]. I am [illegible] which [illegible] remains in suspension, and is always saved. When the [illegible] purposes are kept in the bath, common salt is used for precipitating the chloride. By addition of small quantities of [illegible] from time to time, I find [illegible] precipitation. The prints are washed in batches of [illegible], and receive eight changes of water, six of which are considered of sufficient value to save. At intervals the liquid of chloride of silver in the trough is filtered and placed in trays with canvas bottoms, these being previously covered with blotting-paper. After draining for a few days, the mass is put in a [illegible] pan, and quickly dried over the fire. From £[illegible] in silver used in the given time, I received as value of chloride residue the sum of £[illegible].

I now come to a most important item, viz., chloride of gold used for the purpose of toning the prints, in practice which the [illegible] worth of silver was used. I recovered [illegible] to the value of [illegible]. Of this I recovered, by means I will now describe, [illegible]. The prints are toned in porcelain [illegible] placed in a long sink, provided with [illegible]. The whole of the [illegible] of this trough are [illegible] with three plies of cotton-cloth, a pipe at the lowest end conducting any spilt bath, or splashes of toning solution, into large glazed earthen pans, in which a quantity of sulphite of iron is placed. After the prints are toned, they are placed in trays of water; this and a subsequent washing are also thrown into the glazed pans; these, when filled, are allowed to stand for two days, when the clear water is drawn off, leaving the gold residue at the bottom. From time to time it is lifted and dried in the same manner as the chloride.

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* [illegible] Photographic Association.

I have found it pay to provide the toners with thick cotton aprons, which are burnt after a certain time, and the gold which has got on them from splashes when toning, recovered. Previous to erecting the trough I have described, the dishes for toning were placed on a bench eight feet by two feet. When removing this, more from curiosity than anything else, I reduced the whole bench to ash, and received from the assayer the sum of £4 11s. 7d. as the value of gold it had contained.

I now come to the last operation, viz., fixing the prints; and a most important quantity of silver is recovered from the hyposulphite of soda solution in which the prints have been fixed. In my practice the fixing of the prints take place in shallow slate trays, fixed permanently inside a long trough; each tray is provided with a plug, and the waste solution runs off by a pipe into the depositing troughs, which are placed in the open air. Two of these are used; while one is filling, the other has time to allow the sulphide of silver to settle at the bottom. Wooden spiggots are placed in these troughs about ten inches from the bottom, to allow the clear liquor to run off. For precipitating the silver I use strips of zinc suspended in the liquid, and also a small quantity of liver sulphur. This residue is a very valuable one, and I understand many photographers do not know this, as many throw it down the sink. From the £720 worth of silver used, I recovered the sum of £193 16s. 4d., this giving a total of £476 7s. 3d. recovered in the shape of residue from £720 worth of silver nitrate used, and I had still in hand of the £720 silver bath to the value of £25 10s. Of gold I used £274 worth; I recovered £101 14s. 3d.

Another valuable residue is that from the fixings of gelatine plates. I regret I am unable to give exact proportions on this matter at present. The assayer's charge for reducing the above value of residue was £24 10s. 9d., and I have never been able to do it so cheaply myself.

I shall be glad if these notes have the effect of inducing others to save systematically their gold and silver "wastes."

AN IMPROVEMENT IN LENS SCREWS.

BY GEORGE SMITH.*

The Rev. A. Corbet's suggestion to turn off, in a lathe with an eccentric chuck, a portion of the screw-thread on both lens and flange, struck me as an excellent idea; the only difficulty being that of gaining access to a lathe fitted with such a chuck, I asked myself whether it could not be easily done by hand with a file, and at once set to work and did it. It is simplicity itself, and answers perfectly. First screw the lens fairly home in its flange, and make a mark top and bottom, or if you like to take a little more trouble, three equidistant marks on both lens and flange; now file away all the thread in the intervening spaces up to (say) a quarter of an inch from each mark; do this to both lens, mount, and flange, preferably leaving a little greater length of thread on the flange than on the lens mount. I have found it a good plan to make a distinct black mark on the lens mount, at the top, and a black line on the inner edge of the flange, showing at a glance the exact spot at which to enter, and the distance to be travelled to completely fix the mount in the flange.

ON THE RAPID PRINTING PAPER.

BY LEON WARNERKE.†

Next follows the development of the image. All manipulations with this paper can be carried on in a room illuminated with orange or yellow light. I am personally in favour of yellow paper, either for a lantern or for a window. Canary paper answers very well. It can be prepared by treating ordinary white paper with any sort of lead. When dry, immerse it in a solution of bichromate of potash, and wash in water. It may be said that generally a great deal more light can be allowed than for gelatine bromide plates.

The paper, when removed from the printing frame, must be soaked in cold water. Some prefer to put it immediately in the developer without wetting; but for my part I always prefer, whether an emulsion be on glass or paper, to soak the film first in water.

Development can be effected with ferrous-oxalate, ferrous-citrate, or hydrokinone developers, each producing a different tone.

1. *Ferrous-Oxalate Developer.*

A.—Potash oxalate ...	...	25 parts or	2½ ounces
Ammonia bromide	...	1 part or	48 grains
Water	...	100 parts or	10 ounces
B.—Iron sulphate ...	...	10 ,,	1 ounce
Water	...	150 ,,	15 ounces

Adding a small crystal of citric acid.

These two solutions are mixed in equal proportions, and the mixture may be diluted with water for warm tones and dense negatives.

2. *Ferrous-Citrate Developer.*

A.—Citric acid ...	...	200 parts or	4 ounces
Ammonia carbonate	...	100 ,,	2 ,,
Water	...	500 ,,	10 ,,
B.—Iron sulphate ...	...	100 ,,	1 ounce
Water	...	500 ,,	5 ounces

Adding a small crystal of citric acid.

C.—Common table salt	...	5 parts or	1 ounce
Water	...	100 ,,	20 ounces

A and B are mixed in equal proportions, and a few drops of C added, according to the exposure given and tone of the print desired.

Ferrous-citrate develops the slowest, and produces generally the warmer tone.

3. *Hydrokinone Developer.*

A.—Hydrokinone ...	...	5 parts or	24 grains
Alcohol	...	100 ,,	1 ounce
B.—Potash carbonate ...	...	20 ,,	96 grains
Water	...	100 ,,	1 ounce
C.—Common table salt	...	5 ,,	24 grains
Water	...	100 ,,	1 ounce

To form a developer, mix 10 drops of A, 5 to 10 drops of B, 1 to 3 drops of C; water, 1 ounce.

A short time after the exposed paper is immersed in the developer, the image begins to appear. If the exposure be short, the colour of the image will be black; but the longer the exposure, the redder is the first image. The development is continued until all details are out. A properly exposed print should permit sufficient details in the high lights to be seen before the deep shadows become too heavy; but in the case of a very intense hard negative it will require some practice to adjust properly the exposure and the developer. With such negatives a normal developer will give hard and very dark prints; but dilution with water, in proportion to the density of the negative, will overcome this difficulty.

It will also be found in practice that with some sort of negatives a warm tone is not easily obtained. Clear and rather weak negatives are preferable for this paper. The ferrous-citrate developer very often will give a warm tone, when oxalate will not. The ferrous-oxalate developer is quicker, but, being decomposed by the action of the atmosphere, it cannot be used for developing longer than from twenty to thirty minutes, independently of the number of prints immersed. Ferrous-citrate keeps much better, and can be used for hours, therefore it will be found more convenient when many prints have to be developed. Hydrokinone gives very warm tones: it is very economical, notwithstanding the cost of the salt; but being used very diluted, it is cheaper than iron. The only objection I found was, that it is very soon discoloured, and if the development for this or any other reason is prolonged, there is the danger of staining the paper.

The ultimate tone of the print can be modified by gold toning—warm tones cannot be got easily if the developed print is of a blue or slate colour. This is the reason that it is useful to have in readiness more than one developer, and to use them according to the nature of the negatives. Lastly, I may mention that the relative proportions of the salt forming the developer has considerable influence on the developed image. It will be out of place in this paper to dwell longer on this important subject; but I must refer persons interested to the excellent works of Dr. Eder and Pizzighelli, *Die Photographie mit Chlorsilber Gelatine* and *Der Neue Eisenoxalat Entwickler.* The investigations of Dr. Eder are so exhaustive, that there is almost no room in this direction for any new and original remarks. After the image is developed it must be washed in four or five changes of water, and for the elimination of the iron it is left in a ten per cent. solution of alum for fifteen minutes; it is then washed again in four or five changes of water. Leaving the prints long in the washing water is not advisable.

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* Abstract of a paper read before the Photographic Club.

† Continued from page 91.

Next, as to toning. Any toning used for albumenised paper will answer. I tried, successfully:—

Gold chloride	1 grain
Sodium acetate	30 grains
Water	8 ounces
Chloride of lime	A trace

Care must be taken that no trace of iron (from the developer) is left in the paper, as gold is reduced by iron salts, and spots or general greyness may be the result. Personally, however, I prefer and strongly recommend toning and fixing in one bath.

A.—Sodium hyposulphite ...	30 ounces
Water...	30 ounces
B.—Gold chloride..	15 grains
Water	20 ounces

To solution A add slowly, and well stirring, four ounces of B. The bath is then ready for use. It improves by keeping, and when necessary, is replenished by the addition of fresh hyposulphite of soda and of gold solution B. The print is to be kept in this bath for ten minutes, when it will be both toned and fixed.

This bath keeps well, and improves by keeping. Care must be taken to add fresh gold and fresh hypo after a certain number of prints have been passed through the bath. If separate toning is used, fixing is effected in the ordinary 20 per cent. of sodium hyposulphite.

And here I must give warning that in the operation of printing care must be taken against any contact of the paper with hyposulphite of soda. This substance accelerates the action of the developer, and is the cause of spots in consequence. After fixing, the print must be washed from every trace of the hyposulphite of soda, like any ordinary albumenised paper print. An erroneous notion is entertained by some that it will not require so much washing as such.

The washed print, when dried spontaneously, will have the appearance of an albumenized print; but there is a very easy way of producing a surface equalled only by the finest enamel process, and to do this, a glass plate is rubbed with talc (French chalk), and the wet print squeezeed to it; this, when dry, can be easily peeled off, with a surface like glass. If the glass is perfect, no failure can occur; but sometimes it happens, as is well known to enamellers, that through the invisible holes in the glass the print is spoiled, from a refusal to detach from the glass. I found that if a finely-polished ebonite sheet is used instead of glass, and the wet print squeezeed to it, without any previous preparation, as soon as it is dry it will peel off with a surface very little inferior to that from glass, and failures in this case are not to be feared.

Naturally, the enamelled print will lose some (not all) of its exquisite gloss when moistened again, and in order to preserve it, the mounting material must be pasted to it before it is dry and separated.

Now comes the question of the permanency of these prints. Time only will conclusively answer this question; but, knowing by experience that silver-developed images keep so well in negatives or transparencies, we have reason to suppose that these newly developed prints will also prove equally permanent.

Before I conclude, I must express my belief that this paper will be the paper of the future, and that before long it will supersede albumenized paper, not only for dark winter days, but for all printing, at any time, because, producing equally fine results, it is so much quicker to print, and permits a greater range of colour to be obtained. I shall not be surprised if, instead of the slow and tedious operation of printing, we shall have a suitable printing machine, in which the exposure will be produced by the simple movement of a handle, regulating the speed according to the intensity of the light, and perhaps an equally mechanical development.

Machines for such purposes have been already designed, but the paper was not in existence; now, therefore, the time has arrived when they may be forthcoming.

EMULSION MAKING.

Notes about a Lecture,

by F. Myott.*

The lecturer disclaimed any pretence to originality, and said he came before the meeting to give his own experience of everyday routine. The formula, therefore, would show no very startling deviation from those already in use, but was simply the statement of one he had adopted after experimenting among many. He cautioned all who would be "emulsion makers" that much patience and perseverance were necessary, for many failures would come to the most careful of workers; but for all that, there was a great fascination connected with plate making that would tempt one to continue pouring their pounds, shillings, and pence down the sink, and perhaps not a little spoilt "bromide of silver."

In order to give a better idea of what constitutes the recognized requirements of a good emulsion, the lecturer gave a brief history of the rise and progress of the gelatino-bromide process, reference being made to the experiments of Dr. Maddox, and the modifications of Bennet, Abney, and Eder, until the latest improvement—viz., the introduction of iodide of potassium—was recommended. This latter he had experimented with somewhat exhaustively, with the result that he was strongly in favour of its use, being confident that it contributed largely to the production of bright and sparkling shadows in the resulting negative, and prevented the development of fog when boiling the emulsion; and he now adhered to its use on all occasions. He had also given gelatine of various makes some amount of study, and in his hands the use of equal portions of hard and soft samples, so often recommended, had proved unsuitable, and he now invariably adopted one part of hard to three of soft gelatine. The following is the formula used by him for a five-ounce proportion:

No. 1.—Bromide of potass	45 grains
Nelson's gelatine, No. 1 ...	15 ,,
Distilled water	1 ounce
No. 2.—Silver nit.	60 grains
Distilled water	1 drachm
No. 3.—Iodide potass	1 grain
Distilled water	1 drachm
No. 4.—Nelson's gelatine No. 1 ...	60 grains
Swiss hard ,, ...	20 ,,
Distilled water...	1 ounce

This would allow for an excess of bromide in the resulting emulsion, and would be found useful in keeping it free from fog during manufacture, and distilled water should be used to prevent a precipitate of the carbonates or other matter forming. He preferred bromide of potassium to the bromide of ammonium, because the latter was more liable to change and get acid by keeping, and it was very necessary to use it while fresh. If it were not for this drawback, he would be inclined to favour the bromide of ammonium, as this was capable of giving an exceedingly rapid emulsion.

The bromide of potassium solution No. 1 should be slightly acidified if found alkaline on testing with litmus paper, and dilute hydrochloric acid should be used for this purpose.

To form the emulsion, after allowing the solutions containing gelatine to soak some little time, Nos. 1 and 2 should be heated until the temperature was raised to about 150°. He thought that the temperature at which these solutions were when brought in contact was of some importance. The silver solution No 2 should be mixed with No. 1 gradually (say at about five or six times), shaking well between each addition. He sometimes used a small spray-producer for finely-dividing the silver; No. 3 was then added. Now place the emulsion in a stone bottle loosely corked, and boil for an hour, now and then removing the bottle and well shaking, after which allow to cool to 100° Fah., and after No. 4 has been warmed to a similar temperature, add to the emulsion. The temperature at which this operation was performed was also important. If the bulk of the gelatine were added when the temperature was high, the resulting emulsion would give a smooth and horny surface. The medium temperature would give a matt surface, and this was by far the best quality. Now pour out into a flat dish and allow to set; force through coarse canvas into clean water. After repeating this operation three or four times, it may be considered sufficiently washed.

Now dissolve by gentle heat, and add three drs. of absolute alcohol, when, after filtering through cotton-wool, the emulsion is ready for use. When boiling, care should be taken to keep the temperature just under the actual boiling point, say three or four degrees.

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* Delivered before the Halifax Photographic Society.

Notes.

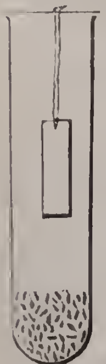
How much of the silver and gold used by the photographic printer can be recovered? Mr. W. D. Valentine tells his experience. In a given time he spent £720 for silver, but recovered to the value of £501 17s. 3d.; and during the same period he paid £274 for gold, but recovered to the value of £101 14s. 1d. Those who wish to know how he did this should refer to p. 101.

According to the *Figaro*, a couple, anxious to intimate the fact of their wedding in the latest new way, must use a four-paged enamelled carte. Page one of the little *livre des noces* is to be devoted to appropriate floral decoration; pages two and three to the names of the bride and bridegroom, the date and place of their wedding, the expression of their good wishes, and the like; whilst on page four should be found the photographic likenesses of the lately-married pair in hymeneal attire. Let the notion become fashionable, as all good photographers will hope it may, and the once general public intimation—"No Cards"—at the end of an announcement of a wedding, will be superseded by the still curter one of "*Cartes.*"

There is one difficulty in the way, however. How are the negatives of the bride and bridegroom to be obtained in hymeneal attire? Does this imply a preliminary dress rehearsal of the marriage service, or is the photographer to be hidden somewhere in the chancel or the organ loft? A wedding party impressed with the idea that there was "a chiel amang 'em takin' '*cartes*,' and that faith he'd print 'em," would find that yet another misery had been added to the marriage ordeal.

That commercial paper is liable to contain sulphides, which on decomposition by traces of acid give off sulphuretted hydrogen, is a certainty; and perhaps many cases of fading are due to these sulphides. Ultra-marine, of which sulphides form a considerable proportion, is added to the pulp to disguise a yellow tint; while sulphate of lime is largely used as a "loading" for paper, and when paste-board is made up of such loaded paper, there is considerable probability—indeed, almost a certainty—of a portion of the sulphate becoming reduced to the condition of sulphide, when the card is kept in a damp place.

How to test for sulphides in cardboard is the next point. Take a glass tube, closed at one end, and slightly expanded at the neck—in short, a test-tube about five inches long; cut up some of the card or paper, add enough water to nearly cover it, and a piece of citric acid as large as a small pea. Now take a disc of paper that will cover the top of the tube, and hang from this, by means of a thread, a slip of white blotting-paper which has been moistened with a solution of acetate of lead; one part in five or six of water. The whole apparatus is shown by the cut.



If there is a very large proportion of any sulphide present, the lead paper will very soon blacken; but if the proportion is small, the action is less rapid. It is just as well to very slightly warm the mixture by holding the tube over gas or candle flame, but the heat should not nearly reach the boiling temperature; now set the apparatus aside (in an upright position) and examine it next day. If there is no darkening whatever of the lead paper, one may conclude the card to be free from sulphides.

In these days of heroes, when a fresh one springs up every week, the competition between the illustrated newspapers eager to obtain a portrait of the latest notability has been unusually keen. It is only after you become celebrated that society demands your photograph, and it would seem that soldiers in particular are averse to being photographed. Last week the agent of a certain paper, at the first intimation that General Earle's portrait was needed, did not waste time by going to any of the dealers, but rushed off at once to head-quarters—that is to say, to the general's home. It was still early in the day when he arrived, but, early as it was, some one had forestalled him, and had secured the only portrait from Mrs. Earle but half an hour before. There was no help for it but to retire gracefully.

When are we to get an actual photograph of a battle? Now that correspondents really go into action, a negative of the scene they witness, or at any rate of a portion of it, might be obtained without increasing very much the danger to the "special." The additional "exposure" necessary, which need be but momentary, would not be his. Doubtless, then, we shall soon hear of the camera being under fire, and whilst a general may have his horse shot under him, our special will be wiring home that his apparatus and reserve of "dry plates" have been shot all over him.

An artistic photograph—that is to say, a photograph which is also a picture—is not the outcome of chemistry and manipulation alone; but when one sees a fine photograph it is natural to ask something about the making of the plate. Mr. Dunmore's "Early Spring," which forms our supplement, was taken on emulsion made with iodide by Abney's formula; Mr. Dunmore having, however, deviated to a trifling extent from the instructions. The reader will find some particulars on page 97.

Can it be that Dr. Crichton Brown is preparing another surprise for the Public Education Department? It is rumoured that nearly all the children in one of the large metropolitan Board Schools have been mysteriously way-laid and photographed, and there is naturally much conjecture abroad as to what it is the "negative" results, thus procured, are to make more positive. Some think it is Mr. Galton who is thus collecting fresh anthropometrical facts, whilst another suggestion is that it is Mr. Brudenell Carter, who in this way hopes to get at the information the London School Board will not allow him to otherwise obtain.

Automatic engraving processes, in the majority of which photography forms a part, are yearly gathering more importance. There appears to be no mystery about the main principles on which these processes are worked, but every firm has its own secrets in points of detail, and these secrets they are naturally jealous in guarding. One therefore is forced to judge of the comparative advantages of these processes by results. So far, the contemplated "International Competition in Automatic Engraving" will prove of great interest. Mr. J. S. Hodson, the hon. secretary, states that there are now about thirty processes, English and foreign, to which distinctive names have been attached, the earliest known process dating as far back as 1856. In order to render the competition impartial, each competitor will be furnished with the same subjects for representation, such subjects comprising a pen-and-ink drawing, a line engraving, a drawing in wash, a photograph of sculpture by Mr. W. England, a photograph of a landscape by the Military School at Chatham, and a photographic portrait by Messrs. Window and Grove. The jurors include distinguished artists and practical men, and the private view of the results will be held in April, after which the collection will be shown at the International Inventions Exhibition at South Kensington. Those wishing to compete should write to Mr. T. S. Hodson, at 20, High Holborn.

In a case of alleged sham firemen, heard last week at the Southwark Police Court, the counsel for the defendants handed to the magistrate a photograph of the fire station and men to show that the affair was a bona-fide one. No doubt to some extent the photograph was useful, but its evidence was—without intending any joke—of a negative character. Had it been accepted as conclusive, we might next expect to see burglars of the Peace order putting in photographs of their suburban dwellings and pony and gig, to prove their respectability.

When we hear so much at times about the mechanical nature of photography, it is wonderful to find the *Athenæum*, in criticising adversely the Arundel Society's publication (a chromo lithographic reproduction of a fresco by Fra Bartolommeo), say :—" We would rather have an ounce of art and sympathetic translation of any picture, than a ton of that tame correctness which is the pedant's glory. A photograph of the picture, however inadequate in some respects, would be much better than this stupid print." After this, the possibility of photography being a plastic and sympathetic art need not be scouted.

Patent Intelligence.

Applications for Letters Patent.

1503. Lorentz Albert Groth, 30, Finsbury Pavement, London, E.C., for "A new or improved method of etching and reproduction by photography or heliography."—Communicated by Dr. Eugen Albert, Germany.—Dated 3rd February, 1885.

1637. Alfred William Smith, 93 and 94, High Street, Rye, Sussex, for "An improved and easy method of placing magic-lantern slides in lanterns, and changing and removing the same."—Dated 6th February, 1885.

1716. Arthur Coventry, Carlton Chambers, 18, St Ann's Street, Manchester, for "Improvements in apparatus for coating and drying plates for use in photography."—Dated 7th February, 1885.

1782. Basil Alfred Slade, 34, Southampton Buildings, for Improvements in sensitive metallic plates for photographic purposes."—Dated 9th February, 1885.

Patents Sealed.

2312. Alfred George Brookes, of 55, Chancery Lane, in the county of Middlesex, Fellow of the Institute of Patent Agents, for "Improvements in the method and apparatus to be employed in the preparation of surfaces for printing or etching by the aid of photography."—A communication to him from abroad by Edward Kunkler, of St. Gall, in the republic of Switzerland, Civil Engineer, and Jacques Brunner, of Kussnacht, in the canton of Zurich, in the aforesaid republic, Photographer and Art Printer.—Dated 29th January, 1884.

13,372. William Charles Hughes, Brewster House, 82, Mortimer Road, Kingsland Road, N., London, for "An improved frame for rapidly changing the pictures in a magic lantern."—Dated 9th October, 1884.

Patents on which the Seventh Year's Renewal Fee of £10 has been Paid.

533. Alfred Pumphrey, of Birmingham, in the county of Warwick, Manufactuerer, for an invention of "An improvement or improvements in the production of printing surfaces." —Dated 8th February, 1878.

The process called "collography," and described in the Year-Book of Photography for 1879.

1097. James William Thomas Cadett, of 68, Camberwell Grove, in the county of Surrey, for an invention of "New or improved pneumatic arrangements for facilitating the uncapping or exposing and capping or shutting the lenses used in apparatus for depicting persons or objects by photographic means."—Dated 19th March, 1878.

The lift-up or flap pneumatic shutter with which our readers are familiar.

Specifications Published during the Week.

5186. Michael Edward Rowlandson, M.A., Oxon., Priest, Angl. Eccles.; Wonford House, Heavitree, Exeter, Devonshire, for "Sketching by means of sketching glasses"—Dated 20th March, 1884.

My invention consists of two frames or "pedestal stands,"—1st. A wooden grooved frame, enclosing a pane of glass, surmounting a tripod pedestal, on which glass the sketch is made. 2nd. Behind the above instrument a frame consisting of two stout ash poles, with "head-rest," "body-rest," rope and plug, from which frame a person at perfect rest sketches nature, as seen through the glass pane, in perfect perspective, with oil brush, or gold size, &c.

Claims.—1. The combination of the support carrying a transparent plate, and the support by which the point of sight of the sketcher is retained constant, substantially as and for the purpose described and shown in the drawing.

2. The combination of hinged legs, stay rope, and adjustable head-rest, forming the support for the sketcher's head.

3. Projecting arms and rope or flexible band forming a support for the sketcher's body.

THE RAPID PRINTING PAPER.

BY W. T. MORGAN.*

It is really gratifying to know that Britishers have again been first in the field with this new departure, and have maintained their place well in the front, as they always have been in all things appertaining to photography.

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* A communication to the South London Photographic Society.

Quite recently so much has been written, said, and done in this and every other country in the world respecting this new system of positive printing, that there appears little left to say that has not already been said and commented upon. It appears pretty well decided, in the minds of most who have tried the new method, that it is the printing process of the future. Some go as far as to say that albumenized paper will be entirely superseded. I must admit we are not quite so sanguine as that, although we are quite convinced that it will, under certain conditions and in many instances, serve the purposes of albumenized paper, and where the latter would be unusable. We also believe it will be found useful for many other purposes beside printing from the photographic negative.

There is no question of doubt that the range and variety of tones and all-round general excellence obtainable under skilful treatment are superior to anything obtainable upon albumenized paper by any modern method.

We all know the vexatious, troublesome drag the printing has been during the winter months; it was always bad enough with the old wet plate negatives, but the advent of dry plates has increased the difficulty to such an extent that I doubt whether it has been found profitable, taking all things into consideration (loss of repute from inferior prints, &c.), to carry on printing at all in London during two or three months of winter. Every now and again the cry has been raised for a quicker printing process. Many and various suggestions have been made from time to time in the journals for years past, and at last sheer necessity, that true Mother of Invention, has again asserted her supremacy by coming to the rescue; hence gelatino-chloride paper.

There is one—as I take it—very healthy sign in connection with the introduction of this paper, and that is, it has the usual number of detractors, like all other good things that have come before. Retouching, dry plates, and many other valuable introductions have all met the common fate of new departures. There are many advantages in the use of this paper over that of albumen, and amongst the rest I will name that of the humouring of dense or weak negatives, varieties of tones, the facility of production, independence of daylight, and last, but by no means least, its undoubted permanency.

Now with regard to the latter virtue, I have something to say. Many photographers, and some of those of eminence in the profession, appear to have some doubt as to the permanency of prints produced upon gelatinized silver paper, but on this point we are particularly sanguine. Our argentic gelatino paper, a similar kind of preparation to this chloride, has now been before the photographic world for some years. We have made many thousands of photographic prints, some hurriedly for experimental purposes, but have never yet seen a single faded print; we have occasionally seen a slight yellowing, but that has always been attributed to some neglect in the manipulations.

Mr. G. S. Penny, in the Year-Book for 1885, page 53, in suggesting the use of gelatino-chloride paper (before it was announced as a commercial article) speaks there of prints made by himself more than ten years ago, and are now as good as the day they were made.

When gelatino-bromide was first talked about some sixteen years ago, we made some rough experiments on paper, but as we could not get sufficient sensitiveness, we did not go on with it; on reviewing our experiments some years since, we looked up some prints of our first trials, and, to all appearances, they were as good as the day they were made. I have submitted many prints on our paper to various severe tests, and have now in our possession prints that can be seen by any one who cares to see them, that have been exposed in a southerly aspect quite unprotected from the sun's rays for four years, and are as good as ever. This, I think, may be taken as a fair test of their undoubted permanency.

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ENLARGING UPON GELATINO-BROMIDE PAPER.

BY J. GEDDES.*

Although the task before me to-night is more that of doing than of saying, I cannot help, in a few words, contrasting the gelatino-bromide process of enlarging, with that of the salted paper and gallic acid process of days gone by. The older method was a favourite occupation of mine, and many a good enlargement by that method I had the pleasure of producing. Although never thoroughly satisfactory in themselves as finished pictures, they served well as a basis for painting upon in oils, and in my case it was entirely for that class of work they were produced. I had, however, always a certain amount of misgiving as to the stability of these enlargements, even although painted upon. The fear of fading or breaking out into big yellow spots loomed before me, coupled with the uncertainty of thoroughly washing large paper pictures; but as the craving for portraits in oil of a cheap kind began to wax strong, something had to be done, and with the feeling that "familiarity breeds contempt," fear gradually diminished, the result being, the more in quantity put out, the less the thought of stability. I here show an enlargement by the gallic acid process. It is some ten years since it was done, and you will observe that it has faded considerably—more in patches than otherwise; possibly, this was due to insufficient washing. When the Lambertype process became the rage some eight or nine years ago, I tried another method—that of making an enlarged life-size head from quarter-plate transparency, and by the single transfer process converted it into an enlargement for painting upon, believing that permanency here was assured. I now show one by this process which has been rolled up side by side with the one previously shown for some years. You will see that there is not the least apparent trace of fading, and the colour is as bright now as it was the day on which it was made; but even although permanent, I had to give up this method as expensive and laborious, and fall back again upon the method previously spoken of. Contrasted with the new process, the whole was as difficult and troublesome to work with as the new is simple and easy.

Regarding exposure, this can only be judged by noting the density of light and quality of negative—possibly from three or four seconds to three or four minutes. But while we are using the lantern to-night as a means of enlarging, it can also be done in daylight without the aid of a lantern at all. Make a room, or out-house, thoroughly light-tight (I have brought in a wash-house with great success); remove a pane of glass—one foot square is amply sufficient—darken all the rest of window; lay on the bottom of this opening a piece of wood horizontally, and upon this wood or shelf place a quarter-plate, or other camera, with the focussing end outside the window, the lens facing your enlargement; remove focussing slide, and put in its place a carrier fitted to slip in, containing negative. Outside the dark-house place a mirror on a continuation of same shelf, at an angle of 45°, to receive, and place upon, the negative a direct sky-light, or so angled as to receive the direct rays of the sun. Exclude the light round the camera by throwing round it a large focussing cloth, and you are ready for work. In my case, I block up the window with two thicknesses of yellow cloth, with a black cloth screen over all, which screen I remove partially when about to develop, and have a good and safe light to work by. In developing I may say that I strictly adhere to published formula.

The making up of the developer, however, is a very simple matter. It consists of a saturated solution of neutral oxalate potash, saturated solution proto-sulphite iron, bromide of potassium 60 grs. to 1 oz. of water. These are called stock solutions, and are made up in separate bottles. Complete saturation is effected in the case of the neutral oxalate and iron by adding crystals to boiling water till no more will dissolve. To develop, take:—

Neutral oxalate	3 parts
Proto-sulphate iron	1 part

Bromide of potassium, 1 minim to every 3 ounces

The order of mixing must be strictly adhered to. Add the iron to the oxalate, and then the bromide. After development, which ought to be complete in three or four minutes, wash in a few changes of water, and then soak in a saturated solution of common ground alum; well wash again, and fix for about five minutes in

Hypo soda	1 part
Water	6 parts

A few hours' washing after this will complete the operation. The pictures must then be dried spontaneously, and can be mounted with good starch or any of the usual mounting medium, taking care not to wet the face of the paper.

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WATER SUPPLY FOR THE DARK ROOM.

The figure (p. 107) shows an arrangement of a very simple character, devised by Mr. H. T. Anthony, for supplying water to a dark room in a country house. As will be seen, it consists of a tall stand supporting a barrel for water. Over the top of the barrel a piece of netting is tied to prevent dust and dirt from getting in, and also to strain the rain-water, which is conducted from the roof by an ordinary V-shaped spout. A short piece of lead pipe extends through the room, and into the mouth of this pipe is driven an ordinary wooden vinegar faucet. Just below this is placed the sink, and underneath a keg is placed to catch the waste water. This, when nearly full, is taken up and carried outdoors; or the outlet from the sink may be led outside at once, as shown by the dotted lines.—*Anthony's Bulletin.*

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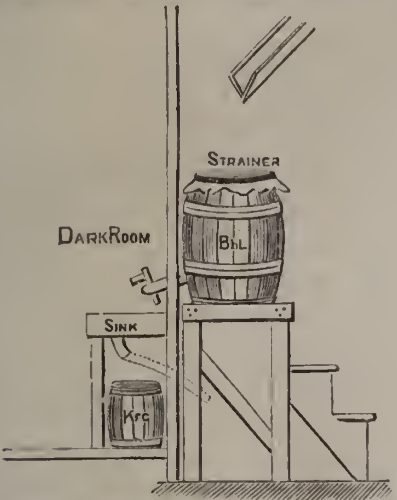
* Abstract of a paper read before the Dundee and East of Scotland Photographic Association.



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Correspondence.

LENSES FOR TAKING SMALL PICTURES FOR SUBSEQUENT ENLARGEMENT.

Dear Sir,—Would you or your optical correspondents oblige us with the arguments "pro and con" *re* short-focus lenses for the above purpose. Like our celebrated Scotch ancestor, I have tried both, but, unlike him, I cannot decide for myself which is best; and it strikes me that the subject is well worth the full consideration of experts as to what is the best medium, so as to avoid on the one hand monstrous foregrounds, and on the other, diminished or invisible distance.

Rapidity, of course, barred the way to long focus up to a very recent date, but that may now be disregarded within any reasonable limits, and I see great reason for believing that this is practically the only thing that can now stand in the way of "small kits" in the field.—Yours truly,

Richard Parr.

BEARD'S CAMERA CLIP.

Dear Sir,—May I be permitted to point out that the above title is—well—say a mistake, inasmuch as I fully described a precisely similar article, with an addition that practically makes the motions universal, in a description of "A Cheap Home-made Pocket Camera, &c.," in your number 1062, January 10th, 1879, the apparatus having been in use ever since the commencement of 1868.

Surely no "patentee" can be allowed to appropriate an invention (if it is worth such a term) after this; although of course I do not suggest for a moment that it is not a genuine discovery on the part of Mr. Beard.—Yours, &c.,

Richard Parr.

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Proceedings of Societies.

Photographic Society of Great Britain.

The annual meeting of this Society was held on Tuesday, the 10th inst., at the Gallery, 5a, Pall Mall East, Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the last meeting having been read and confirmed, Messrs. George J. Avent and C. Phipps Lucas were elected members of the Society.

The Hon. Secretary then submitted his report, the following being a brief outline:—

The Council, in issuing a retrospective of the past year, noted renewed attention had been given to the points mentioned in the report of 1883, more especially with regard to rapid plates, and pyrogallol development. The introduction of a rapid positive printing process they hailed with satisfaction, permanency being a possible outcome. Instantaneous photography was still active, and had tended toward the inauguration of several provincial photographic societies. During the past year several carefully prepared papers had been read before the Society, and much useful discussion had arisen. The Exhibition of 1884 was a success. Fifty-four fresh exhibitors were represented, and the general quality of the work was good. The sizes chosen were somewhat larger than usual, necessitating more space than formerly. The number of portraits were much smaller than on former occasions; this was to be regretted, for the two medals awarded were not placed in such sharp competition as was desirable. 11,182 visitors had attended the Exhibition, being 90 in excess of 1883; the receipts were also in excess. The number of exhibitors was 193, of whom 97 were amateurs and 96 were professionals; 574 frames, containing 1,268 photographs, were accommodated with wall space; these, with 421 transparencies, made a total of 1,689 pictorial works exhibited. The number of new members elected was 57. It was expected the Society's Journal would have a new interest, since it was proposed to illustrate it with various mechanical processes now in vogue. Loss by death had been heavy, and included several well-known names.

Upon the motion of Captain Abney, seconded by Mr. W. England, the report was carried.

The Hon. Treasurer then submitted his report, which, as a financial record of the past year, showed decided progress. The general expenses, Mr. Bird said, remained about the same, but the exhibition account showed some profit: £277 3s. 6d. had been paid for admittance, and £63 for catalogues. Twenty-three medals had been awarded. Mr. Bird, having dealt with the details, gave the summary:—Total receipts, £870 15s. 9d.; expenditure, £638; balance in favour of the Society (including balance from last year), £505 0s. 6d. He congratulated the Society on its present prosperity, and thought the time had arrived for investing a part of the funds annually in the Consols, and thus build up a fund to provide them a home of their own. Life members' subscriptions should also be invested in like manner.

Mr. J. Spiller hoped a special vote of thanks would be given to Mr. Bird for the laborious duties in connection with his report. He (Mr. Spiller) noticed that in 1883 some £50 had been spent over and above the receipts. In the present case, they were more than that sum to the good. He considered Mr. Bird's suggestion an excellent one, and proposed the sum named by Mr. Bird (£100) be invested, and the report adopted.

It was seconded by Mr. S. Sebastian Davis, and carried.

The Chairman said it had given him much pleasure to put that vote. He was only too glad to find the treasurer was in the position of having a little money to put in Consols. He could not pass over the report without asking for a vote of thanks for the auditors, Messrs. Addenbrook and Cobb. The Journal, too, gave abundant evidence that the Editor, Captain Abney, had his heart in the work, and was deserving of the Society's thanks.

The votes having been accorded,

The Chairman announced the result of the election of officers for the ensuing year, to fill the vacancies caused by those retiring.

President—Mr. James Glaisher, F.R.S., &c.

Vice-President—Capt. Abney, F.R.S., R.E., &c.

Hon. Treasurer—Mr. Walter S. Bird.

Hon. Secretary—W. F. Donkin, M.A., F.C.S., &c.

Members of Council—Messrs. W. Bedford, J. Cadett, W. Cobb, A. Cowan, J. E. Mayall, F.C.S., J. Paget, and L. Warnerke.

The Chairman observed that with such able men on the Council, the success of the year was guaranteed. There was one more vote of thanks he wished to move, and that was to Messrs. W. England, J. Ince, and W. K. Burton, the scrutineers. This was passed.

Captain Abney informed the chairman that Mr. Paget did not desire to serve on the council.

The Chairman hoped Mr. Paget would attend the council meetings; his name was familiar to them as the giver of a £50 prize, and the members had remembered it by electing him on the council.

Obituary notices, giving biographical sketches of the late Vice-president, H. Baden Pritchard; Councilman, C. Jabez Hughes; Henry Greenwood and J. Hubbard, members, were read to the meeting.

Mr. F. Cobb said he wished, before passing on to other business, to propose a vote of thanks to the President, who so assiduously had watched over their interest for so many years. When they heard of their President trotting over the Rocky Mountains, they were reminded of Tennyson, and thought perhaps he would "go on for ever."

The vote having been passed by acclamation,

The Chairman returned thanks. He said it was a great many years since he first took an interest in the Society, at a time when things were different. The difficulties had been overcome, every farthing the Society owed had been paid, and he was glad to see they were about to act as he wished them to do in 1862. He hoped they would have a home of their own, as indicated by the Treasurer. In three or four years he would be eighty years of age, and the time was approaching when he would not be able to attend their meetings.

A vote of thanks was also accorded to the Hon. Secretary, after which the adjourned discussion on Mr. L. Warnerke's paper was resumed.

Mr. Ince, in opening the discussion, said he heard there was a difficulty likely to arise in making enlargements in the camera by means of the new paper. Since the last meeting he had had an opportunity of testing this method of enlarging. The day chosen was a very dull one indeed. The lens was a rectilinear $\frac{f}{48}$, and the reproduction was four times larger than the original. The exposure was twenty minutes. In the process of drying mounted prints, when the same were squeezed on glass, he considered tendency for the water to accumulate in the centre, so that the edges would be quite dry sometimes several hours before the centre; any attempt to detach such a print when partly dry resulted in failure. An example of this defect was passed round.

Mr. A. Spiller called attention to some small examples of "rapid paper" developed with his "hydroxylamine solution;" he claimed that by the use of this developer, and a mixed hypo and gold toning bath, pure whites could be obtained; and if the wet prints were attached to ordinary autotype flexible support, they would strip off with a surface similar to albumen.

Captain Abney had predicted the permanence of this process three years ago, and for the reason that in the first place the image was composed of metallic silver, and that metal was protected from atmospheric influence by the gelatine surrounding it. Every one knew that an unvarnished collodion negative became changed when exposed to the fumes pervading a laboratory; gelatine negatives were unaffected. Whenever there was a definite compound, there they must look for permanence. If oxide of silver could be used, there would not be any fading. Captain Abney then referred to a paper he had read before the Society, in which the value of a citrate salt with a chloride salt was pointed out. He was now able to develop a paper coated with silver citrate and silver chloride in equal quantities, without getting the whites degraded. If organic compounds are employed in the film, the molecular condition upon exposure to light is changed; thus the colours may be altered as desired. Another advantage is the greater range of sensitiveness; silver chloride being sensitive to violet rays, and silver citrate to green rays, which would of course include an ordinary gas jet. He thought it advisable to use a salt affected by gas light, as such a compound would, on account of its greater sensitiveness, be of great pecuniary value to the professional photographer.

The Chairman requested Mr. Warnerke to reply.

Mr. Warnerke had less to reply to than he expected; he supposed the subject was as yet too new. The difficulty spoken of by Mr. Ince might be overcome by interposing a thin sheet of Willesden paper between the print and its cardboard mount. The tones shown by Mr. Spiller were very good, and Captain Abney had pointed out how good effects could be produced. He (Mr. Warnerke) had modified his opinion regarding certain negatives giving a particular tone. In cases where he had used his normal developer, and other portions diluted with two, four, and ten times the quantity of water, far different results were obtained; the more dilute the developer, the softer results. He now used as large a proportion of water as possible. Regarding latitude, exposures ranging from three to one hundred seconds were made, and equal results could be obtained by care in development. By altering the proportion of oxalate and iron, considerable difference resulted; the larger the proportion of iron present, the blacker was the image; in fact, he had been led to consider that development might be arranged to suit the quality of negative, dense negatives requiring weak developers. Certain emulsions gave a more or less definite colour; ammoniacal fuming acted just contrary to its effect in ordinary silver printing—it made toning much slower. Papers treated with gold, platinum, and copper solutions before development, had a marked effect on the results. With copper the image flashed out, and the colour was a weak slatey grey. With gold the quality was much better; the colour being red, it was easily amenable to the toning bath. Treatment with platinum gave a black image, and the experiments pointed to the possibility of determining the tone before development. He did not like the prints when burnished so well as when enamelled, but he thought they might be coated with a hard varnish somewhat similar to that used on phototype prints. He hoped before long they would be able to overcome all obstacles, when it would be the paper generally used. The transparency of the shadows was better preserved, and the whites were equally pure with other processes.

Mr. Payne Jennings was able to bear Mr. Warnerke out so far as the advantage of weak development was concerned; and he thought mixed hypo and gold toning bath better than any other.

Mr. W. M. Ayres was opposed to the use of an old mixed hypo and gold toning bath.

Captain Abney hoped other bromides than potassium would be tested, for restraining purposes, as they influenced the colour.

A vote of thanks to Mr. Warnerke having been passed, Mr. Shew exhibited an improvement on the camera clip shown by him at the last technical meeting (see page 78). Instead of a fixed bridge as before, a sliding jaw had been substituted which could be clamped at any required position up to 10½ inches. It was announced that the next ordinary will take place on Tuesday, March 10th, and the next technical meeting, February 24th. The meeting was then adjourned.

South London Photographic Society.

The ordinary meeting of this Society was held on Thursday, the 5th inst., at the House of the Society of Arts, John Street, Adelphi, W.C., Mr. W. Ackland, president, in the chair.

The minutes of the annual general meeting held in December, and the lantern meeting held in January, were read and confirmed.

The following gentlemen were elected members of the Society:—Messrs. G. Glanville, Edgar Clifton, and C. Pilkington.

Messrs. W. M. Ayres and E. Clifton were appointed auditors.

The Chairman announced that the Society's presentation print selected by the sub-committee for 1884 was entitled, "A View on the Lake, Kew," and was from a negative 12 by 15, taken by Mr. E. Dunmore.

With regard to the artistic competitions inaugurated by the Society, the Chairman said that his committee had decided to return to the original system of conducting both the method of fixing the subject, and taking the Society's vote on the pictures, as in the opinion of the committee it was preferable to that adopted last year. For the future two subjects would be selected at each meeting, one being a view and the other a figure subject. Competitors would send their pictures to the Society in time for the following meeting, when the members present would be invited to decide who was successful. Voting papers having been passed round for the subjects to be chosen at the March competition, the Chairman took the vote of the meeting, which resulted as follows:—View—"A Country Lane"; Figure—"A Newspaper Boy."

The Hon. Sec. exhibited "Kershaw's new instantaneous shutter." It was a form of curtain-shutter with square aperture encased in a compact box not larger than a quarter-plate. By means of two pinions the curtain could be wound from one wheel to the other for exposure as in Edwards's shutter, and released by a trigger or pneumatic attachment.

Mr. Bridge found the shutter to be extremely simple and portable.

The Chairman then called upon Messrs. Morgan and Kidd to demonstrate the method of working their "New Rapid Contact Printing Process."

Mr. W. T. Morgan introduced the subject by reading a short paper (see page 105).

Mr. R. S. Kidd, who conducted the experiments, spoke of the desirability of a red image on development, which permitted being changed to any colour afterwards with gold toning. To obtain this, he advocated a full exposure. Four cabinet negatives in printing frames charged with the paper were formed into a square, and two inches of magnesium ribbon ignited within the square. The exposed prints were then passed into a weak ferrous-oxalate solution, development occupying two minutes. The following formulæ were given :—

No. 1.

Neutral oxalate of potash	8 ounces
Bromide of ammonium...	½ ounce
Hot water	50 ounces

No. 2.

Sulphate of iron	10 drachms
Hot water	50 ounces
Citric acid	½ ounce

Mix equal proportions of Nos. 1 and 2 when required for use.

Mr. Kidd found ten ounces of developer would develop fifty prints ; he did not recommend more than thirty prints for that quantity of solution, as there might be a tendency towards yellownesss. Prints ought not to be handled in the developer, he said, since that was a frequent source of unevenness, the parts touched becoming more susceptible to the influence of the developer. Rapid development and rapid washing, followed by an immersion of ten minutes in the alum bath, was favourable to pure whites. He did not recommend the alum bath stronger than half a pound to the gallon of water. The success of toning depended on the alum effecting a removal of any trace of iron. Any toning bath would answer, but he preferred a modification of the acetate bath as follows :—

No. 1.—*Stock Solution.*

Acetate of soda	40 drachms
Chloride of lime	160 grains
Water	80 ounces

No. 2.—*Stock Solution.*

Chloride of gold	15 grains
Water	4 ounces

Mix one ounce of No. 1 with two drachms of No. 2, dilute with ten ounces of warm water, and use when cold. Mr. Kidd, having toned the developed prints rather more than he desired them to appear when finished, fixed only one half, to show what change was effected by the hyposulphite of soda solution. He advocated a weak bath, and mentioned that the proportion of two ounces of the salt to each pint of water was quite strong enough, and perfect fixation would take place in ten minutes. Washing and mounting he regarded as being details well understood. Several prints were stripped from talced glass plates and circulated among the members, also many mounted examples of larger dimensions, which were much admired.

The Chairman remarked that any degree of toning could be performed after fixation by means of the mixed hypo and gold bath if it were so desired. He thought the examples shown by Messrs. Morgan and Kidd were very beautiful, and any questions the members wished to put would be cheerfully answered.

Mr. W. Cobb desired to know if there was any objection to keeping the prints some time between exposure and development ; had a continuing action of light been observed in this case, as with carbon tissue ?

Mr. Kidd had not noticed any difference with intervals up to a week. They had not delayed development beyond that time.

Replying to another question, Mr. Kidd stated that an exposure of ten seconds to average daylight would be equivalent to the exposure made with two inches of magnesium ribbon.

Mr. E. Clifton : Do prints of this kind lose strength in toning ?

Mr. Kidd : Ordinary warm tones do not become noticeably lighter, but when black tones are made there is a little loss. In reply to another question, he said the prints did not get lighter after leaving the developer.

Mr. Francis Cobb : Do the prints become lighter in the fixing bath ?

Mr. Kidd : If a strong fixing solution is employed, the prints lose much force at first ; this to some extent returns by continuing the immersion for a time ; by the use of a weak fixing bath that difficulty is avoided

Mr. W. Cobb : Does a weak fixing bath perform the necessary function of fixing the prints properly ?

Mr. Kidd : Yes. Replying to Mr. Hare, he said that rapid washing after development did not effectually prevent a slight developing action continuing ; it was better to stop just short of the desired depth, wash quickly, and immerse in the alum bath. In reply to Mr. Foxlee and other questions, Mr. Kidd stated that although hypo and gold toning could be employed immediately after development, or after fixation, the rich purple colours could not be made in that way.

Mr. Foxlee had one other question to put, viz., whether with a gelatine coating containing a sensitive compound such as chloride of silver, the kind of paper employed plays any part in the preparation of the picture ?

Mr. Kidd said it was well to use a good class of paper for the sake of the texture ; any paper containing chlorine would be injurious ; and it was remarkable to what an extent chlorine was present in many papers. He thought more albumenized silver prints faded on that account, than from hypo. There would be no spots formed by impurities in the paper, as no free silver was present.

Mr. W. Cobb thought more artistic results could be produced if a coarse-grained paper was used, especially for enlargements.

Mr. Clifton thought in that case very little gelatine would be needed ; in fact, only enough to retain the sensitive coating.

Mr. C. J. Hussey suggested stripping the films from the paper for the purposes of lantern slides.

Mr. F. Cobb had noticed in some gelatine prints that the whites were not very pure. Was there any real difficulty about it ?

Mr. Kidd replied that if prints remained sufficiently long—say ten to fifteen minutes—in the alum bath, the whites were perfectly pure.

Mr. W. M. Ashman remarked that an extremely dilute solution of ozone bleach or chloride of lime would decolourize gelatine prints. Care was necessary in its employment, or the image would be affected.

Mr. Kidd found the alum bath would bleach the image if allowed to act too long.

The Chairman, in closing the discussion, proposed a hearty vote of thanks to Messrs. Morgan and Kidd, which was agreed to.

The Hon. Secretary then exhibited, on behalf of Mr. Trueman Wood, a convenient camera-clip, made by fastening two American clamping screws below the base-board ; attachment to a tricycle or other suitable place being easy, owing to the length of screws.

The artistic competition pictures for 1884 having been exhibited, and the votes of the members ascertained,

The Chairman announced the result as follows :—1. "Gone," by Mr. Mathew Whiting ; 2. "River Scene," by Mr. E. Dunmore ; 3. "The Village," by Mr. E. Dunmore ; 4. "Study of Leaves," by Mr. Matthew Whiting.

It was announced that on Thursday, March 5th, Mr. Shadbolt will lecture on "Experiences in Balloon Photography."

London and Provincial Photographic Association.

The usual weekly meeting of this Association was held on the 5th inst., Mr. F. W. Hart occupying the chair.

Mr. A. Cowan, in reference to the discussion of the previous week on plates treated with boiling water leaving a positive image on the glass, passed round two plates that he had coated with an emulsion made for the purpose ; these had been exposed through the back, and developed in the ordinary way. One was passed through hot water previous to fixing, and the other after fixing ; the first plate showed a much stronger image than the other. He had tried the same experiment with an emulsion containing alum, but was unable to obtain the same effect.

Mr. A. L. Henderson drew attention to an ordinary gelatine plate that he had exposed through the back and developed in the usual way, excepting that, after being fixed, it was allowed to remain in water, the temperature of which was gradually raised to about 90°, when the film commenced to blister. After rubbing with the finger a skin of gelatine came away, leaving the image in considerable relief, from which Mr. Henderson thought a typographic block could be made.

Mr. A. Cowan showed a gas-burner suitable for the dark-room. The jet, after being turned out, when required again, re-lit upon the gas being turned on. A small metal cup attached to the top of the gas-pipe—in the centre of which was the burner—contained inside it a very small jet, which, being fed from a pipe below the tap, kept burning, and re-lit the burner each time the gas was turned on.

Mr. Wellington remarked it had been stated that inferior silver was found to be the cause of green fog: this was quite in accordance with his experience. When he used a low-priced silver, green fog was invariably the result. He now used only the best silver, getting perfectly clear emulsions.

Mr. A. Haddon supported this view. With a certain silver he could get only fog; he tried many formulas, with a change of chemicals, with no better result, until he replaced the silver with some of a better quality, when the fog disappeared.

Mr. W. E. Debenham was also of this opinion; in his case he generally purified his silver previous to using it, any organic impurity being traced with perchloric acid.

Mr. Trinks passed round a very interesting micro-photograph of eighty named diatoms, mounted by Mr. Moller. The names of the diatoms had been first photographed, and the film floated on to the glass micro mount; the diatoms were then arranged in the small circles left for them. The exhibit was viewed by the aid of a Coddington lens passed round with it. Mr. Trinks subsequently gave a detailed method of getting a sharp focus when taking a micro-photograph—such as a newspaper or any other object. The newspaper being fastened to a board, a large letter was drawn immediately above it on the board. This letter was sharply focussed; the object, being in the same plane, would then be of the same degree of sharpness.

Photographers' Benevolent Association.

The usual Board of Management meeting was held at the Offices, 181, Aldersgate Street, E.C., on February 4th.

The minutes of the previous meeting were read and confirmed, and Messrs. W. J. Anckorn, H. Cox, and R. Hobbis were elected members of the Association.

The ordinary business having been disposed of, it was followed by the Annual General Meeting, Mr. W. S. Bird presiding.

The proceedings were commenced by the reading of the minutes of the last general meeting, which were confirmed. The Secretary then read his report and balance sheet, as follows:—

In submitting my Report of the business done during the year I desire to call special attention to the increased membership subscription, being £24 9s. as against £17 5s. in 1883, notwithstanding the fact that the reduction of subscription makes a difference of 2s., 1s., and 6d. respectively per year, to members paying their contributions quarterly, half-yearly, or yearly, and for the first time exceeds working expenses. This is encouraging, and should the same progress continue, it would result in the general and more hearty co-operation of the employers, who naturally desire to see the assistants endeavouring to help themselves; and I ask assistants to recognize this fact, and do their part towards maintaining the Association, by providing an adequate fund to enable its usefulness to be extended; likewise to establish the pension funds, which cannot be done with the limited capital now at its disposal. It behoves every member to bring the Association under the notice of their photographic acquaintance, point out these facts, and do all in their power to assist the executive. Donations amounting to £19 2s. 6d. have been received, in sums varying from £3 3s. to 5s. The evening at the exhibition of the Photographic Society of Great Britain resulted in an addition to the funds of £3 9s. 4d. The working expenses are about the same as in previous years, and I believe all will agree that the Society is worked on the most economical principle, and that nothing can be done to reduce that item, if any administration is to be maintained. At the same time I would point out, that if the Society were ten times its present strength, it could be carried on with a very trifling extra outlay. The assistance granted this year is £8, and the claims on the fund have been for several years small, because through the Association, its members have, when required (with few exceptions), been found situations; beyond which, the Association has assisted non-members to employment, when among the members none were out of work. To aid the Society in this department, employers requiring assistants are requested to communicate with the Secretary.

The summary of the year's business is, that the income is £52 0s. 10d.; disbursements, £31 4s. 8d.; increase to the funds, £20 16s. 2d.

The Chairman, addressing the meeting, dwelt on the meagre support the committee received, alike from large commercial houses, professional photographers, and their assistants. The latter he considered most likely to need the good offices of such a fund; but they had not adequately proved, by the membership roll, that they appreciated the efforts which had been made by the committee. Personally he had canvassed the leading commercial firms, and knew that it was not from any want of charitable consideration that their donations had been so small; but the lack of spontaneity among the employers and assistants' subscriptions made them doubt if the profession cared for the success of the Association. They were ready to contribute freely if the Society could be made numerically strong enough to worthily represent the benevolent inclinations of an important profession. The Society had an accumulated fund of £180, but the annual income ought not to be less than twice that sum. He submitted that it was little use continuing on the old lines, but that a final effort should be made to establish the Association on a wide basis, or to consider the propriety of abandoning their charitable effort. He had obtained from the commercial houses such assurances of support, that he believed something like an income of £100 per annum would arise from that source, provided the membership roll could be increased to 300 before the end of the year. There were over one thousand established photographers conducting business in the kingdom, so that another £100 annually might reasonably be expected from them, if the great body of assistants showed themselves earnest in the matter. If the stipulated number of members could not be obtained after the generous response made to him by the leading trading firms, he felt they would not be justified in asking for further donations, as their efforts had not met with the success expected, and with so small a revenue the expenses could not but contrast unfavourably with the income.

The Chairman's announcement was considered of such supreme importance, that after discussion the meeting was adjourned to consider the best method of bringing the subject under the notice of the profession, and to take necessary steps to ascertain the views of the fraternity.

The meeting was adjourned till the first Wednesday in May.

For the information of those who may be unacquainted with the objects of the Association: it was established to assist members, their wives, and children, when in distress through sickness, death, or want of employment, by means of immediate grants of money; to grant annual pensions to aged members; and to aid the unemployed members in obtaining situations. Photographers, professional and amateur, and assistants, are eligible for membership. Subscriptions are as follows:—Quarterly, 2/6; half-yearly, 5/-; or yearly, 10/-.

North Staffordshire Amateur Photographic Society.

The usual monthly meeting was held on Wednesday, Feb. 4th, at the Mechanics' Institute, Hanley, Mr. C. Alfieri (President) occupying the chair.

Mr. F. J. Emery (Vice-President) showed a splendid series of instantaneous photographs of yachts and shipping, taken by Messrs. West, of Southsea; these pictures were much and deservedly admired.

Mr. Hall exhibited a dark room lantern, from Newton and Co., Liverpool.

Mr. W. B. Allison handed round for inspection of the members a number of lantern slides made by Mr. C. Fincham, of Dulwich, which were greatly admired, both for their vigour and their delicate half-tone; some of the slides were then thrown upon the screen from the President's lantern, the light used being a three-wick oil lamp, of Lancaster, giving a ten feet disc.

The plan of holding meetings fortnightly having been successful, it was determined to continue the same during the remainder of the winter.

Messrs. Frank Emery, Jun., A. Furnival, and J. Bourne, were elected members of the Society.

Halifax Photographic Society.

The monthly meeting was held on Tuesday evening, Feb. 3rd, the Rev. W. E. Hancock, M.A., in the chair. There was a large attendance of members, and the meeting was one of much interest.

Mr. Myott introduced Mr. Forsyth, of the Bradford Photographic Society, together with Mr. Grayson, camera maker, of the same town.

Mr. Forsyth afforded the Society the privilege of inspecting some very fine 15 by 12 pictures, of his own work, which were greatly admired.

The Rev. J. H. Warneford, Messrs. Geo. Hepworth, Clay, and S. Worsnop, were then elected members.

Mr. F. Myott next gave his paper on "Emulsion Making" (see page 103), and handed round some transparencies made by his formula, which were greatly admired for their tone and brightness.

Mr. Councillor Smith asked if Mr. Myott found his formula to compare favourably, as regards rapidity, with Dr. Eder's ammonia process.

Mr Whitely also wished to know if he had tried boiling for a much longer time? He had carried on the "cooking operation" for as much as four hours, but now obtained as rapid a plate in ten minutes.

Mr. Myott, in reply, thought his formula gave as rapid results as any he had ever tried, although he had found Henderson's good. He did not think boiling longer than one hour increased the sensitiveness at all. He always tested for colour, and when the blue stage is reached, it was time to stop.

Mr. Forsyth quite agreed in all that had been said, and, in reply to a query, said the standard of sensitiveness as so many times wet plate was misleading, because he did not think that the speed thus quoted by makers had ever been arrived at in actual practice.

The Secretary gave notice that, by special request, the dissolving view entertainment of the Society would be repeated on Friday evening, March 13th. The Mechanics' Hall, a room accommodating eight hundred persons, had been engaged for the occasion, and the proceeds would be devoted to the Halifax Infirmary.

A vote of thanks to Mr. Myott and the Chairman brought the meeting to a close.

Dundee and East of Scotland Photographic Association.

The monthly meeting was held in Lamb's Hotel, on Thursday, when there was a good attendance, Mr. J. C. Cox presiding. After the routine business had been disposed of,

Mr. W. D. Valentine read a paper on "Systematic Recovery of Gold and Silver in Photographic Printing" (see page 101). He explained the system applied in his establishment, and stated that of £720 worth of nitrate of silver used in a certain time, he recovered £501 17s. 3d. from the trimmings of sensitized paper, waste solutions, and washing waters. To tone the £720 worth of silver, £274 worth of gold was used, and of this quantity £101 14s. 1d. was recovered.

Mr. Valentine's statements were listened to with great attention, and they will no doubt have the effect of inducing photographers to pay attention to this important matter. As comparatively few think it worth while to save their waste, the amount of precious metal annually thrown down the sink and irretrievably lost must be enormous.

On the motion of the Chairman a very cordial vote of thanks was awarded to Mr. Valentine.

Mr. Geddes then proceeded to make some enlargements on argentic bromide paper, using for the purpose the Society's lime-light lantern. He exposed and developed the pictures in presence of the members, and two splendid portrait enlargements were the result; the size was 25½ by 17½. Mr. Geddes received the hearty thanks of the meeting for his instructive demonstration. (See page 106.)

The Secretary (Mr. D. Ireland, jun.) exhibited a number of prints on Marion's alpha paper, which were very much admired, and considered by some of the members to be fully equal to albumenized paper prints.

A lampshade consisting of a series of transparencies on chloride plates backed with opal was shown by a member, and the novelty and beauty of the effect were highly thought of.

Mr. Valentine kindly offered one dozen selected lantern slides for the first prize in the slide competition on the 19th inst., and Mr. J. C. Lamb consented to give half-a-dozen as the second prize.

Glasgow Photographic Association.

A meeting was held in the Religious Institution Rooms on Thursday, 5th, Mr. Archibald Robertson in the chair.

After the routine business was gone through, a discussion took place on the new rapid printing paper.

Mr. Urie, Jun., promised to show at next meeting a new automatic printing machine.

Mr. Lang also promised to give a demonstration with his new tartrate of iron developer.

Mr. Paton promised a demonstration with the alpha paper.

The rest of the evening was spent showing transparencies through the lantern.

St. Helen's Association of Science, Literature, and Art.

Photographic Section.

A meeting of this Section was held in the Association Rooms, on Wednesday, 21st ult., Mr. Heather occupying the chair.

After the ordinary business was disposed of,

The Chairman showed the remainder of the lantern slides he had made from Mr. Brookes' negatives, most of them on chloride plates. The Chairman stated that he had found it difficult to keep chloride plates, because of the action SH_2 had upon them. He also mentioned that out of two dozen bromide plates he had to cut half of them in order to get them into the slides.

Other members had had similar experience with plates.

Mr. Drewhurst showed a few wet-plate negatives.

Mr. Sherlock gave a brief account of the manufacture of pyroxyline and collodion.

Mr. Brook showed prints and transparencies from local and American negatives.

The meeting then closed.

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Talk in the Studio.

International Inventions Exhibition.—Arrangements are now in progress by which it is hoped that the whole of the garden illuminations this year will be carried out by means of the electric light. It is intended to employ for this purpose 10,500 incandescent lamps, most of which will be of five-candle power, though some will be be equal to ten, and some to twenty candles; the aggregate will amount to 52,000 candles.

The Exhibition at New Orleans.—In addition to the matters which have already been referred to, it may be mentioned that there is a collection of portraits of women who have made themselves famous in the State of Indiana by striking out independent paths for themselves. It includes female editors, managers of business concerns, doctors, poets, musicians, and artists. The State of Kentucky shows a fine collection of photographs made under the direction of the Government geologist, and mostly the work of Mr. Mullen, of Lexington. In speaking of this Exhibition, the *Photographic Times* says:—"One of the most interesting collections is that made from the negatives of our ill-fated brother who accompanied the Greeley Expedition. There is his sled, the ropes he used to tie about him to keep the wind from blowing his wrappings from him; there the whip he cracked to make his Esquimaux hounds leap for life; there the remains of his commissary department! There his camera? No! But there are the proofs of his work. Some, by their lack of definition, show how the cruel wind blew when he exposed. Others tell how the cold made it almost impossible to develop an image. There is the ice-bound steamer and the snow-clad hut in which our artist lived, and lo! the portrait of our artist himself, seated among his traps, protecting-glasses upon his eyes, and endeavouring to look cheerful under chilly circumstances. It made me sad to look over it all, for I, too, have been in such dangers with my camera, and know full well how good it is to escape with my precious plates."

A Photograph of a Theatrical Scene.—Messrs. G. West and Son, of Gosport, send us a 7 by 9 photograph of the transformation scene, taken at the Theatre Royal, Portsmouth, by lime-light; and the detail—even in the darker portions—is rendered in a most satisfactory manner. The authors of the photograph write: "We did it for an experiment; the ordinary lime-light was used, and the exposure was twelve seconds. It may be interesting to some of the readers to know this has been done, as we have been informed that it has often been attempted with little success."

M'Leod's Sunshine Recorder.—In the current number of the *Proceedings of the Physical Society* we find a sketch and description of this instrument, with which our readers are already familiar, as it was figured on page 483 of our volume for 1884, and is also described in the Year-Book, page 169.

Death of Professor Silliman.—The illustrious American scientist, Benjamin Silliman, died at Yale on the 14th of last month. His labours in connection with pure and applied chemistry will long be remembered.

Upon what should the Wet Gelatine Prints be Squeezed?—Glass is good, but, despite care and watchfulness in waxing or talcing, the prints often stick. Mr. Warnerke recommends ebonite. Smooth American cloth has been suggested in our columns; and in the last number of the *Bulletin Belge*, Captain Abney recommends the use of ferrotype plates. There is no fear of the prints sticking or tearing, while the plates are cheap, and can be obtained at any photographic material store.

Messrs. Damson and Co., Opticians and Manufacturers of Photographic Apparatus.—A correspondent wishes for the address of this firm, and we shall be glad if any reader can give us the information.

A Mountain of Alum-Stone.—It is said that a mountain of alum-stone, which has a base over four miles across, has been discovered at Gila, in South America; and that by simply lixiviating the material with water, a solution is obtained which is sufficiently pure for many commercial uses.

Local Intensification of Gelatine Plates.—The following method is recommended in the *Correspondenz*. A varnish which will not dry is made by mixing together ordinary negative varnish, ether, and castor oil (two volumes of negative varnish, one of ether, and one of castor oil, will answer; but these proportions may be varied), and painting over those parts which do not require intensification. The mercurial method answers best (see Year-Book for 1885, p. 196, also present volume, p. 83), and when the negative has been washed and dried, the varnish is removed by means of alcohol and a tuft of lint; after which the plate may be further treated in the same way if necessary.

How to Look at a Picture.—There are two excellent ways of discovering any weakness in a picture you have in hand. One is to look at it through a magnifying glass, which enlarges and makes its shortcomings more noticeable; the other to reverse it in a mirror. The latter is an old and ever popular method, for the eye becomes so accustomed to looking at a thing in one way that it ceases to be critical. The moment the picture is reversed it becomes a fresh picture, and in nine cases out of ten errors hitherto unnoticed reveal themselves.—*The Picture and Art Trade.*

Photographic Club.—The subject for discussion at the next meeting of this Club, on February 18th, will be "Working Capabilities of Cheap Lenses."

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To Correspondents.

*** We cannot undertake to return rejected communications

Emulsion.—1. It is possible that the change may be due to the partial reduction of the sulphates in the water to the condition of sulphides; an effect which takes place frequently in the case of water stored in barrels on shipboard. 2. Perhaps the addition of a minute trace of sulphide of sodium or potassium may answer the purpose, but this is quite conjectural. Dissolve one part of the sulphide in ten of water, and try the effect of adding ten or twenty drops of this to each litre of water. 3. Perhaps this will answer—indeed, it comes to nearly the same thing. Let us know the result of your experiments.

C. Rogers.—Thank you for the calculation, which is interesting and quite correct; but it should have been sent to the publication in which the original article appeared.

C. Brown.—If your drop shutter is well constructed, we think you will be able to get the required speed by using a number of rubber bands. Try; and let us know the result.

J. B. H.—Apply to Sprague and Co, 22, Martins Lane, or the Meisenbach Co., 39, Farringdon Street.

J. Urie.—The address is the one officially given by the Commissioners of Patents, and if you wish to have another inserted in future announcements, you must communicate with them. It is not an uncommon thing for a patent agent to give his own address as that of his client, and possibly this has been done in your case.

A. Penmell.—Any hints we can give in this column will be of very little use, especially as we know nothing of the local circumstances. See the advertisement columns.

A. H.—We are very sorry that you should also have been ill-treated by the person referred to, and we will make note of your suggestions.

John Churchyard (Southport).—We have no doubt that you write in perfect good faith, but must attribute your claiming to be the originator of the sulphite of soda bath in mercurial intensification to the fact of your not having read the Photographic News with sufficient attention. It is not easy to tell you who was the first to use the method, but on page 391 of our number issued on June 20th, 1884, you will find the process described by Mr. W. N. Jay, in much the same form as you say you published it on the 25th of the following July. As regards the exact date of Scolik's suggestion to add potassium bromide to the mercuric chloride solution, we cannot inform you, it being sufficient for us to mention that your suggestions in this direction, which you refer to as published in December last, were anticipated by the publication of Scolik's formula on page 657 of our issue of October 17.

G. W. S.—Cases have occurred in which similar stains have been the result, when the washing trough has been made of unvarnished zinc; but we cannot devise any theory to explain the action.

J. M. Thomas.—1. A rapid symmetrical or rectilinear. 2. A transparent positive. 3. Immerse it in the following:—

Water...	4 ounces
Hydrochloric acid	¼ ounce
Bichromate of potassium	1 drachm

It must remain in this solution until the image is completely whitened. 4. Rub the glasses well with powdered French chalk, dust off the excess, collodionise with plain collodion, and finally coat with the emulsion. Never hesitate to ask as many questions as you may be disposed to.

E. J. S.—We do not remember it, but there is a very excellent formula on page 161 of our volume for 1884; also in the Year-Book.

S. L.—Sensitized albumenized paper contains nitrate, chloride, albuminate, and often citrate of silver. It is the spontaneous decomposition of the organic salt of silver in the presence of free nitrate which causes the discolouration of the paper. Messrs. Schæffner and Mohr, some years ago, introduced into the market a carbonate paper, in which the free nitrate was replaced by carbonate of silver; although the paper was fairly permanent, it was never largely used. The new gelatino-chloride paper will probably prove stable when preserved in a dry condition. Moisture always conduces to fading and discolouration.

Operator.—Varnished collodion films which have become honeycombed, and partially separated from the glass by the action of frost, &c., can be restored by the action of alcoholic-ether fumes. A mixture of three parts of methylated spirits and one of ether is placed in an inverted glass shade; two of the negatives are placed in the latter with their film surfaces outwards, the vessel being then covered with a glass plate. After about twelve hours' treatment the films should have subsided, and all that is needed is to gently warm the negatives to harden the varnish. Notwithstanding all this, you had better secure a good transparency first.

F. Jackson.—Rub the plates with cotton-wool moistened with the following cream of Tripoli:—

Alcohol	30 parts
Ammonia ·880	10 ,,
Fine tripoli	30 ,,
Water	40 ,,

When dry, clean off with a rag, and polish with a well-washed chamois leather pad.

C. M.—Thymol added in the proportion of half a grain to the ounce will preserve the emulsion for some weeks.

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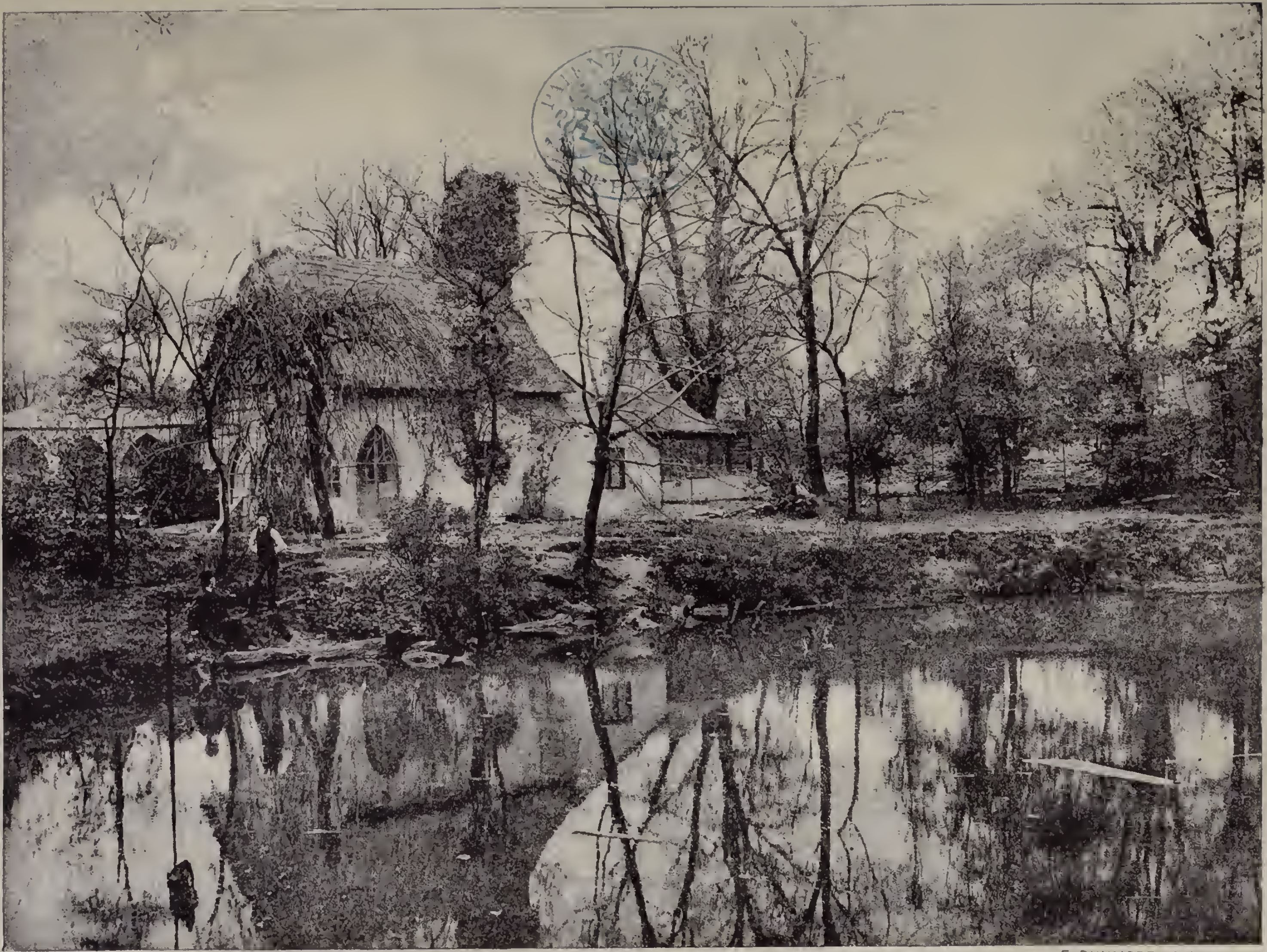

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1381.—*February* 20, 1885.

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AN EXHIBITION OF PHOTOGRAPHS AT NOTTINGHAM.

As far as we can call to mind, the Exhibition which opened on Saturday last is the first of its kind which has been held at Nottingham.

The Water Colour Gallery of the Art Museum in Nottingham Castle certainly makes an admirable exhibition place for camera pictures, and it is satisfactory to find that an excellent and representative collection of photographic pictures is gathered together; this result being mainly due to the energy and tact displayed by Mr G. Harry Wallis, the Director of the Art Museum.

There are no less than 415 exhibits, but considerably more pictures than this number, as many of the frames contain more than one picture. Among the names of the exhibitors are to be found those of gentlemen well-known in the photographic world; Captain Abney contributing about a dozen pictures, the Autotype Company some fifteen or so, Mr. Berkeley and Mr. Valentine Blanchard five each, Mr. Manfield nine, Mr. H. P. Robinson eleven, Herr Schuster, of Berlin, nineteen, Mr. T. G. Whaite half-a-dozen, and Colonel Stuart Wortley five.

It is scarcely necessary to say that in a provincial exhibition taking place at the present season of the year, the bulk of the photographs shown are examples of work which has been previously exhibited in London or elsewhere, original pictures being the exception. It will therefore interest our readers to know what is the view taken by the local critics as represented by the *Nottingham Journal*, from which we quote the following:—

"There are numerous very pleasing prints, by Captain W. de W. Abney, exhibiting landscapes with much truthfulness and delicacy; we may mention 5, 'Behind Magdalen, Oxford,' and 215, 'Chill Autumn on the Chirwell.' No. 7 contains twelve instantaneous views by G. Hadley, remarkable for their effects of motion in water and clouds, and clearness of atmosphere. No. 13, a 'Portrait of Viscount Ingestre,' Autotype, by Richard Keene, is very pleasing; the softness of the fur on which the child is laid is well expressed. No. 14, 'Waiting and Watching,' by J. B. Smith and Son, is excellent in depth, and at the same time transparency of shadow. No. 16 contains twelve panel portraits by J. Lafayette, all interesting and full of character, as is also No. 73, by the same artist. No. 34, 'Choir Stalls, Lincoln Cathedral,' by G. Hadley, is crisp and clear in details, as is also 52, 'Nave of Lincoln Cathedral,' by the same artist. Mr Alfred Cox exhibits six panel photographs, all distinguished by artistic taste and ease, and gracefulness in the position of the figures. No. 59, 'Birch Trees'; 60, 'Great Guble, Walsdale Head'; and 63, 'The Screes, Wastwater,' by Mr. T. A. Green, are excellent specimens. No. 68, 'Waiting for Nurse,' by F. Whaley, is a work of merit, as are other specimens by this artist. There is a very fine 'Study of a Head,' No. 91, by Valentine Blanchard. In 96, 'Studies of Yachts racing in the Solent, taken from a sailing boat,' by G. West and Son, the atmosphere effects and the motion of water under the breeze are admirably caught. In 116, 'Frame of six Portraits,' by C. Marius, all are excellent. 'The Unfamiliar Tune,' by Edwin Smithels, is very expressive. No. 167, exhibited by the Autotype Company, is really a grand picture, representing 'Rheims Cathedral,' enlarged from negative by A. Borderia; the details are wonderfully distinct and clear. No. 196, enlarged from a negative by W. Mayland, with the quotation attached to it, 'There is sorrow on the sea, it cannot be quiet,' is really a beautiful and very striking work; the beating of the waves on the shore, the wild clouds, the light on the horizon, and the distant ship, are shown with excellent effect. No. 202, by A. Brothers, is a remarkable autotype, the female head partaking much of the character of a Magdalen, by one of the old masters. No. 211, 'Portrait of Sir Henry Wilmot, Bart., V.C.,' is a noble work, near life-size, by W. W. Winter. No. 225, 'He loves me—he loves not,' by H. P. Robinson, is clever in the arrangement of the details, and clearly executed. No. 266, 'The Hemlock Stone,' by T. Scotton, is worthy of notice, as is also 272, 'Study of Pampas Grass,' by J. B. Hilditch. Mr. C. B. Wright exhibits Nos. 283, 351, 362, and others, mostly views of the South Coast, full of nature, and artistically treated. No. 303, by C. V. Shadbolt, is very interesting, being a view of the Thames and Royal Albert Docks, taken from a balloon at an altitude of 600 feet. Herr Schuster exhibits many charming works, but none more worthy of notice than No. 360, 'The Quartermaster.' Nos. 439, 440, and 441, by Colonel H. Stuart Wortley, on opal glass, are beautiful productions."

The number of awards is small in proportion to the exhibits, the only exhibitors honoured by the jurors being Mr. H. Manfield (silver medal for view of Bossington, in Somersetshire), Mr. J. Pike, and Mr. Joseph Taylor.

PHOTOGRAPHY AS AN ASSISTANCE TO PAINTING.

To shake before photographers the red rag of "photography and art" is the thing we least of all wish to do. It will, however, surely be harmless to say a few words on one or two of the manners in which artists of the brush make use of photography to assist them in their work.

A few days ago we called at the studio of a friend, a successful landscape painter. It was not many minutes before our eye fell upon a very small camera, which, on its tripod stand, was leaning up in a corner. In answer to our enquiries, our friend replied, "Yes, I make use of this camera to help me in my work, and a very great aid I find it at times."

We tried, and not without success, to draw him out as to what he considered to be a legitimate application of the camera in the hands of a painter, and what not. We give his opinions without comment as he expressed them to us, and, so far as we can remember, in his own words.

"Skies of all things are those in securing which the camera is the most useful. Of course there are some skies that remain more or less the same for long enough time to sketch them, and to put down a memorandum of the colours. With those, never have recourse to the camera. But there are others. You try to knock them in in charcoal, but they are gone before you have enough down to be of any good. Here the camera comes in. You can put down a few memoranda of colours on a piece of canvas or paper besides, if you require it.

"Then there is moving water, waves, and ripples. You will sketch that better, as a rule, from an instantaneous photograph, than you will from the water itself, which is always changing. The same often, with a little bit of foreground, weeds at the water's edge, and so forth. All that, I think, is well enough, but a fellow who wants to paint, we will say, a cottage with a bit of road and a tree, and who takes a photograph of that, then goes home, and copies the photograph to make his whole picture, I consider prostitutes art. Not but what the thing is done by men who call themselves artists, and who are successful, too. They make their 'pot boilers' that way.

"Then about figures. I know men who'll take a photograph of a figure, and copy it precisely, line for line. They have, perhaps, no knowledge of anatomy, and they manage to put the figure in such a position and with such incongruous surroundings that it is easy to tell the thing is from a photograph. If you want figures, I say paint them from the life; or if you use a photograph, use it not to copy, but only to help you in points of detail.

"With cattle and horses it's different. You can't pose your ox, for example, nor can you even make him stand still for long enough to draw him correctly, and I think that if the ox is only an adjunct to the picture, not the chief thing in it, it's right enough to make a photograph of him, and to draw from that.

"There's another thing I use photography for, and find it very useful in. You see that picture, there? Well, this very morning I have commenced etching from it. The first thing I did was to make a photograph of it. I can get a far better idea of how to work on the copper when I have the picture in monochrome as well as in colour. Not that I work from the photograph alone; that won't do, because the red and yellow come out too dark, and the blue too light, in it; but by having the photograph along side of the painting, I find that I get on much more easily than without it."

Our friend seemed to be quite innocent of any knowledge of isochromatic plates till we mentioned them to him. He continued :—

"Then, again, you know, an artist is often dissatisfied with his work. He feels there is something wrong with his picture—a want somewhere. This is particularly the case when he is finishing up a landscape at home. He wishes the advice of a brother artist. Well, you know, I can't expect to get a fellow to come up here at a minute's notice to advise me about my picture, even if I can find one. What I do now, since I have got my camera, is this. I take a photograph of my picture half finished as it is, and I put a print in my pocket, and when I am at the club of an evening I show it to a friend or two. Perhaps one of them says, 'Look here, you want a figure just at that place.' I wonder when it is pointed out to me, how I did not see that long ago. It's strange how much easier it sometimes is to see the want in a picture at a first glance, than when you've been looking at it day after day."

"Yes, my camera is a small one, and what's more, I don't intend to have a larger. I find that quarter plate is large enough for what I want; I know what would happen if I had a much larger one, because I know how fascinating your art is. If I could bring home negatives of a good size, and get good prints from them, I could not resist the temptation to keep working with the camera and wasting time; not that I wish to say anything disrespectful about photography, mind, but I'm not a photographer, I'm a painter; and I consider that if I kept using the camera instead of attending to my canvas, I should be wasting time. By all means let the painter use photography to assist him, but don't let him slavishly copy photographs taken either by himself or by any one else. If they are taken by another man it's downright dishonesty for a painter to copy them and call the resulting pictures his own. I think that if they were taken by himself—to be copied slavishly—he would be far better to stick to photography, and call himself a photographer."

We asked our friend why it was that so many painters who made use of photography were ashamed to admit the fact. He could not tell. For his part, he was never ashamed to admit that he was a photographer in a small way, and to recommend his brother artists to follow his example in the matter. Possibly those who are ashamed to admit that they use the camera make use of it more extensively than they ought to.

Review.

Spon's Mechanics' Own Book.—Large octavo, 702 pages, 1,420 illustrations in the text, price 6s.. (*London and New York, E. and F. N. Spon.*)

Whether to look on this book as more especially adapted for the emigrant who must make good use of his wits and his hands in a new country, or to speak of it as being just the thing for an artizan who may wish to learn something of such branches of industry as are akin to his own, we are at a loss; but on second thought, it seems to have been written as a hand-book for the amateur mechanic, who is too often flippantly snubbed as a "jack of all trades," unless it was compiled and edited with the express object of being used for presentation or loan to that troublesome individual, the intelligent school-boy home for the holidays.

Mechanical drawing is treated of in thirteen pages, tracing, colouring, copying by various photographic methods (including contact printing from drawings by the gelatino-bromide method) being comprised; but nearly three times this space is allotted to casting and founding, while "forging and finishing" take up no less than forty-six pages.

A very comprehensive chapter on the various methods of soldering precedes a shorter one on sheet metal working, after which comes a treatise on carpentering, occupying no less than 224 pages. Woods and tools are first treated of, after which constructive carpentry, or the principles of framing, is ably dealt with; and those of our readers who contemplate building glass houses cannot do better than profit by the information here given them, especially as subsequent chapters treat of such subjects as the various methods of glazing, and details as to painting and upholstering: gas-fitting, paper-hanging, warming, ventilating, masonry, bricklaying, plastering, roofing, and cabinet making.

Over four hundred sketches of the more usual mechanical movements, with a few lines of letter-press devoted to each, very appropriately precede the chapter on lathe and lathe-tools. Besides the matters already referred to, it will be sufficient if we mention the chapter on road-making—in which the reader is rapidly transported from the back woods of America to the Punjab, and thence to Canada, London, New York, Vienna, and once more to India—the short but clear directions for well-digging and water getting in various localities, and the chapter on building houses, from log-huts upwards.

A very notable feature of the book is the profuseness with which it is illustrated, and another useful feature is that in general the approximate cost of tools and materials is given.

A TALK ABOUT LENSES.

BY W. H. WHEELER.[*]

As we have seen, the direct converging pencil from the front lens is incident first on the convex anterior surface of the flint lens, and the direct action is slight, that surface having generally for its centre (that is, the centre of a sphere of which the convex surface is a part) a point not far from that to which the pencil is converging at incidence. But the oblique pencils have the effect of their obliquity exaggerated by that convexity. For, spreading out from the stop or centre of the whole combination, their oblique direction is made more oblique in its incidence by the form of the surface. So also at emergence, and the depth of the concavity adds extremely to the effect. From what has been already said of aberration, it will be understood that its effects at one deep curve may outweigh the sum of several contrary effects at other surfaces. And this effect, being of a diverging obliquity at a concave surface, is *negative oblique aberration;* which, lengthening the oblique pencils by an action increasing with the obliquity, flattens the field. For while positive aberration, direct or oblique, tends to shorten the focus, negative aberration tends to lengthen it.

It is important to notice here that this oblique action, being largely dependent on the obliquity of incidence, as well as on the form of the surface, can exist where the direct aberrations are accurately balanced, thus flattening the field without injury to central definition. Other means of flattening the field are, an over-correction of aberration generally, so that with a small stop marginal pencils are lengthened, and also an effect which this carries with it, the abnormally increased marginal action of the flint lens over-correcting the marginal dispersion And this effect, becoming more sensible as the obliquity increases, produces a want of coincidence in the foci, the actinic image being formed further from the lens than the visual, and the resulting field of view being thus flatter, as formed on the plate, than it appears on the focussing glass. We may thus see partly how flatness of field is obtained at the expense of the central part which can better spare it—a small stop equalizing the whole. To continue, the oblique aberration at the front lens is fairly favourable. Its anterior convexity harmonises with the relative positions of the pencils which converge to it from the subject we are photographing. (Of course it is understood that we are considering the relative directions of the various pencils which start from each point in the object, to be converged by the lens to corresponding points in the image. We *must* keep the idea of these relative directions quite separate from those of rays in the same pencil, which start from a point and come to a point. The pencils, as a whole, converge from an extended natural view, and diverge, after crossing at the stop or centre of the lens, to an extended artificial image. Then comes a partly unfavourable positive action; for although the anterior convex surface of the flint has little effect on the converging rays as such, yet as regards obliquity the effect is strong, because the relative directions of the pencils are divergent, while the surface is convex. At the next surface, where they emerge, the concavity renders the surface still discordant with those relative directions, and the form of each oblique pencil, being generally moderately divergent as it emerges,[†] is, as we have seen, strongly affected with negative oblique aberration. The greatest positive oblique aberration is evidently at the next anterior convex surface—that of the second lens—the relative directions of the pencils, as well as their moderately divergent form, being discordant with it; though harmonious with the posterior convexity, which again is discordant with the form of each separate pencil.

To sum up, the first surface is positive and discordant to relative direction, and neutral as to form; at the second surface, greatly discordant in both respects, but entirely negative; at the third surface, positive and discordant, greatly as respects direction, but generally less so as to form; at the fourth, harmonious or neutral as to direction, but discordant as to form, yet in general not strongly so.

This is, of course, a most rough and inadequate presentation of this beautiful arrangement, and, the curves being all mutually interdependent so as to combine achromatism and aplanatism with a very remarkable flatness of field, and freedom from confusion and astigmatism, considering the great aperture usually given, there will remain a considerable latitude in the curves and distances adopted by different makers, the double convex lens, for instance, being sometimes more convex at its posterior than at its anterior surface, though oftener quite the reverse. But in general we may see how the flatness of field depends on the excess of negative oblique aberration, and the distinctive peculiarity of the Petzval construction is that both the surfaces of the flint lens are discordant with the relative directions of the pencils, and the second one extremely so.

Now, as the proved efficiency of this principle is so great with a front lens whose convexity of field, oblique aberration, and astigmatism are distinctly more than with the front lens of an ordinary doublet, and that even with the much greater aperture usually given, one might be led to hope that to substitute that form, and use a Petzval back combination with it, would be an improvement, especially with a greatly reduced aperture, cutting off by far the worst part of each lens, and reducing the cost.[*]

Some years ago, I wanted a lens which should cover well a plate of dimension rather over its focal length, and of large size (30 by 25). By using for front lens one from a wide-angle combination by Tench, of about 42 inches focus and 3 inches diameter; and for back lens, the Petzval back combination from a Ross's 4A, the separate focus of which was over 90 inches, and 5 inches diameter, it could be done, and leave very little distortion. But on putting them together, both were found so much over-corrected for aberration that they would not define well enough in combination. It then occurred to me that if the double convex posterior lens were placed next the stop, and the flint concave behind it, with its deep concavity next the plate, the balance of aberrations would be favourably altered, while the peculiar flattening power would remain. The result was that the back combination now distinctly improved the definition of the front lens (which, when used alone, required to be stopped down extremely), and the flatness of field was something extraordinary. I may remark that two pictures taken with this lens were exhibited at Paris in 1878, and may be presumed, therefore, to have been fairly successful. One might naturally expect that lenses constructed and calculated for this form would do better still, and I may remark that in a back combination so placed (as in Dallmeyer's B and D lenses), the pencils having their most convergent form while traversing the interval separating the two lenses of the back combination; an adjustment of that distance has its maximum effect on the balance both of aberration and dispersion, which is a practical facility in construction. Mr. Dallmeyer, indeed, specially sought this maximum effect for another purpose, and in his constructions the original aberrations are both much larger, while the distinctive peculiarity of the Petzval form is absent.

Again, some eighteen months since, I desired to copy some engravings with minute accuracy, and to a large size (24 by 18). A lens of over 50 inches focus, of an orthoscopic form, but modified to correct distortion, was tried, but the marginal definition was insufficient. This I considered owing to the comparatively violent curves of a combination in which an achromatic concave lengthens the focus of a shorter achromatic convex; for though it had behaved excellently well with views even up to 41 by 27 inches, yet a much smaller copy was a severer test. And having by me a convex achromatic lens of the usual shallow meniscus form of old telescopic objectives, and of 82 inches focus, I took off the front lens of my Ross's 4A (39 inches focus as single lens) and substituted that. The definition was bad until much stopped down, the aberration being over-corrected; but, and probably partly from that cause, I found the field perceptibly concave when quite a small stop was used, and a far better marginal definition than with the modified orthoscopic. After that I arranged another back combination of odd lenses, finding the best position for definition to be with the concave next the plate, as when I had used the doublet front lens. The definition is excellent with a properly-shaped convex out of the Ross; the distances and focal lengths also giving correct achromatism. Wishing, however, to keep the complete lenses separate, I substituted an equi-convex, which required a stop, and this being also over-corrected for dispersion, unless too much separated for the aberration; I have placed a common 2¼ inch plano-convex lens of 11½ feet focus just in front of the stop; and now the lens is an excellent copying combination of 37 inches equivalent focus, sensibly free from distortion, coincident in foci, and having no perceptible convexity of field when used to cover a 24 inch plate with a stop of one inch, the marginal definition being also very good. Now all these are odd lenses, the cost reckoned almost by shillings, and the fitting only in a wooden box. Even the front lens was made up by joining a 5 inch convex with a 4¼ inch concave lens, cemented with castor oil (a hint from Captain Abney in your paper) and fitted in a wooden cell. Cannot Petzval combinations of 4, 6, or 10 feet focus, be made to copy paintings, &c., cheaper and better than the shorter focus lenses usually used, and as large as can be wished?

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[*] Continued from page 98.

[†] Angles of incidence and emergence must always be reckoned by their angle with a perpendicular to the surface (called the *normal) before* incidence, and *after* emergence.

[*] It is possible this may have already been done without my knowledge. Living in the country, I have never seen Ross's group lenses, and of course do not know their construction.

To further illustrate the inter-dependence of lenses in form and position. If I had separated the convex and concave components of that back combination which I found to give non-coincidence, by about 2 inches, that error would have been corrected, and coincidence of foci obtained, because the pencil emerging from the convex has a form convergent to a focus some 21 inches distant. The 2-inch interval would reduce this to 19 at incidence on the flint concave, and the dispersion, being as the area of the circle corresponding to the pencil, would be reduced from the square of 21 to the square of 19, or from 11 to 9. It comes to nearly the same thing as regards dispersion, whether the correction be thus reduced from 11 to 9, or the power of the convex increased from 9 to 11; and adding the central convex lens was equivalent to this. But it is not an equivalent as regards aberrations, either direct or oblique. A shorter focus equi-convex would have had more positive aberration. To give it a shape more convex towards the stop, and less so towards the flint lens, might have reduced that sufficiently, but such a shape increases the positive oblique aberration, reducing the flatness of the field. Perhaps it would not otherwise injure marginal definition, because though positive confusion and astigmatism are increased, that increase may merely correct that of the other lens, whose negative oblique aberration may probably leave a balance of other negative error while flattening the field. A maker would probably change the forms and positions of both lenses to the usual type, and perhaps slightly under-correct the front lens. But there is another plan at which he might shake his head. If for the one convex lens of the back combination two thin ones were substituted, the sum of their powers being equal, both direct and oblique positive aberrations would be diminished, and a more favourable balance of both aberrations and dispersions obtained at the cost of two more reflecting surfaces; and, for a large copying lens, I should think this the best plan. Any loss of light would be fully compensated by the larger stop then admissible, and the evil of stray reflected light, reduced by a dark margin round the picture to be copied, and a rectangular aperture in front of the lens, admitting light only to the rectangular plate, would be insensible. I have also noticed, when putting the deepest concave surface next to the plate, a remarkable freedom from flare, which seems a probable advantage of that position.

We can now better understand something of the difficulty and complexity of calculations for finding the best forms and positions uniting all compatible advantages. For experiments and some intelligent appreciation, a general understanding is enough. Not so to deduce working formulæ.

There is yet one other consideration. Ordinary lenses are corrected for rays less divergent than is usual in copying; and the condition that, with the best correction for slightly divergent rays should be joined one as perfect as possible for rays much more divergent, is one of some importance. Sir John Herschel used this condition in his general solution of the best forms for telescopic objectives, and it led him to a form very unfavourable to a flat field. I am inclined to doubt whether any general practical form can be indicated as best fulfilling this condition, but I think I may say certainly that a division of the refraction among many surfaces is distinctly favourable, and such experience as I have had in comparing Petzval lenses with aplanatic doublets in copying to the same size tends to confirm that opinion.

ARTISTS *VERSUS* PHOTOGRAPHS.

BY MR. PAE.*

The works which artists produce and those which photographers produce are two entirely different things, and should, I think, never clash together. The art work belongs to the region of emotional thought, and the photograph to that of science; the more emotional thought there is evidenced in a picture the more is it a work of art; whereas, the better the photograph, the more the evidence of scientific knowledge of the instrument and chemicals used. All nature appears before the artist, and whatever he sees he can depict and give us his thoughts about them; but it is very different with the photographer: he cannot, if he wishes, with the instrument he uses, depict many phases of nature; he is limited within certain boundaries. The grandest and most beautiful aspects af nature are utterly out of reach of photography; the lower strata of rain cloud, when they are in forcible light and shade, can be photographed, but all the other aspects of sky—and they are countless, such as sunsets, sunrises, mountain-like clouds and cirrus, in all their variety of form and relative depth and shade, to the depth of open sky—is a dead blank to the photograph; and although in mountain scenery the mist covering out part of their form can be photographed, yet the grandest effects of cloud and mountain in their relative depths of shade to each other and to the nearer landscape cannot be recorded, for when nature is using her full scale of light and shade, compared wih the light and shade at the photographer's command, I shall be very moderate if I put it as 200 to 10; so, on this account, if the photographer goes for the shadows, he sacrifices and loses his sky and light; if he goes for the light, he sacrifices and loses his shades; he has to choose between these two evils, he cannot go for all; but the artist has all at his command; he can arrange his limited scale just as he pleases in order to give the relative depths of the masses of light and shade, from the deepest shadow to the highest light, and in doing this he gives us his thoughts, and leads us to those parts in nature which he wants us to rest most on. The photographer can think what he likes, and can be impressed with the scene he is photographing in a thousand different ways, but the lens takes no notice of his impressions or thoughts, but casts the scene on to the plate according to the law which governs light and lenses.

And this brings us to the question, does the lens give correct drawing? Does it represent objects in right relative size to each other? If we take a photograph and compare it with a tracing on glass of the same subject, the same size and focus, we shall find that the lines of the photograph do not exactly coincide with the tracing; there is a variation from the truth in the photograph; near objects are larger, and distant objects smaller, than they should be in relation to each other. This is owing to the fact that the lens does not see as the human eye sees; no lens has absolute depth of focus, and as the scale of picture is determined with any given lens by the back focus, it follows that if the focus for distant objects is less, then the focus for near ones with the same lens, the relative proportion will vary in ratio to the difference of focus. The landscape lens has the greatest depth of focus, but it gives spherical aberration, that is, from the centre of the plate it gradually resolves all lines into a sphere. This is very little apparent if objects with straight lines are kept out of the picture; but though we avoid straight lines, and photograph things which are curved, still the aberration is there, and is altering the curved lines exactly as much as it would alter the straight ones; so if the subject photographed was a very perfect combination of curves, such as a mountain outline, stretching from side to side of the pictures, they would be altered in their form in the photographic landscape. To get over this difficulty, lens makers made a combination of lenses, placing a plano convex lens opposite another plano-convex lens, so that the lenses acting contrary to each other bend the lines sufficiently into their right form; but to secure this, depth of focus is sacrificed, so that with the symmetrical or rectilinear lens the photographer is restricted within the limits of the lenses' capacity.

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* A communication to the Newcastle-on-Tyne and Northern Counties Photographic Association.

In the experiments I have made, I find that if in photographing architectural subjects we keep the nearest object about ninety feet off, and do not include a great difference in the distance of one object from another—that is, do not include a great depth of focus—the traced outline from nature almost coincides with the photograph. It is when we try to include great distance with near foreground that the difference becomes apparent. Now if we bear this in mind, and consider how differently scenes present themselves before us, we shall see that with this restriction, many of the most beautiful combinations of line composition in nature cannot be reproduced satisfactorily in the photograph, for it often occurs that the beauty and composition of a view depend on a system of lines beginning very near to the spectator, and grouping themselves and harmonising with the distance. The photographer, placed before a scene which is beautiful in composition, has to consider the capabilities of the lens, and ask himself, can this be photographed? but the artist has no consideration of this kind coming between him and nature. He can transfer the scene to his paper or canvas without hindrance.

Now, this tendency of the lens to dwarf magnitude is in direct opposition to the artistic mind, for artists feel that a mere topographic copy of a scene, line for line, and tint for tint, will not give an impression of the breadth, vastness, and magnitude of nature, therefore they use their art power, and arrange their lines and gradations of shade in such a way, that every line and shade will have its use in the composition, and if, after all this, he feels that his picture will not give the same impression of size and magnitude as nature, he will represent things larger in proportion, so that they may convey the same sense of largeness as nature; this you will see in working in the opposite direction to the photograph.

And now I will draw your attention to the different ways in which an art critic considers a picture, to the way in which photographs are judged at our exhibitions. The art critic looks for correct drawing, the relative masses of light and shade, breadth, composition, and, above all, to the evidence there is in the picture of the mind of the artist. Now I want you to notice that I do not include in this list of excellences that of detail, for the artist, according to his subject, has to sacrifice detail in order to attain higher truths. Now, if we turn to the photo critic, we find he first of all looks to see if there is what is called sharp focus, perfect definition throughout, and if this is found wanting, the photo is straightway condemned as not possessing the first quality in photography; but if the photo stands this crucial test, then he goes on to examine it as to composition, choice of subject, point of sight, and light and shade. He cannot look for breadth, because the demand for definition and detail destroys it. Perhaps it may stimulate comparison of the different ends aimed at by the artist on the one hand, and the photographer on the other, if I give for your consideration a well-known paradoxical description of sunrise, by the great French painter Corot. Referring to the mystery and indefiniteness of masses rising against the sky at the first blush of dawn, he exclaims, "I can see nothing—everything is there!" And referring to the later excess of detail revealed by the broad common daylight, he cries, "I can now see everything—but nothing is there!"

TRANSPARENCIES.

BY T. N. ARMSTRONG.*

When the season for out-door work closes, amateurs begin to look about for means of employment during the dark evenings. There is, fortunately, no necessity for being idle, or to relinquish photographic pursuits entirely, even though the weather and light combine to render out-door work almost impracticable; and most amateurs will be found to have some hobby or favourite amusement which enables them to keep in practice during those months when many channels of employment are closed to them; and probably one of the most popular, as well as the most pleasing, occupations is the production of transparencies for the lantern.

It is not my desire to enter into any discussion as to this or that being the best means of producing these delightful pictures, but merely to describe a way by which a pleasant evening can be spent at photography, and slides produced of much excellence by artificial light.

To-night I propose, by the aid of artificial light, to make a few slides with Beachy's dry plates. On the whole, I have been most successful with them, and have obtained results more satisfactory than by any of the other processes I have tried. I do not say that results quite as good cannot be obtained by any other method, for I know manipulative skill plays a most important part in this class of work.

When I first took up the making of transparencies with wet collodion, I was told that my sorrows would not be far to seek, and so I soon found out. Need I tell you of all my failures, such as films floating off the glass, oyster-shell markings, pin-holes, films splitting when dry, &c., &c., not to speak of going to business with fingers in fearful state with nitrate of silver and iron developer? Now all these miseries have gone, and I can, with dry collodion plates, work with the greatest of comfort, and obtain results quite equal to the best productions of any method.

It may be interesting to some to know the formula by which the emulsion is made, and as the making of it is by no means a difficult operation, I may be pardoned if, before going fully into the more practical part of my paper, I describe the formula, and also the manner in which I coat and dry the plates. The formula is as follows, for which the world is indebted to Canon Beechy:—

In 8 ounces of absolute alcohol dissolve 5 drachms of anhydrous bromide of cadmium. The solution will be milky. Let it stand at least twenty-four hours, or until perfectly clear; it will deposit a white powder. Decant carefully into an 8-ounce bottle, and add to it 1 drachm of strong hydrochloric acid. Label this "bromide solution;" and it is as well to add on the label the constituents, which will be found to be nearly—

Alcohol	1 ounce
Bromide of cadmium	32 grains
Hydrochloric acid	8 drops

This solution will keep for ever, and will be sufficient to last two or three years, and with this at hand you will be able in two days to prepare a batch of plates at any time. In doing so, you should proceed thus:—Make up your mind how many plates you mean to make, and take of the above accordingly. For two dozen ½-plates or four dozen 3¼ by 3¼, dissolve by heat over, but not too near, a spirit lamp, and by yellow light, 40 grains of nitrate of silver in 1 ounce of alcohol ·820. Whilst this is dissolving in a little florence flask on a retort stand at a safe distance from the lamp—which it will do in about five minutes—take of the bromized solution ½ an ounce, of absolute ether 1 ounce, of gun-cotton grains; put these in a clean bottle, shake once or twice, and the gun-cotton, if good, will entirely dissolve. As soon as the silver is all dissolved, and whilst quite hot, pour out the above bromized collodion into a clean 4-ounce measure, having ready in it a clean slip of glass. Pour into it the hot solution of silver in a continuous stream, stirring rapidly all the while with a glass rod. The result will be a perfectly smooth emulsion without lumps or deposit, containing, with sufficient exactitude for all practical purposes, 8 grains of bromide, 16 grains of nitrate of silver, and 2 drops of hydrochloric acid per ounce. Put this in your stock solution bottle, and keep it in a dark place for twenty-four hours. When first put in, it will be milky; when taken out, it will be creamy; and it will be well to shake it once or twice in the twenty-four hours.

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* Abstract of a paper communicated to the Glasgow and West of Scotland Amateur Photographic Association.

At the end of this time you can make your two dozen plates in about an hour. Proceed as follows:—Have two porcelain dishes large enough to hold four or six of your plates; into one put sufficient clean water to nearly fill it, into the other put 30 ounces of clear, flat, *not acid*, bitter beer, in which you have dissolved 30 grains of pyrogallic acid. Pour this through a filter into the dish, and avoid bubbles. If allowed to stand an hour, any beer will be flat enough; if the beer be at all brisk, it will be difficult to avoid small bubbles on the plate. At all events, let your preservative stand while you filter your emulsion. This must be done through perfectly clean cotton-wool into a perfectly clean collodion bottle; give the emulsion a good shaking, and when all bubbles have subsided, pour it into the funnel, and it will all go through in five minutes. The filtered emulsion will be found to be a soft smooth creamy fluid, flowing easily and equally over the plates. Coat with it six plates in succession, and place each, as you coat it, into the water. By the time the sixth is in, the first will be ready to come out. Take it out, see that all greasiness is gone, and place it in the preservative, going on till all the plates are so treated.

A very handy way of drying is to have a flat tin box of the usual hot plate description, which fill with hot water, then screw on the cap; on this flat tin box place the plates to dry, which they will do rapidly; when dry, store away in your plate box, and you will have a supply of really excellent dry collodion plates.

Just a word as to the preparation of the glasses before coating. It is very generally considered that it is better the glasses receive either a substratum of albumen, or very weak gelatine. I use the latter on account of the great ease of its preparation. After your glasses are well cleaned, place them in, and rub them with a weak solution of hydrochloric acid of the strength of 2 ounces acid to 18 ounces water.

Prepare a solution of gelatine 1 grain to the ounce of water, rinse the plate after removal from the acid mixtures, and coat twice with the above gelatine substratum; the first coating is to remove the surplus water, and should be rejected. Rear the plates up to drain, and dry in a plate rack, or against a wall, and be careful to prevent any dust adhering to the surface while wet.

Having now described the plates I intend to use, let us next consider what a transparency is, that we may understand the nature of the work we are undertaking. You are all aware that if we take a negative, and in contact with it place a sheet of sensitized paper, we obtain a positive picture. Substitute for the paper a sensitive glass plate, and we obtain also a positive picture, but, unlike the paper print, the collodion or other plate will require to be developed to bring the image into view. Now this is what is termed making a transparency by contact. It often happens, however, that a lantern slide 3¼ by 3¼ has to embrace the whole of a picture contained in a much larger negative, so that recourse must be had to the camera, and the picture reduced with the aid of a short focus lens to within the lantern size; this is what is called making a transparency by reduction in the camera. Both cases are the same, however, so far as the process being simply one of printing.

Those who have never made a transparency will have doubtless printed silver prints from their negatives, and when printing, how often do you find that to secure the best results you require to have recourse to some little dodge.

Now, let us bear this in mind when using such a negative for the printing of a transparency, for, as I have said before, it is only a process of printing, after all. Although we cannot, when using a sensitive plate, employ the same means of dodging as in the case of a silver print, still we are not left without a means of obtaining the same results in a different way, and this just brings me to what I have already hinted at previously, that a deal more depends on the manipulative skill of the operator than in the adoption of any particular make plate or formula; and not only does this manipulative skill show itself in the exposure, development, &c., but likewise comes into play in a marked manner even in the preparation of the negative for transparency printing.

Let me deal with the latter point first. You will at once understand that a negative whose size bears a proportion similar to 3¼ by 3¼ will lend itself more easily to reduction; thus whole plate or half plate negatives are easy of manupulation in this respect, and require but little doing up. But as other sizes have at times to be copied into a disc 3¼ by 3¼, recourse must be had to a sort of squaring of the negative. Now, here I have a negative 7½ by 4½, which is perhaps the worst of all sizes to compress into the lantern shape, so I have, as it were, to square this negative, and this I do by simply adding to sky. I take a piece of cardboard and gum it on to the glass side of the negative, and this addition gives me a size that lends itself easily to reduction to the lantern disc, and in no way detracts from the picture.

Having said so much about making up the size, let me add a few words as to other preparations that are sometimes necessary. In a good lantern transparency, it is, of all things, indispensable that the high lights be represented by pure glass, absolutely clean in the sense of its being free from any fog or deposit, to even the slightest degree; it is also necessary that it be free from everything of heaviness or smudginess in the details. To obtain these results, I generally have recourse to the strengthening of the high lights of my negatives, and this I do with a camel's hair brush and india ink, working on the glass side.

I nearly always block out my skies, and so strengthen the other parts of my negatives, that I can rely on a full exposure without fear of heaviness or smudginess. This blocking out is easily done.

Having said so much about the preparation of the negative, let me now describe the apparatus I use. I have here an ordinary flat board, and here my usual camera; it is the one I use both for outside and inside work. It is a whole-plate one, very strongly made, and has a draw of twenty-three inches when fully extended; but this is not an unusual feature, as nearly all modern cameras have their draw made as long as this one. The lens I use is a Ross rapid symmetrical on five inches focus, and here I have a broken-down printing frame with the springs taken off, and here a sheet of ground glass. This is all that is required. I mention this because I find it generally believed that a special camera is required for this work, such as to exclude all light between the negative and the lens; in my practice I have found this unnecessary. There is nothing to hinder the use of ordinary cameras provided the draw is long enough, and the lens a short focus one.

Now let me describe how to go to work. I take the negative and place it in the printing-frame, holding it in its place with a couple of tacks, film side next the lens, just as in printing; then stand the printing frame on its edge on the flat board, and place the ground glass in front of it—when I say in front of it, I mean not between the negative and lens, but between the light and the negative. The ground glass can conveniently be placed in another printing frame, and both placed up against each other. I then bring my camera into play, and so adjust the draw and distance from the negative, till I get the picture within the disc on my ground glass. I find the best way is to gum a transparency mask on the inside of the ground glass; this permits of the picture being more easily brought within the required register. This done, focus sharply, cap the lens, and then proceed to make the exposure.

Now what shall I say regarding exposure? Just let us bear in mind again that it is merely a printing process we are following up, as you will all know that in printing no two negatives are alike in the time they require. So in this case no two negatives are the same in their required exposure. Still, with the plates I am going to use, so wide is their range for exposure, that but few failures will be made on this score, provided we are on the safe side, and expose fully.

Athough these plates are not nearly so fast as gelatine plates, it may surprise you to be told that working with a negative which to daylight at this dull time of the year required an exposure of sixteen minutes, will, I hope, give me good results in about a tenth of this time; and this I obtain by burning magnesium ribbon.

At first the error I fell into when using magnesium ribbon was too much concentration of light. I now never allow the ribbon, when burning, to remain in one position, but keep it moving from side to side, and up and down, in front of the ground glass while making my exposure; and if there be any dense place in the negative which, as in printing, would have required printing specially up, I allow the light to act more strongly on that part; the result, as a rule, being an evenly and well exposed plate.

I must not forget to explain to you the manner in which I coil up the ribbon before I set it alight. I take an ordinary lead pencil and wind the ribbon round and round, thus making a sort of spiral spring; this done, I gently pull the coils asunder. I then grasp the end of the ribbon with a pair of pinchers, light the other end, and make my exposure.

Having said so much regarding exposure, I shall now proceed to deal with development. You will see me use a canary light, with which I can easily see to read a newspaper. It may cause some of you surprise to see me use so much light. It is the same lamp that I use for developing all my rapid bromide plates: it is the best lamp I ever used. The canary medium is inserted between two sheets of glass 7¼ by 4½, the two glasses are then fastened on to the tin with gummed paper, a few holes are bored in the back for air, a funnel let in, and the thing is complete.

The formula for development is as follows,—

Pyro	96 grains
Methylated spirits	1 ounce
Bromide of potash	12 grains
Water	1 ounce
Carbonate ammonia	60 grains
Water	1 ounce

Mix 30 drops pyro with from 30 to 60 drops bromide, then add 2 drachms ammonia solution and 2 drachms of water.

I find a thin negative requires a slow development, and so gain contrast; while hard negatives are best over-exposed and quickly developed.

The plate is first placed in water or rinsed under a gentle stream from the tap till all greaseness has disappeared, it is then placed in a flat dish, and the developer applied. Should it be found that some parts of the picture are denser printed than should be by tho ribbon acting more strongly on some particular part—this is often the case if the negative has been thinner in some parts than others through uneven coating of the plate—the picture need not be discarded as a failure, for I will explain to you later on how to overcome this difficulty.

Fix the plate in hypo—the fixing takes place very quickly—then examine the picture for the faults above described; if they are found, wash the plate under the tap gently, and bring into operation a camel's hair brush and a weak solution of cyanide of potassium. Apply the brush to the over-printed parts, taking care not to work on the places that are not too dense. Do not be afraid to use plenty of washing while this is being done; let it be, as it were, a touch of the brush and then a dash of water, and you will soon reduce the over-printed parts. It only requires a little care in applying the brush.

After this wash well, and should it be deemed necessary to tone to a black tone, use a weak solution of bichloride of platinum and chloride of gold, or a very weak solution of iridium, in equal quantities, allowing the picture to lie in the solution till the colour has changed right through to the back of the glass. Should a warm pinkish tone be desired, I tone with weak solutions of ferri-cyanide of potassium, nitrate of uranium, and chloride of gold in about equal quantities.

After toning, wash well and dry: they dry quickly. Varnish with Soehnee crystal varnish, then mount with covering glasses, and mark. Bind round the edges with paper and very stiff gum, and the picture is complete.

The making of a really good transparency is by no means an easy or pleasant task with a wet collodion plate, but with these dry plates an amateur can, with a little practice, produce comfortably, slides quite equal to those procurable from professional makers.

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BACKGROUNDS OF PORTRAITURE.

BY NORMAN MACBETH, R.S.A.*

Backgrounds of portraiture are regulated by these two conditions—viz., as being under a partially enclosed light, or open daylight. Under the former the light is expressed as being concentrated, not diffused, and the shadows are consequently strong. Under the latter (open daylight) the shadows are not positive, but diffused, excepting when under direct sunlight.

These two conditions, then, constitute the great variety of effects and diversity of treatment in art. Some prefer the effects of light and shade common to ordinary rooms, others those due to a well-directed light in a studio, and others again prefer light as nearly as possible resembling out-door effects, coming from all sources flat upon the subject. These all cause peculiar difficulties to both painter and photographer. Ordinary room effects, or even the most complicated studio effects, are very visible and easily apprehended by the painter, because he can render reflections much more easily than the photographer can. But in the case of open air effects the painter meets the most subtle difficulties, and it costs him much pains and careful study to overcome them; whereas the photographer has every facility, by good light, to represent any appearance which the subject manifests.

It is to room effects that the photographer should especially direct his attention, where some of the most suitable backgrounds can be got through judiciously arranged and well-designed furniture.

There have been issued of late in the *Magazine of Art* woodcuts from photographs and drawings taken from studios and dwelling-houses of some of the leading artists in London, and these cuts exhibit exquisite material for the structure of backgrounds in portraiture. Almost every inch of panelling in Alma Tadema's house was arranged and constructed so that it could be used in endless varieties of treatment under light. From this source chiefly does he get the charming details with which he enhances his subjects.

Furniture of early English design should be employed by the photographer when that belonging to the subject happens not to be good in character. The cabinet work of the period referred to is specially well adapted for backgrounds, and, excepting the old Dutch cabinets, nothing can be better fitted for producing broad masses of shadow—relieving certain portions of the figure.

The simple device of gauze hung between the window and sitter, causing considerable diffusion of light, is a great auxiliary to indoor photography, and prevents the harsh and extreme effects which a strong and suddenly used-up light produces. The disadvantages of feeble light are more easily overcome by the painter than by the photographer, hence the necessity of some such aid to equalize the light. On the other hand, while the photographer can easily and instantaneously reproduce out-door effects of subtle reflection, of which he may not be conscious, the painter can only represent them by very accurate observation, skill, and assiduity.

Another great difficulty which the painter has to surmount, is to bring into consistency indoor and outdoor effects employed in the structure of portraits represented in the open air. Nothing is more common than inconsistencies of background and subject in many of our best painters' works, specially in the early period of portraiture by Vandyke, Rubens, or Velasquez. The treatment of backgrounds has hitherto been very conventional, and it is most desirable that a little more realistic, as well as ideal, treatment of backgrounds be aimed at. Perhaps few of our countrymen, except Millais, attempt portraiture in out and out daylight effects. It is more common with French artists, several of whom have studios constructed of glass similar to photographic studios; and the great aim of many of them is to have, if possible, no shadows on the countenance. Colour supplies the deficiency, which, unfortunately, is a great want in photographs taken in such circumstances—the delicate violet flesh tints are nowhere.

Backgrounds of portraits represented indoors, though on the whole much easier to treat than those represented without, are susceptible of great variety of treatment, especialy in the use made of shadows to bring out lights. Not unfrequently shadows are cast over a background which are thought to be barely possible, because the object from which the shadow is cast is not visible. But there is hardly any shadow cast on a background to relieve or give effect which could not be easily accounted for. Therefore, as much freedom as possible should be taken in producing agreeable effects. The lines of light and shade across the background, or on portions of the figure, should not be directed at right-angles to the sides, but rather diagonally.

In order to produce an effective portrait, regard must be had to such particulars as the lightness or darkness of the hair of the individual, and the colours of different portions of the dress.

Nothing is more difficult than the adaptation of backgrounds with the view of giving due effect to certain constituent parts of the subject. It is said that a father once took his son to Sir Joshua Reynolds to see if the great painter would permit the youth to assist him and get instruction in return. Sir Joshua declined. The father of the youth still entreated, saying that he could at least assist in painting backgrounds. Sir Joshua told him that he little knew the difficulty of that part of a portrait, for it was just there he felt himself most powerless.

Of all subjects comparatively dry and prosaic, few are more so than backgrounds. And yet it is here that knowledge and skill can be shown, by rendering what may be plain and commonplace in itself, positively attractive and beautiful.

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* Abstract of a paper read during the Conference of the Picturesque at the Edinburgh Photographic Society.

Notes.

"I find that pyro and ammonia make the best developer." So said Mr. Peter Mawdsley at a recent meeting of the Rochester Photographic Association.

The subject under discussion was, "What developer gives the best negative?" and if all the members did not speak at once, a very large proportion made remarks in rapid succession, and mentioned points in favour of more developers than we thought existed. Mr. Mawdsley, whose experience is far riper than that of anyone else who was present, summed up the case as above stated.

"The working capabilities of cheap lenses" has been the subject under discussion at the Photographic Club on several occasions lately, and the following is the outcome.

When one only wishes to work on a plate of the smallest size, and shortness of exposure is a secondary consideration, a cheap lens may be used; but it must also be understood that neither straight marginal lines are to be expected, nor can a wide angle be included.

The cheap lens advocated by Mr. George Smith—the most persistent champion of economy in optical appliances—is an achromatic opera-glass objective, which costs 1s. 6d. if bought wholesale. It is quite true that excellent pictures can be taken by such an instrument, if the subject should happen to be one that does not suffer by the sacrifice of all the qualities above enumerated, and if the user should not be so unfortunate as to have a lens with a very bad place just opposite the diaphragm; but all this holds equally good of a spectacle lens costing two-pence.

To make a lens which, like the English portrait lens tested by Belopolski (vol. for 1884, p. 777), will give well-defined images less than a six-hundredth of an inch in diameter, is a triumph of optical skill of no mean order. The lens was used with its full aperture of about $\frac{f}{3}$.

On p. 258 of our volume for 1883 we gave an illustration of the arrangement for laryngeal photography, as devised by Dr. Stein, of Frankfurt. He illuminated the larynx with a beam of solar light in the case of his early experiments, but now uses a small incandescent lamp placed in the mouth. The conditions under which the incandescent electric light can be used for photographic work are explained on page 385 of our volume for 1882; and on page 225 of the vol. for 1883 will be found details of the method by which Mr. H. Trueman Wood, together with Mr. Cadett, made laryngeal photographs by the electric light.

An ingenious fraud committed indirectly by means of photography. A spendthrift nephew having obtained his rich uncle's carte, placed it in his album, which was one in which a slit was cut out of the page beneath each carte in order to show not only the portrait, but the autograph of the original written at its foot. Having procured a blank cheque on his uncle's bank, the nephew slipped it between the bottom of the carte and the album page so folded that the place for the signature came just beneath the slit referred to. When he next had a chance, he asked his uncle to kindly append his autograph beneath his carte, and tendered him the album and pen-and-ink. So the uncle wrote his name, not on the carte, as he thought, but on the blank cheque.

Mr. H. Chapman Jones, who in our issue of a fortnight ago pointed out the value of the uranium intensifier for gelatine plates that have been treated first with mercuric chloride and then with sulphite of soda, calls attention to a possible source of failure. He says:—

"When the uranium intensifier is made with ordinary hard water, it will sometimes (if not always) refuse to act even after several minutes' application. This is apparently due to carbonate of lime in the water. A little citric acid added to the intensifier at once sets matters right, and under such circumstances acidification is the proper course, and not the strengthening of the intensifier. Ignorance of this fact has probably led to many a foggy plate, and ill-feeling towards one of the best intensifiers.

Mr. Olivier, writing in the *Comptes Rendus*, points out that the radiometer of Crookes may be used advantageously as a light indicator by the photographer; and this, notwithstanding the fact that the speed of revolution is not exactly proportionate to the actinic power of the light. Mr. Crookes himself called attention to this matter ten years ago.

Photography, it will be remembered, was turned to practical account in a House of Commons debate by Mr. Broadhurst, M.P., who, before delivering his speech on the enfranchisement of lease-holders, distributed broadcast on the benches about him copies of a photograph of a leasehold house which had been allowed to fall into utter disrepair and ruin by the time the end of the lease term approached. During the coming session, it is said, the example thus set will be followed in several other debates. Thus, for the discussion on the state of the Crofters, which is soon to come on, a well-known Scotch M.P. has procured a series of striking photographs, in which the miserable state of certain crofters' cabins are depicted. He has photographs of crofters' children, too, in their usual costume of bare-skin, trimmed with rags, and he thinks the distribution of the views cannot but serve to emphasize his statements, and literally "illustrate" his meaning.

Another illustrated debate is to be that on the ignorant condition of gipsy-van and barge children; whilst the inevitable sessional discussion on short *v.* long service is likely to acquire some interest from the proposed exhibition of typical portraits of the weedy and stunted boy-soldiers of the new *régime.* But if photography was to thus come into general use, would it not be better for the House to go in for a big frame at the side of the Speaker's chair, on which enlarged copies of the various objects alluded to could be exhibited to the whole of the members present and the public upstairs as well? A door-keeper could attend with a pointer too, and point out the details of the photographs for the M.P. who was speaking. Such a plan would certainly add to the interest of the debates.

In a not inconsiderable Yorkshire town the three principal photographers held a consultation as to the best method of putting a stop to the "club system;" that is to say, the sending out canvassers to take orders for portraits, and to receive the payment by instalments. After much deliberation they determined to issue the following notice, and they did issue it; every dead wall was plastered with the bills; shop-keepers were asked to display them in their windows; and each police station showed one on its notice-board.

> "£20 *Reward.*—Whereas, it has come to the knowledge of the undersigned that certain persons have fraudulently canvassed from house to house in our names, taking orders for photographs, receiving monies in part payment, and frequently possessing themselves of valuable originals, of which they have professed to be able to supply copies; we herewith state that we have never employed agents to take orders for us, and that to any person giving us such information as shall lead to the apprehension and conviction of any one of the before-mentioned impostors, we will pay a reward of £20. Signed—
>
> "A. B.," &c.

This ruse succeeded; the offer of a reward was talked of, but no claimant for it came forward; still so much distrust of club agents followed, that two canvassing photographers had to close their establishments.

Not the mouth only, but the whole expression of the face changes when the various vowel sounds are articulated. At any rate, this is the case if the illustrations given by M. Félix Hément in the current number of *La Nature* are to be depended upon; they are said to be exactly copied from photographs, and show the same lad as he appeared when reciting the various vowels.

Not only Mr. Galton, but also the "art" photographer, should be able to make something of this; the former might make one composite showing Mr. Irving reciting from *Hamlet*, and another showing the same actor in a comedy: while the "art" photographer may be expected to build up a very dictionary of expressions, with their corresponding words.

Mr. Van Beer's striking picture, "La Sirene," which was the subject of such hot discussion in Paris some time ago, is now being exhibited in London, together with a collection of the artist's work. The intensely photographic look of "La Sirene" is certainly some excuse for the critic whose statement that it was simply a photograph coloured, led to an action being brought against him by Mr. Van Beers, who scraped away the head of one of the figures to show that it had no photographic substratum. The critic was wrong, but whether the picture had any help from photography in the way of suggestion is another matter.

The *World's* latest "Celebrity at Home" is Mr. J. W. Swan, of Newcastle. Presumably the writer is unaware that Mr. Swan's greatest triumphs have been made in connection with photography, for there is not a word on the subject from the beginning to the end of the article.

Why does not the Amateur Photographic Association have an exhibition? The number of members is large, and much good work is done, but this work is known only to the members themselves. The system of the Association is this: each member contributes every year a certain number of negatives. These are printed and mounted by the Society, and copies sent to every member. By this plan, every member of the Association amasses a goodly collection. At the same time it would do the Association no harm if the outside world of photography knew a little more about it.

"Babies are so much alike," said an exasperated photographer the other day, "that if mammas did not persist in making ridiculous distinctions with their dresses, one might have a stock photograph which would do for all the little nuisances. No mother minds her baby being made a little better looking, but the difficulty of particular ribbons and laces can't be got over. If there was only a law passed that babies should be taken *in puris naturalibus*, what a lot of trouble would be saved!" The man spoke feelingly, for he had wasted a dozen plates, and at last had to tell mamma she would have to come again. He certainly wasn't so fortunate as the Chinese photographer who, we are told, kept only one negative, and found it served excellently well for all his sitters. But then the whole nation of Chinese, as Dickens said, "haven't a profile among the lot."

Patent Intelligence.

Applications for Letters Patent.

2085. Francis James Ashburner, 33, Chancery Lane, London, for "Improvements in photography."—14 Feb., 1885.

2102. Charles Preston, 6, Livery Street, Birmingham, for "Improvements in photographic camera lens shutters."—16 Feb., 1885.

Patents Sealed.

3531. Thomas Honywood, of Courtenay House, the Causeway, Horsham, in the county of Sussex, gentleman, for "Improvements in nature-printing."—Dated 18th February, 1884.

3866. Josiah William Saunders, David Thomas Davies, and James Alexander Macdonald, trading as Saunders, Davies, and Macdonald, of Ryland Works, Upper Tower Street, Birmingham, Brassfounders, for "Improvements in head-rests for perambulators, invalids' chairs, barbers' and photographers' chairs, and for other like purposes."—Dated 25th February, 1884.

Specifications Published during the Week.

3865. Thomas James, 37, Renshaw Street, Liverpool, County of Lancashire, Sewing Machine Agent, for "Improvements in obtaining typographical impressions from photo-relief surfaces."—Dated 25th February, 1884. *Provisional specification.*

My improved phototype blocks are composed of an elastic material or compound, such as glue or gelatine with sugar or glycerine, printers' roller composition, or india-rubber, vulcanised or not, or other similar elastic material or compound, instead of type metal or other solid material or compound, cast from any suitable relief produced by any of the well known photographic methods. Such elastic phototype blocks in the printing press yield under the pressure of the inking roller and tympan according to the varying elevations and depressions of the block, thereby securing gradations and half tones without either dot, line, or stipple.

I declare that what I claim is the power to produce half tones and gradations in the type press by means of an elastic or yielding surface substantially as above described; and the power to print several colours or tints from the same block by means of its elastic or yielding nature substantially as above described.

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COLOUR IN DEVELOPED IMAGES.

BY J. B. B. WELLINGTON.

What is the cause of the various colours seen in a developed silver image? This question can be answered in a few words—viz., that it is owing to the state of division the silver has been reduced to. If any one will take the trouble to examine a transparency (say) of a black tone under the microscope, he will see that the particles of metallic silver are somewhat coarse, and easily distinguishable even with a low power. Now examine one of a brown tone; it will be perceived that the deposit is still finer. Finally, take one of a decided red. In this case the particles are so fine as scarcely to be seen. Now to get these results—namely, red tones—it is well known that the exposure must be increased, and the developer restrained; but besides this, something else steps in, and that is, that the length of time it is allowed to stay in the developer has much more to do with the colour than most people imagine. This was pointed out by Mr. Debenham on page 98, which, when I read, was certainly contrary to my preconceived ideas; but before writing this I determined to try his experiment, and can now bear out all he says. Chancing to have some 3¼ plates coated with the bromo-chloride emulsion made after the formula given by me on page 36 for the new rapid printing paper, I took one plate and cut it into four little squares, and exposed behind a negative four inches from a gas flame, and each piece had respectively twenty, forty, sixty, and eighty seconds. I also took another 3¼-plate, but not cutting this, made four similar exposures from the same negative. The exposed plates were all placed in a restrained developer to produce red tones, and, as each appeared of the correct density, was taken out, the piece having eighty seconds coming out first, and having a red tone, each successive plate losing the red and becoming browner, till the 20″ one was sufficiently developed, which was of a pleasing brown, but not black, as was the case in Mr. Debenham's experiments. The other plate, with the four exposures, was taken out the same time with the 20″ one, and all the exposures found to be of the same tone—namely, brown. Why the red colour should have vanished it is hard to conceive, as one would imagine that as the developer got weaker and absorbed the bromide and chloride from the plate, it should reduce the silver still more finely; instead of that, it makes it coarser the longer it is allowed to remain. These experiments should be made by every one before experimenting with the new printing paper, as it will enable one to learn what exposure and development are necessary to procure a red tone, so essential if the pictures are to be toned.

Mr. Debenham's experiment has certainly thrown much light on my experiments in making lantern slides. I never could find out the reason why at one time, with a given developer, I could procure red tones, and at another, using the same developer, only brown and greenish-black. I always was abusing the poor developer, little thinking that the exposure and length of stay in the developer had really more to do with it than anything else.

Mr. Debenham, in his article, seems to infer that it is necessary to prepare the plates with a strongly acid emulsion, in order to produce red tones, alluding to my transparencies. If he will refer to my article in the Year-Book for this year, on page 45, it will be seen that after mixing the emulsion, it is strongly alkaline, free ammonia being liberated from the ammonio-citro-nitrate solution as soon as the bromide of silver is formed. Brown, ruby, and claret-coloured transparencies, have been shown by me at the various societies in London made from this very formula. It requires less care in the mixing if the emulsion is strongly acid, and leaving out the ammonia altogether, and by this means red tones are more easily obtainable, but the emulsion is much slower by this means.

A great deal depends on whether the gelatine has been thoroughly dissolved or not before mixing. I find it best to raise the gelatine solution containing the bromide to a temperature of 180°, and then allow it to cool down to 150° before adding the silver to it, thus ensuring that it has been perfectly dissolved. I believe many failures can be attributed to the gelatine being insufficiently dissolved. The more perfectly that gelatine has been dissolved, the easier is it to seize upon the particle of bromide of silver the instant it is formed, and thus encase it, and so keep it in a fine state of division, which is such a desideratum, whether it be for a warm-toned transparency or a rapid plate which is to be boiled. I believe Mr. H. S. Starnes has pointed this out before.

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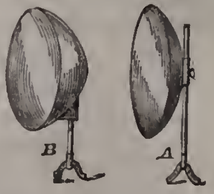
A Dictionary of Photography.

BACKGROUND (*continued*).—For portraiture in the so-called Rembrandt style, Kurtz and others have found it very advantageous to make use of cup-shaped backgrounds, and these may be made either of thin metal or *papier maché*. Cup-shaped backgrounds take up a good deal of space, and few can afford room enough to keep at hand such an assortment as shall afford much variety with respect to tint and the degree of concavity. Our subjoined cut shows the usual method of mounting a cup-shaped background, and it is scarcely necessary to say that the background in the form represented is only adapted for head and shoulder portraits.



KULTZ'S CUP-SHAPED BACKGROUND.

It is not a very uncommon thing to see a large flat circular background, which is gradated from light to dark, mounted on a foot like the Kurtz background. This arrangement is very easily made, as an ordinary fabric stretched on a light wooden hoop can be used, and the painting of the face should be done according to Mr. Ashman's directions, as already quoted in this article; but the background in question must be so mounted that it can not only be raised or lowered, but also turned on its axis; this capability of double adjustment giving the photographer great facilities for throwing any part of the figure into special contrast.

Next after the plain background, or one simply graduated, comes what may be termed the pictorial or scenic background; but these are far less used than formerly. Excellent designs in backgrounds can now be obtained commercially, but notwithstanding this, there is a growing tendency among photographers to depend on themselves for the making of background designs. The advantage of being able to frequently vary the backgrounds from time to time needs no comment, as few circumstances give such an air of vulgarity to a collection of photographic specimens, as the over-frequent recurrence of the same design as a background.

To enter into a discussion of the artistic principles which should regulate the sketching or painting of a background design would be beyond our present design; but it may be well to point out that in portraiture the background and accessories should be strictly subservient to the figures, and anything whatever of a loud or decidedly obtrusive type should be avoided; but after having given such manipulatory details as may assist the reader, it may be well to give a few examples of style.

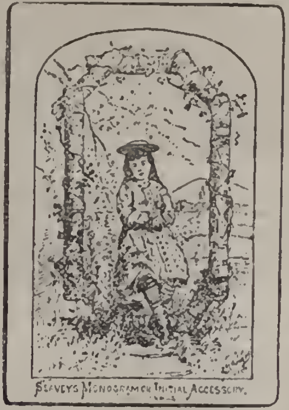
Plain unbleached calico, or even light brown paper stretched on a frame, may be rapidly and easily worked upon with charcoal, chalk, or crayon, a tolerably stiff hat or coat brush being used to soften the work. A background painted with a size-colour, as already described, also takes marks from these materials readily enough, and the work is easier to remove, either by dry brushing, or by means of the damp sponge, than in the case of unprepared cloth or paper.

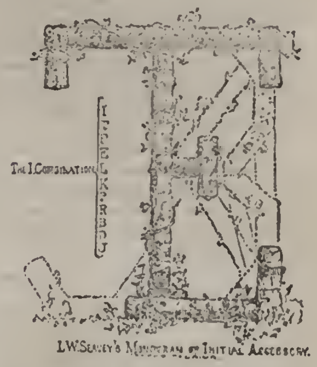
Should more permanent designs be required, they may be painted in water-colours or distemper; but no special remarks are required on the subject.

Mr. R. Faulkner, the eminent portraitist, makes many of his backgrounds by a process in which colours mixed with powdered gum or dextrine are applied to a stretched fabric, and the back of the cloth being now damped, the dextrine or gum softens and fixes the colour. This mode of working gives a desirable softness of outline, while it is easy to ensure the most delicate transitions from shade to shade, provided that the distributing brush is used before the application of the water. Such a pigment as burnt sienna may be mixed with one, two, or three times its weight of the powdered gum or dextrine, and the dry mixture may be formed into crayons by pressure if required, although the greater part of the work may be ordinarily done with stump and brush. When considerable surfaces have to be tinted, it is an excellent plan to tie the various mixtures of pigment and powdered gum in little muslin bags, like blue-bags, and to dust the material through the fabric; while similar devices, such as tubes filled with the powder and tied over with the muslin, will suggest themselves to every intelligent worker. It is well to complete the work as far as possible before damping the back of the calico screen, as it will be found impracticable to work with the powdered colours on a damp surface. The method may be varied by mixing the colours with powdered resin, and damping with methylated spirit. Finishing touches with charcoal or crayon may, of course, be put on these backgrounds.

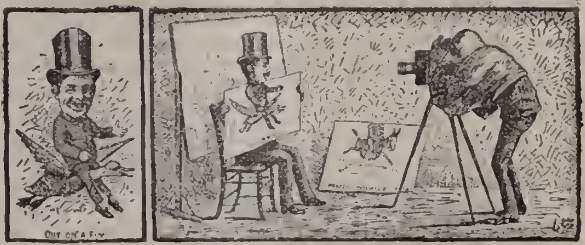
The use of solid accessories in connection with the background is very general, and the following sketch will sufficiently indicate the way in which such accessories may be used. It represents the interior of a studio designed by Mr. Notman.

Among what may be termed the eccentricities in backgrounds may be mentioned the initial backgrounds (or rather, accessories, as they are solid) of Seavey, and the subjoined sketches will afford sufficient explanation.


Seavey's Monogram or Initial Accessory.


The I Combination
L.W. Seavey's Monogram or Initial Accessory.

The caricature backgrounds (or, should we not rather say, foregrounds?) of Coolide deserve mention, as a photographer with some notion of the grotesque may create much merriment by the production and circulation of pictures obtained by the method shown in the following cut.



Mr. Thomas Gulliver, writing in the Photographic News, tells us how to introduce a ghost in the background, or even a ghostly reflection of a landscape. He says:—

"Many persons now using gelatine plates have at command a good large plate glass window, and it often happens that this said glass window faces a bit of landscape or a shrubbery. By a little careful arrangement this window may be made into a landscape background. Care must be taken to put the camera on a low stand, as the background is formed by the reflection of the trees, &c., opposite. Should it be deemed advisable to introduce a ghost into the picture, all that is required is to pose the lady or gentleman ghost-fashion, and place either one or the other so that the reflection shall come in its appropriate place."

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PRESIDENT'S ADDRESS AT THE BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

We may congratulate ourselves upon the fact that our *soirée* of inauguration has been a gratifying success, and therefore it now simply falls to my lot to state what I think should be our aims. We should offer to all amateurs and professionals of both sexes, duly elected, a hearty welcome; our meetings should be characterized by practical demonstration as well as by general information; a sub-committee should be formed to instruct students, artistically and chemically; a box should lie in the hands of the Secretary for questions to be asked and replied to; Birkenhead, being situated on the estuary of the Mersey, offers great opportunities (which should not be lost sight of) for the production of pictures of instantaneous seascapes and the like; excursions should be made into the country to suit as many of the members as possible; the Society should fix upon, with as little delay as possible, a series of competition subjects for the year, arranging to issue (the funds permitting) suitable awards for the best pictures illustrative of the same; at the end of each year the council should select from among the prizes one or more subjects for reproduction and presentation to each individual member.

A great deal has been written and said as to exposure in the camera, and tables calculated with a view of arriving at an infallible mode as to exact time; but my experience leads me to the conclusion that a particular knowledge of judging by sight, assisted by the appearance on the focussing glass, is the only way to determine the true period, except in such instances as interiors and deep gorges, where the actinometer is requisite. The actinic force of light is constantly altering from morning to evening of each day, and the quality is also completely changed at different seasons of the year (April and May being by far the best months in this respect), and a knowledge of judging accurately as to its value can only be arrived at by observation of the state of the atmosphere.

A successful photographer must be one having talents artistic, chemical, optical, and mechanical—combining great energy and resource to discover the requisite elements to make up a first-class picture. One of the special aims of this Association should be the education of its members, a field too large to be entered upon in my address.

The time has arrived when an effort will be required to produce an apparatus of a portable character to enable us to change or develop our plates without a dark-room. The necessity of this is especially felt upon a voyage or in foreign countries, where convenient places are sometimes very difficult to find, and also at home, where an entire room cannot always be set apart for such a special purpose. I have endeavoured to meet this want with the models I now bring before your notice, and any suggestions the members may make for their improvement will, I need hardly say, be gladly received.

The apparatus which I present is divisible into two parts, and a whole-plate size, when folded together for convenience of portability, only occupies a space of 16 inches long by 12 inches wide by 3 inches deep. The lower portion may be used for the changing of sensitive plates without the chance of being affected by the light. When developing is required, the lower portion is occupied with a piece of thin silvered fluted glass placed at an angle of 45 degrees; this sends the light (one end being open) through a piece of ruby glass lying horizontally above it, upon the upper portion of which is a wooden frame-tray with glass bottom, into which receptacle the sensitive plate is placed for development. The space is sufficiently large to take in the dark slide, which may be manipulated through india-rubber apertures at each end; two pieces of ruby glass on top and side give ample illumination for watching the development of the plate underneath. For travellers visiting distant countries it is hoped that such an apparatus will alleviate the miseries of makeshift dark rooms; while for those working at home, it would enable them to surmount the difficulty of want of space to which I have just alluded.

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IMPROVED DEVELOPER.

BY PROF. H. W. LORD.

Assuming, as is probably correct, that the rapid deterioration of the mixed ferrous oxalate developer is due to the accumulation of ferric oxalate in the solution—this being a most powerful restrainer—and also believing the major part of this oxidation is due to the air rather than to the plate under development, it occurred to me that by adding some substance to the mixed developer that would protect it from the action of the air, and even, perhaps, reduce the ferric salt as fast as it formed, the "life" of the mixed solution might be greatly prolonged, and its efficiency increased.

The most available substance seemed to be sulphite of soda, which has been so extensively used in connection with pyrogallic acid, but not heretofore, as far as I am aware, tried with ferrous oxalate.

My experiments with this salt fully confirmed this opinion. I find that by the addition of sulphite of soda and some free acid, so as to slightly liberate sulphurous acid, a permanent oxalate developer of great power is produced. My formula is as follows:—

To a saturated solution of potassic oxalate, 175 c.c. (2,975 minims), add 10 grammes (154 grains) of sodic sulphite (crystals); when this is dissolved in the oxalate solution add 50 c.c. (850 minims) of a saturated solution of ferrous sulphate, then add strong sulphuric acid, drop by drop, till a faint odour of sulphurous acid is developed in the solution, about 1 c.c. (17 minims) is required. This completes the developer. It is very powerful. It can be used over and over again with very little loss of strength. My plan is to mix about 500 c.c. (8,500 minims), keep it in a corked bottle, and take out what I want to use. After development, I pour it back into the bottle and shake it up. The next time I want to develop a plate, I take out what I want as before.

This developer is too strong for many purposes, so that for most cases it is well to dilute it as given with its own volume of water; the diluted solution being kept as before.

In case of *over-exposure*, I use but one plan for all developers, viz., take the plate out of the developer at once, and place it in a one-half per cent. solution of potassic bromide for from five to sixty seconds, according to circumstances, then wash off rapidly, and proceed with the development as at first.—*Photographic Times.*

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Correspondence.

CARRIERS FOR DOUBLE DRY PLATE BACKS.

Sir,—The following may not be new to many of your readers; but if you think it would be useful to some, you will perhaps give it a corner.

Wanting to use some double dry plate backs for smaller plates than they were made for, I found I could not get carriers made in wood, as there is not more than $\frac{3}{16}$th inch space; so I procured a piece of material known as vulcanized fibre, the flexible kind, made in sheets and $\frac{1}{8}$th inch thick; this can be cut to the greatest nicety with a sharp strong large blade of an ordinary penknife, and a straight-edge, and I soon made the carrier I required, using a small piece of the waste centre split in half to form the corner supports. The material, though flexible, is rigid enough for, I should think, a 12 by 10 camera; the size I have made is 9 by 7. The corners are glued on, and the whole cost less than 1s. As the material is only 2s. per lb., and not brittle or hard like ebonite, anyone can make these carriers easily; vulcanized fibre will not stand much moisture or acids, and can be bought of the agents, Messrs. Mosses and Mitchell, Chiswell Street, E.C.—I am, sir, yours faithfully, Frank Haes.

LENSES FOR TAKING SMALL PICTURES FOR SUBSEQUENT ENLARGEMENT.

Dear Sir,—Mr. Parr's question in your last involves a very large subject. It is not only the covering or depicting qualities of lenses which are concerned, but the whole range of outdoor photographic work. To avoid on the one hand monstrous foregrounds, and on the other diminished or invisible distances, is not a matter involving judgment merely as to lenses. Both are faults specially incident to the use and abuse of lenses of wide angle, and therefore of short focus; but while the first fault may often be cured by a judicious use of the rising front, and, perhaps, a lowered stand, the other is inherent, depending directly on the focal length. How rapidity has barred the way to long focus up to a recent date, I really do not know, and cannot there follow the argument. Twenty-five years ago long focus lenses were more used than now.

For myself I value greatly the opportunities afforded by a large choice of lenses of exercising my judgment in choosing the best point of view for each subject, and subordinating, not the view to the lens, but the lens to the view. But I will say that if really confined to one lens, I should probably prefer a wide angle rectilinear doublet made for plates the next size larger. I am inclined to think that the superiority of the best lenses of this description in flatness of field and marginal definition, over the more rapid doublets, is less commonly appreciated than it should be. Even a single lens from a good wide angle combination will cover better with a small stop, than a rapid doublet of the same focus similarly stopped down. On the other hand, these advantages become less sensible in very small sizes. And, again, a very rapid doublet is often the best for instantaneous views; and such are the most tempting subjects for enlargements, especially to

those who, like myself, are firm believers in the general superiority of direct views. The subject is a very wide one, and I do not see how it can properly be dealt with from a merely optical point of view.—I am, dear sir, yours truly,
W. H. Wheeler.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

Sir,—This Association has now been established for ten years, but has not been able to emerge from the *embryo* state. It has not failed to make its existence known, for it has enjoyed the good offices of the Press, a benefit evening at the Photographic Society's Annual Exhibition, and altogether a reasonable amount of publicity. Some well-known names figure on its Council; its Secretary has been assiduous; some charitable service has been done, and there is a small accumulated fund. Nevertheless, it would be absurd to claim for the Association the position of adequately representing the benevolent energy of the photographic fraternity.

Is its feeble existence due to error of inception, or of management? Or is such an organization uncalled for in the circumstances of the profession? Possibly it is not wanted; skilful photographers, masters, and assistants may find their business so safe and remunerative, that with ordinary care and provident arrangement associated charity is not wanted. The accidents of life may be so few in their ranks as to receive adequate help and commiseration by private generosity, by which nothing is shorn of the value of free gifts by costs of management, nor of their grace by delay, and a *quasi* publicity. If this be so, then happy the profession more secure against the vicissitudes of fortune than any other.

Such fortune, however, if it exists, is not likely to be permanent in a world of competing activities, and the present is a fitting time for the members of the photographic body to consider if they will allow the work of ten years to be abandoned, or infuse new life into the Association. The photographic fraternity is numerous and wealthy enough to make such an association really effective, if believed to be desirable; and the writer would be glad to elicit opinions from both masters and men on this point.

If there be defective organization of the Association, its rules, and the appointment of its officers, rest entirely with the members, and there would be no difficulty in adapting both to larger means and greater usefulness. W. S. Bird.

Sir,—In reading the report of the meeting of the Photographers' Benevolent Association in your last issue, I cannot help thinking that a great deal of its non-success may be attributed to the basis upon which it is worked. Why not make it a self-supporting society, not a "benevolent institution?" Benevolence is grand for those who can give, but it is more pleasant to give than receive. Depend upon it, the largest section of photographers—that is, the employés—would much prefer a society on the principle of a mutual aid society: that is to say, let there be a fixed scale of benefits; let there be a certain sum per week in sickness, also a sum at death of members; and if the subscriptions were raised, as undoubtedly they would have to be, I believe the Society would soon improve. Of course, it would become a benefit society, and why not? Does it not teach independence. Why should we rely on the benevolence of the generous?

Those gentlemen at the head of the profession who have so kindly come forward with their assistance could still aid us as honorary members: but let ordinary members feel, in appealing to the Society, that they do so as their right; that in doing so they are not endangering their independence by falling upon the charity of others, although they may pay a small sum per year. I should like to have the opinion of others on the matter, and remain yours,

Swansea. James Lambert.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 12th inst., Mr. A. J. Brown in the chair.

There was a large attendance to hear Messrs. C. and F. Darker's lecturette, "A Chat about the Lime-Light and Interference." The first part consisted of a practically illustrative explanation of the lime-light, from the manufacture of the gas to its use with various kinds of jets, including the cause and prevention of accidents. This was given for the benefit of amateurs, upon whom Mr. Charles Darker strongly urged the necessity of keeping the same pressure on both gases when using the oxygen and hydrogen mixed gas jets. Purifying oxygen by passing it through a series of wash bottles was shown, and particular stress was laid on the fact that the last vessel of the series should not contain water, or dry gas would not be obtained. Replying to the Chairman, Mr. Darker said three washings would be enough for the gas; a fourth dry bottle was then attached to such a series, to illustrate how much water could be taken into the bag under certain conditions, without the manipulator becoming aware of its presence. The second portion of the lecture, dealing with "Interference," was a continuation of their three previous demonstrations on light. The Lecturer showed some beautiful illustrations of the colours obtained with films of soap, turpentine, oil, &c., and these being again analysed with a bisulphide of carbon prism proved very interesting, as also did the experiments with diffraction gratings, and the rings of colour produced by interposing some very fine lime dust and fern spores in a divergent ray of light. In the course of the illustrations, the projection on the screen of sound waves by the phoneidoscope, to illustrate lateral waves, was remarkable. Diffraction was shown by partially intercepting the rays of a sharply defined image. Altogether the lecturette was a series of experiments which were highly appreciated by those present.

The Chairman, in proposing a vote of thanks to Messrs. C. and F. Darker, said it was not only for the lecturette, but also for the trouble and expense they had been put to in bringing so much valuable property there for the purpose, that the Society's thanks were due. Having referred to the difficulties under which Mr. C. Darker laboured in performing his own most difficult experiments, and doing the talking as well, he considered it only fair to Messrs. Darker that the discussion should be adjourned, and especially as the evening was so far advanced.

This was accordingly done, and a hearty vote of thanks accorded to those gentlemen.

A glass plate, from which a negative film had been washed off, was sent to the meeting, and it was said that a slight image showing thereon was bitten into the surface of the glass; but one of the members found it an easy matter to rub the deposit off.

To test the value of perchloric acid, suggested by Mr. Debenham as an antidote for green fog, Mr. Henderson had made an ammonia emulsion with favourable conditions for any quantity of green fog; 240 grains of silver nitrate used in compounding the emulsion, had an addition of 120 minims of perchloric acid. Upon converting the silver into ammonia nitrate there was a flocculent precipitate which would not redissolve in ammonia. Mr. Henderson desired to know what the precipitate was composed of. Green fog was entirely absent; but there was brown fog, which was worse. The sample of acid was not new.

Mr. Debenham said the quantity of perchloric acid used was much greater than he mentioned; two or three drops would be sufficient for 240 grains of silver. He thought the precipitate spoken of by Mr. Henderson would have dissolved if more ammonia had been added; and he thought if the experiment were repeated with a fresh sample of acid and less of it, success would result.

Messrs. E. Halse and W. Strickland were elected members of the Society.

Newcastle-on-Tyne and Northern Counties Photographic Association.

The ordinary meeting of the above Association was held in the College of Physical Science, Newcastle-on-Tyne, on Wednesday, the 11th inst., at 7.30 p.m., the President, Prof. A. S. Herschel, in the chair.

The minutes having been read and confirmed, Col. Mitiori and Mr. Dawson were nominated for membership; and Messrs. A. Dunn, J. G. Sinclair, J. Hundley, H. R. Proctor, J. G. Denison, and T. Wilson were duly elected.

Mr. Pae read a paper on "Artists *v.* Photographs" (see page 116).

In the discussion which followed, Mr. J. P. Gibson said that although it is impossible to secure with the rigid photographic lens an image mathematically identical with that formed by the compressible and constantly varying crystalline lens of the human eye (which also varies with the individual), yet by the selection of a lens of sufficiently long focus to suit the subject, a practically similar image may be procured. He also contended that in the examples shown by Mr. Pae, the differences arise, not from the necessary imperfections of the photographic lens, but from the fact that a lens of relatively short focus had been used (seven inches for a whole-plate picture), and also more especially that the tracing had been taken from a point something like a foot lower than the photograph; this being clearly evidenced by the fact that a rag-hole only half shown on the lower edge of the photograph appeared complete about two or three inches up the foreground of the drawing. This was proved quite as conclusively by the relation of the ships' masts in the middle distance to the horizon.

Mr. Proctor said he agreed with Mr. Pae that the perspective machine would give the true lines of perspective, and the true proportion between the sizes of near and distant objects, if it could be accurately worked. He considered it was virtually the same thing in principle as the pinhole camera, which he had spoken of at a previous meeting, but with this difference in working, that the camera obscura put down its results with accuracy, though not with great sharpness, while the accuracy of the perspective machine depended upon the skill of the draughtsman; and he considered that the greatest skill which the draughtsman could exercise was not sufficient upon which to found any doctrine such as Mr. Pae was promulgating. The drawings which Mr. Pae showed as proving the shortcomings of photo work, though admirable as outline sketches, were utterly worthless as mathematical demonstrations. It was difficult to find points in them sufficiently sharp and accurate to establish by measurement and deduction with its proportions between one and the other; and if that could be done, there still remained the question whether it was the result of a faulty working of optical principles, or a want of skill in the artist. With regard to the blackboard diagram which Mr. Pae drew to prove that there must be an error in the proportion of the different distances in a camera picture, consequent upon the difference in the focal distances of objects, some ninety feet and others three miles away, Mr. Proctor said it was quite out of reason to represent the three mile distance as being in focus three inches behind the lens, and the ninety feet distance as being in focus four and a quarter inches from it. He said the whole question under discussion was one of proportion, and to be of any use the illustrations must be kept something near the truth. In reply to Mr. Pae's appeal to Mr. Proctor to draw the foci in their correct proportion, Mr. Proctor said he should not attempt such a thing without calculating what the relative distances should be, but he was sure the deviation from truth in diagram was so great as to vitiate any argument founded upon it. In conclusion, he said he had taken one or two lens views corresponding with the pinhole view which had originated the discussion, and he would lay them before them some subsequent meeting, when the members would have the opportunity of detecting, if they could, any difference in their perspective and proportions.

The Secretary showed and described a new camera, made by Lejeune and Perkin, of London; and a camera and changing-box (Samuel's patent) by the same firm; also a tripod top (size, five inches square) made by himself, for instantly turning the camera from the horizontal to the vertical position; this top differed from others of a similar character inasmuch as it provided a base for the camera to rest upon when in the vertical position, and a sliding arrangement whereby cameras of varying size could be used with the one top.

For the remainder of the present session, the meetings, unless otherwise notified, will be held on the second Wednesday in the month.

Edinburgh Photographic Society.

The fourth meeting of the current session was held in the Queen Street Hall, on Wednesday evening, 4th February, Mr. Norman Macbeth, R.S.A., President, in the chair.

The minutes of last meeting having been read and approved, the following gentlemen were admitted as ordinary members of the Society:—Messrs. John Mackay, Thomas T. Gray, Charles E. Hume, David Mitchell, and Major Ashburner; and the following two gentlemen were admitted honorary members, viz.:—Mr. T. Bliss and Mr. A. T. Niven, C.A.

Mr. J. M'Kean proposed that a social gathering of the members and friends of the Society be held before the close of the session; and after a short discussion, a small committee was appointed to draw up proposed details, gather information, and report to the Council.

The Hon. Secretary then intimated that about thirty members had intimated their willingness to contribute the sum of five shillings annually in addition to the ordinary subscription, in order to secure additional accommodation, including a dark-room.

After a lengthened discussion, it was decided to remit the matter to the Council to consider and report again to the Society.

The next business was a "Conference on the Picturesque." The President said that some of the pictures sent in for criticism were sent to the conference by some of the junior members, and he would like a judicious spirit to pervade the comments. He did not know the names of the authors, and he hoped all concerned would derive benefit from the proceedings. A number of pictures were then exhibited, passed round for examination, and criticised, members freely expressing their opinions on what they deemed good and bad points, and suggesting modifications which might enhance the value of the pictures from a pictorial point of view.

The President then read a paper, "Backgrounds of Portraiture" (see page 119), which was illustrated by transparencies of the pictures referred to thrown on the screen by the lime-light, under the management of Messrs. Dickson and Matheson, who were awarded a cordial vote of thanks.

The President received a cordial vote of thanks for his instructive communication.

A vote of thanks to the President for his conduct in the chair terminated the proceedings, which were unusually prolonged, and yet left the programme unexhausted.

Glasgow and West of Scotland Amateur Photographic Association.

The usual monthly meeting of the above Association was held in their Rooms, 180, West Regent Street, on Tuesday evening, 10th inst., Mr. Hugh Reid, President, in the chair.

After the approval of the minutes, the following new members were admitted:—Miss L. Reid, Rev. Wm. Ross, Mr. R. W. Feldmann, and Mr. John C. Hutcheson.

Mr. T. N. Armstrong read a paper on the "Production of Lantern Slides by Artificial Light" (see page 117), and passed round a number of very beautiful specimens of his work by various processes. Mr. Armstrong then proceeded to the dark room, and gave a practical demonstration of making lantern slides by reduction through the camera, exposing and developing a couple of plates in a completely successful manner, betokening careful manipulation, and a thorough knowledge of the subject.

After a hearty vote of thanks to Mr. Armstrong the meeting adjourned.

Leeds Photographic Society.

The ordinary meeting was held on Thursday, February 12th, the President, Dr. Thorpe, F.R.S., in the chair. This being the evening appointed for the open lantern night, a very large number of members and friends assembled, the large lecture hall being well filled. The views were shown by the oxyhydrogen light kindly supplied by Messrs. Reynolds and Branson, and manipulated by Mr. White, a member of the Society.

A large number of slides were sent for exhibition by the members, some of which were of special excellence. It was arranged by the Committee that all technicalities relating to processes, &c., should not be referred to at this meeting, it being the intention to hold a special meeting for the comparison of various processes, by which the slides were produced, and other lantern matters, in March.

Slides were exhibited by the President (Dr. Thorpe), Vice-president (Mr. J. W. Ramsden), Hon. Secretary (Mr. Thomas W. Thornton), and Messrs. Atkinson, Branson, Denham, Frazer, Foster, Grant, Harding, Hirst, Nelson, Lord, McRoy, Marshall, Poffett, Rodwell and Warburton; and special notice should be made of a very beautiful series of slides exhibited by Mr.

Teasdale, F.R.M.S., on behalf of Mr. George Smith, of the Scipticon Company.

A very hearty vote of thanks was given to Messrs. Reynolds and Branson for the loan of the lantern.

BOLTON PHOTOGRAPHIC SOCIETY.

The February meeting was held at the Baths, Bridgeman Street on the 5th inst., Mr. R. Harwood in the chair.

Messrs. F. Sutcliffe, Ramp, and W. Forrest, were elected members of the Society.

Mr. P. Parkinson exhibited a vignetting frame, and Kershaw's instantaneous shutter; and Mr. W. Banks, Guerry's pneumatic shutter.

A number of fine prints on alpha paper were brought by Mr. Parkinson, the Rev. J. W. Cunday also showing some on the same paper.

It was decided to hold the annual open meeting about the last week in April.

The meeting concluded with a lantern exhibition.

CAMBRIDGE UNIVERSITY PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held in Mr. C. F. Jenkin's rooms, Trinity College, on Saturday, February 14, Mr. W. N. Shaw, M.A., in the chair.

The minutes having been read and passed, the following were elected members of the committee:—Messrs. Miley, Elder, Cobbett, and Jenkin.

Mr. Jenkin then read a paper describing his experiences since he commenced photography, and exhibited a large number of prints.

A short discussion followed, and a vote of thanks having been accorded to Mr. Jenkin, the meeting adjourned.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.

The second ordinary meeting was held on Thursday evening, the 12th inst., when a large number of the members met together to listen to the presidential address, and discuss various other matters of (to them) an exceptionally interesting nature.

Messrs. T. B. Bewsher, J. T. Cochran, H. Cockbain, G. H. Crocker, J. H. Roscoe, E. Whalley, and W. J. Thompson, were elected members; after which the under-mentioned subjects were selected for illustration by competition pictures for the current year, the nature of the awards to be decided upon a future occasion. Old Mill—Trees—Instantaneous—Lantern Slides (3)—Bridge—Old House.

The President (Mr. J. A. Forrest) stated that he had received a circular from the Dundee and East of Scotland Photographic Association, requesting him to lay before the members a preliminary announcement of an International Photographic Exhibition to be held in Dundee in February, 1886, and mentioning that gold, silver, and bronze medals would be offered thereat as prizes. He then delivered an address (see page 123).

At the conclusion of the president's address, Mr. A. W. Cornish developed two of Cowan's chloride lantern plates, using formula No. 2 given in the directions, which he found to be the most satisfactory in his hands, and which consists of—

No. 1.—Carbonate of ammonia	... ...	1 ounce
Citric acid	... ...	1 oz. 3 drams
Water	... ...	3 ounces
No. 2.—Protosulphate iron	... ...	1 ounce
Water	... ...	3¼ ounces

One part of No. 2 to three of No. 1 being the proportions used to develop the transparencies, which, when finished, were very much admired. Mr. Cornish remarked that the exposure given was five seconds indoor at a window in dull daylight, and that a great advantage of the formula he used was that a dozen plates could be developed in succession without change of solution.

Mr. A. W. Beer then exposed a sample of Morgan and Kidd's gelatino-chloride paper behind a negative in the printing-frame to the light of a slip of magnesium ribbon two inches long four inches away from the negative, waving the ribbon in face of the frame during combustion; he next developed the paper, the image coming up rapidly and brilliantly. But when it was facetiously stated that before the picture was finished it would still require ten minutes' working, fifteen minutes in alum, another ten minutes' washing, twenty minutes' toning, another five or six changes of water, twenty minutes' fixing, and a final ten hours under the tap, it suggested the thought to some of the members present that life was so short it was a question whether, beautiful as the results were, the process would ever have a prospect of superseding that of the old style of printing, with all its drawbacks, and all its inconveniences and imperfections, until some of the delays attending it were eliminated or simplified in some at present unexplainable way.

The President exhibited some paper pictures taken upwards of twenty years since.

PHOTOGRAPHIC SOCIETY OF IRELAND.

The usual monthly meeting was held on Friday evening, February 13th, at the Royal College of Science, Dublin, Mr. Geo. Mansfield, J.P., in the chair.

After the formal business,

Mr. Greenwood Pim read a communication on "Quick Printing Papers," and passed round numerous specimens both of his own work and that sent by the makers. He stated that he had tried samples of "Alpha," Warnerke, Morgan and Kidd, and the "Acme," and had obtained fairly good results. Mr. Pim found that unless development was completed within four or five minutes, the colour was cold, and a warm tone could not be obtained. Mr. Pim also stated that he had found enamel paper to yield excellent negatives almost grainless.

Mr. F. A. Bewley next showed some enlargements made with the lime-light on "Alpha" paper; and

The Chairman passed round some nice 12 by 10 prints on "Acme" paper. He agreed with Mr. Pim that it was no more rapid in printing than albumenized paper, although much quicker in toning, fixing, &c.

A lively discussion followed, in which Dr. Scott, Mr. Herbert Bewley, Mr. Woodworth, and Mr. Mayne, M.P., took part. The latter stated that he had sold a large quantity of "Alpha" paper to the trade in Dublin.

Dr. Scott showed a most remarkable re-coated plate on which was a faint *positive* image identical with a group previously taken on it.

Three questions present themselves:—1. "Why did any image appear?" 2. "Why was this image a positive?" 3. "Where was the statue which formed a prominent feature in the original group?" Under-exposure may perhaps account for the statue not appearing; but it is curious there was absolutely no trace of it.

Talk in the Studio.

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will take place on Tuesday next, February 24th, at 8 p.m., at the Gallery, 5, Pall Mall East.

Patent Law.—The Council of the Society of Arts have determined to hold, during the time the International Inventions Exhibition is open, a Conference on Patent law. The subjects for discussion will include the working of the new Patent Act, and also questions of International Patent law.

Phototype Block by Mr. W. T. Wilkinson.—We notice that the *Wharfedale Observer* publishes an excellent photo block portrait of Mr. John Mayhall, and we understand that the block was made by Mr. W. T. Wilkinson from a cabinet print. The graining consists of cross-lining like that of the Ives and Meisenbach blocks. Notwithstanding the necessarily rough treatment in the newspaper machine, the result is very satisfactory.

Whiting's Liquid Colours for Photographs.—We have received a sample case containing Whiting's liquid colours, which are already known favourably to the United States. They are free from deposit, take readily on the surface of an albumen print, will bear dilution with water, and in no way block up or conceal the most delicate detail. The agent is Mr. E. J. Billing, of 5, Catherine Street, Strand.

Racial Characteristics of the Jews.—At the next meeting of the Anthropological Institute, which will be held on Tuesday evening next, at 3, Hanover Square, memoirs on this subject will be read by Dr. Neubauer and Mr. J. Jacobs. Mr. Francis Galton, the newly-elected President, will show some new series of composition photographs in illustration of the papers.

WORTHY OF SAM SLICK.—"I know a very pretty miss who was told by an ardent admirer that she resembled the world-wide known beauty, Mrs. Langtry. At once she possessed herself of the photograph of this fair Briton, and demanded to be photographed in a similar pose. The obliging photographer did what was asked of him, but alas! no Mrs. Langtry. Much vexed, she sought a second time to realize her ambition, and even a third, but always with the same result. At last she was told to go to the celebrated Mr. X. He at once comprehended the situation of affairs, and declared that he would not take her in a pose similar to Mrs. Langtry. "Why not?" asked the fair damsel. He gallantly replied, "Simply because you are much fairer than the latter, and I would consider it much more in accordance with good taste should Mrs. Langtry apply to me to be photographed like yourself." Ah! that was the right string to pull. The lady felt herself so much flattered that she could not gainsay his argument, and, in all patience, allowed herself to be posed in a manner that did not necessitate the slightest approach to Mrs. Langtry."—Dr. W. H. VOGEL in the *Philadelphia Photographer*.

BORLINETTO'S DEVELOPER FOR PLATINOTYPE WITH A SEPIA BROWN TINT.—Dissolve 300 grammes of potassium oxalate in one litre of water, add first 10 grammes of oxalic acid, and when this is dissolved, add 100 cubic centimetres of a saturated solution of copper chloride. The solution is warmed to 80° Centigrade, and the paper placed on it in the usual way. The subsequent treatment is first with very dilute hydrochloric acid, then clean water freely used; afterwards the prints are immersed in a five per cent. solution of iron sulphate, once more in the dilute hydrochloric acid, and finally well washed in water.

THE PHOTOGRAPHIC EXHIBITION AT OPORTO.—The *Moniteur de la Photographie* is informed that the Royal Family of Portugal take much interest in the Photographic Exhibition which is to be held at Oporto next year.

A MINIATURE MAGAZINE MADE BY A PHOTOTYPE PROCESS.—Pitman's musical monthly appears with a page only 3¼ by 2½ inches, and contains several reductions of music from full-size to the smallness of the page mentioned; the rest of the text being also reduced in the same proportion. The reduced music is easy to read, but the same can hardly be said of the letter-press; and this, notwithstanding the fact that the work is beautifully executed.

WHITE LIGHT FOR THE "DARK" ROOM.—A remarkable communication was made to the French Photographic Society by M. Scola on the 6th instant, the gentleman in question contending that when light is reflected from a silver-on-glass reflector, used in the ordinary way so that the rays are reflected without passing through glass, the light is almost completely deprived of its actinic qualities, and M. Scola proposes to illuminate the photographic laboratory with light so reflected. Considering that glass reversing mirrors, silvered on the face, are in daily use at the Autotype works for making reversed negatives, and that general experience tends to show that the loss of light is much less when the reflection is taken from a silvered mirror than from a reversing prism, it becomes difficult to accept M. Scola's conclusion without having further particulars. However, M. Scola says he has made experiments, and we shall be glad to learn the details.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting, on Wednesday, February 28, will be "On the Preparation of Lantern Slides." This is a lantern night.

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To Correspondents.

*** We cannot undertake to return rejected communications.

ENQUIRER.—1. The paper should dry in from six to seven hours, and you will find no difficulty unless your room is damp. It is very little use attempting to dry the room by an occasional fire, as it often takes weeks to thoroughly dry the walls; but when they are thoroughly dry, the room will retain its drying properties for several days after the fires are discontinued. 2. When the film is thoroughly set, hang the paper up.

J. F. (Glasgow).—1. It is bromide of silver. 2. You cannot expect satisfactory results from the formula you quote. Work according to the directions given on page 179 of the YEAR-BOOK.

M. GREENWAY.—You will find the particulars in the last column.

W. B. A.—1. The carbon print can be developed directly upon the metal, and no substratum is required; but if you transfer it from a flexible support, a gelatinous solution must be used. 2. A detailed account of the method so successfully adopted by Mr. Matthew Whiting is given on page 68 of our present volume.

EUREKA.—The most condensed abstract with which we are acquainted is the tabular statement of photographic discoveries given by Dr. Eder on page 203 of our volume for 1884.

H. B.—Interesting, but you do not say what the preparation is. Glycerine, perhaps?

X.—From the Wenham Gas Light Company, Rathbone Place.

KNICKERBOCKER."—It is thick and viscid, like treacle, but should not have a greenish tint. Thin it with oil of turpentine.

F. BUGNON.—Your letter has been forwarded to the gentleman you mention. Perhaps you will forward a description of your tripod for publication in the PHOTOGRAPHIC NEWS.

ED. LAWLEY.—If you will tell us how you make yours, perhaps we may be able to suggest a cause.

A. G. B.—1. The arrangement is a very useful one, and thoroughly practical, but you will probably have to get it made to order. See the letter of Mr. Haes in our present number. 2. It will do very well indeed if it is strained by the use of a more powerful current than is ordinarily employed. See page 385 of our volume for 1882.

J. BLAMPLY.—Such questions cannot be answered without an intimate knowledge of your requirements. See the "Studios of Europe," published at our office.

D. B.—1. No estimate of their value is possible without further particulars. 2. Try Marion and Co., 22, Soho Square.

WET-PLATE.—As a general rule, it is wiser to purchase collodion ready prepared, than to attempt to make it. If, however, you wish to experiment in the manufacture, we should advise you to buy the pyroxyline for first trials, unless you possess some knowledge of chemical manipulation. The following will be found a good formula:—

Alcohol	5 ounces
Sulphuric ether ·820	10 ,,
Pyroxyline	100 grains

When dissolved, filter through cotton wool, and then add the following iodising solution:—

Alcohol	5 ounces
Iodide of ammonium	60 grains
Iodide of cadmium	30 ,,
Bromide of cadmium	20 ,,

In order to insure an even film, it is particularly important that the ether should be of the specific gravity advised.

CARBON.—Bichromate of soda has lately been introduced into the market by Messrs. Potter and Co., of Little Lever, near Bolton. The salt is cheaper than bichromate of potash, and is more soluble, cold water dissolving its own weight of the salt.

B. A.—Citrate of ammonia and sulphite of soda are added to the pyro developer to prevent the latter staining the gelatine film.

LITHOGRAPHER.—Plener's method of stripping gelatine films is more practical, as it is applicable to any plate. The negative is immersed in dilute hydrofluoric acid, prepared by adding 1 grain of sodium fluorido and 1 drop of sulphuric acid to every ounce of water. The operation should be performed in an ebonite dish, as the acid penetrates through the film, and etches the glass, instant separation takes place, and the film floats off. It can be dried evenly by squeezoeing it on a waxed glass plate, from which it separates easily when dry. If a more rigid film is required, a piece of sheet gelatine should be soaked, and pressed down over the film.

STAR.—Mr. P. M. Laws, of Newcastle, has successfully employed gas-light for portraiture for some years; details of his apparatus will be found in vol. xxiv, page 338.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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GLASS.*

TWELFTH ARTICLE.

British or Polished Plate.—A measure of civilization of any country may consist in the statistics of its use of plate glass. That there is abundance of truth in this statement cannot be denied. Take London, Paris, or Brussels, and compare them with Khartoum, Suakin, or Timbuctoo, in the matter of plate glass shop fronts, and you get a pretty fair idea of the relative position of these places in the civilization "gamut." Seriously though, *plate* glass has had a vast effect in the onward march of civilization—more so than might at the first glance be supposed. It is impossible to underrate the advantages derived from plate glass in all matters appertaining to refinement, taste, art, commerce, luxury, and effect. Plate glass is a *necessity* of the age, just as much so as chimneys are needed to carry off the smoke, which the ancient Britons allowed to get out at their doors, or windows, or wherever it could. Quite apart from its general use, plate glass has considerable interest to the photographer—he uses it in a variety of ways; to set his gelatine plates upon, to spread his pellicle upon, to trim his prints upon, to bed his collotypes upon, to glaze his show cases with, and, in fine, to employ in many ways, such as using in large printing frames, making dishes, &c.

Plate glass manufacture is carried on quite distinctly from sheet glass; the whole process is much more refined, the works more substantial, orderly, and elaborate, as machinery of a high class has to be employed. The furnaces also are usually built much more substantially than those for sheet glass, and are constructed so that each pot can be withdrawn bodily when its contents are ready for pouring, and replaced whilst still hot to receive a fresh charge. The materials for making plate glass have to be selected with care, so as to ensure purity of colour and obtain a metal which shall "fine" well, pour well, and be capable of being handled when in large sheets, and finally receive a high polish in the finishing processes. The pots have a special form, to enable them to be lifted by the grippers and carried by a travelling crane to the casting table. The use of gas furnaces facilitates this operation, as there is no loose fuel adhering to the pots or their seats. The process of fusion is very similar to that employed in sheet or rolled glass works, only additional care has to be used to produce full pots of liquid metal of equal density throughout. When the pots are ready for pouring, the furnace is opened opposite one, and a huge iron fork, similar to that employed in sheet glass works, is employed to lift the pot clean off its seat; then a pair of grippers, pendant from the crane, grasp the pot, and it is moved to the casting table, which is of cast iron of large dimensions, and polished on its surface; the table rests on wheels moving on a tram, as in rolled plate works, and it is furnished with a large and heavy roller. The pot having been scraped outside, and the scum skimmed off the surface, its contents are adroitly poured just in advance of the roller—pot and roller travelling at equal pace—and the metal is thus cast and squeezed out into a huge sheet, according to the dimensions of the table and the substance required, all of which have previously been determined upon. When all the clear metal is poured out the pot is quickly returned to the furnace to do duty again. As soon as the plate of cast glass is fit to move, it is slid off the large table on to a carrier table—a truck also running on a tram—and wheeled to the annealing kiln, where it remains from three to six days, according to the thickness of the plate, the heat being allowed very gradually to decline, until it is possible for a workman to enter the kiln to inspect the plates. Of course the largest and most perfect plates are those most prized, and these are selected for the subsequent operations of grinding and polishing into the article called "polished plate." The glass rejected from this selection is sold in the state it comes from the kiln under the name of "Rough Cast Plate," and varies in substance from ¼ of an inch to 1 inch or upwards, and is used for skylights, roofs, and the thicker kinds for flooring where light is required below.]

The operations of grinding and polishing require the agency of costly machinery, with much labour and attention. There are several methods, but that usually followed is to bed one plate on plaster of Paris, and superpose another plate capable of being moved with an eccentric motion horizontally over the lower one—sand and water are thrown in, and thus each plate grinds its opponent down flat by the instrumentality of the grains of sand. This process is applied to each side in succession until both sides are ground quite flat and smooth. Then fine emery is used to obtain a still smoother surface, when the glass is ready for polishing. The polishing machines are flat on the surface, covered with felt, and on these the plates are placed. Rubbers, also covered with felt, move to and fro, whilst the table travels slowly from side to side—the rubbers are charged with rouge and water, the attendants, usually women, keeping an eye on the process, supplying the polishing paste, and stopping or starting the machine as occasion may require. Rouge cuts pretty well, and soon brings up a semi-polish; the attendants sponge off the spent polish and apply fresh as required until the surface is perfect, and when this arrives the glass is turned over and the other side similarly treated. If the operation has been successful in all its stages, there will result a huge plate of transparent glass, of equal substance, equal density, free from bubbles, holes, and striæ, and with both surfaces bearing a high polish. This is polished plate glass. A walk along Regent Street, Oxford Street, or Cheapside will give anyone as good an idea of the advantage of large sheets of plate glass as all that could be written in these columns. It is beyond dispute that a fine sheet of plate glass *does* enhance the appearance of the goods displayed within. Plate glass is made largely in England, also in Belgium, and in France; but notwithstanding the vast sums required as capital, and the great importance of this particular industry, it is an awkward fact that, perhaps without exception, there is not one plate glass works in Europe which can be said to be paying. This arises largely from suicidal competition, but also from excess of supply beyond demand, which latter circumstance will probably be exaggerated, as at the present moment a very large works is just about to start making in Belgium—this, in the face of existing circumstances, is a puzzle to comprehend how people will put capital into undertakings of this nature with so little prospect of a fair return. We repeat, it is difficult to undervalue the great importance of this article—Plate Glass—no longer a luxury, but actually a necessity; this is the excuse for the space we have devoted to its production.

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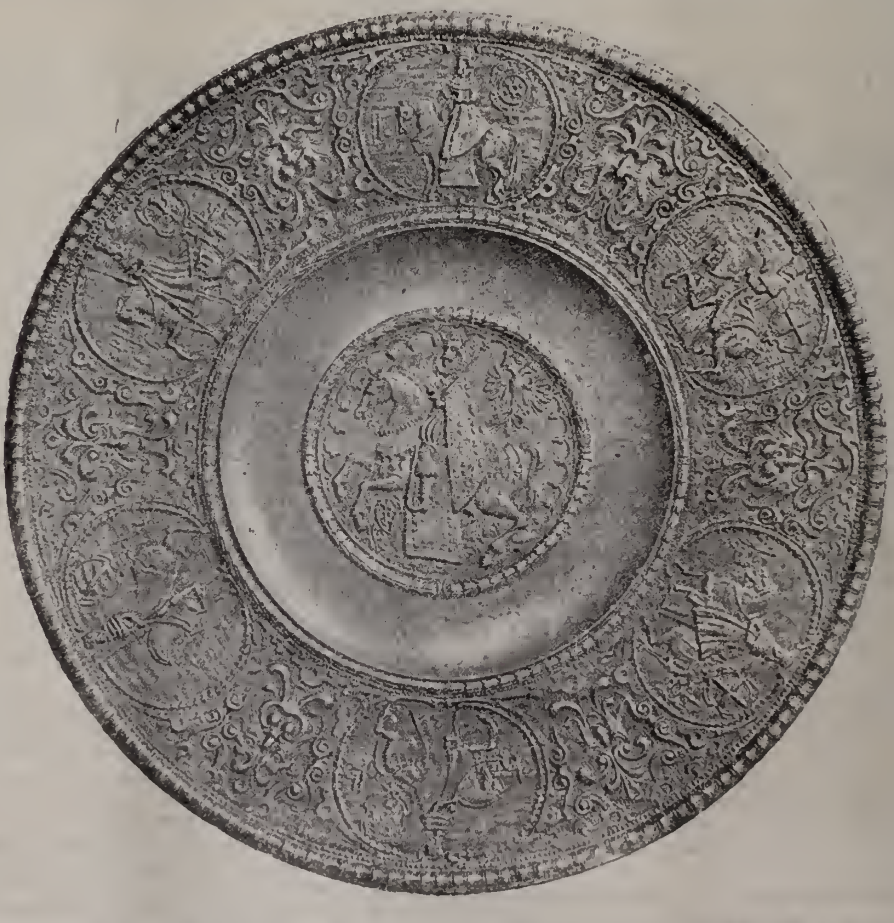
* Reference to previous articles, vol. xxvi., pages 675 and 737; vol. xxvii., pages 3, 95, 226, 419, and 757; vol. xxviii., pages 338, 386, 626, and 770.

THE PHOTOTYPE-BLOCK PROCESS OF THIRIET AND ROUX.

Some of the French technical journals have recently been illustrated by means of photographic block prints made by a method devised by Messrs G. Thiriet and F. Roux. This firm having been good enough to forward us a sample block, we now submit an impression of it to our readers.



It will be noticed that the grain or stipple by which the gradations of the original negative are brought into a fit condition for typographic printing is of a nature analogous to the "Pretsch grain," or that resulting from the reticulation of gelatine; and it is needless to say that the method—called by the introducers photo-typo-nature—is equally well adapted for lithographic or typographic printing.

PHOTOGRAPHING THE SOLAR CORONA.

Dr. Huggins, in his lecture at the Royal Institution on Friday evening, showed that his success in observing the corona without an eclipse rested mainly on two circumstances, in which the photographic eye has a great advantage over the human eye. The reason why the corona is not visible whenever the sky is sufficiently clear, is to be found in the dullness of our eyes to small differences of illumination. The sky near the sun, where there is a background of bright corona behind it, is brighter than the adjoining parts where there is no corona. This difference of illumination, even on the finest days, is too small for the eye to detect it, but it is possible so to accentuate the extreme sensitiveness of the photographic eye to small differences of illumination, that the corona, when other necessary conditions are fulfilled, may be photographed. Dr. Huggins exhibited a sheet of cardboard on which a corona had been painted with a thin wash of Chinese white. The Chinese white was so thinly laid on, and so nearly the colour of the card, that it was quite invisible to the audience, still a photograph of the card showed the painted corona with great distinctness.

The other point was in connection with the fact that the coronal light is rich in the violet rays of the spectrum. This light is indeed within the range of the eye, but so near the limit of its power, that the eye is very insensitive to small differences of illumination. If by some method of selection this light alone is made use of, a great advantage is given to the coronal light, which then can better hold its own against the air glare. Now, in the different behaviour of argentic bromide, iodide, and chloride, we have the means of choosing a film with the needful power of selection, namely, when sensitized with the chloride. Negatives of the sun, taken at the lecturer's observatory in 1882 and 1883, were shown on the screen, and also copies of some negatives by Mr. Ray Woods made at the Riffel in 1884.

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MR. COWAN'S ECLIPSING ARRANGEMENT FOR CHANGING LANTERN SLIDES.

A lantern picture-carrier, or holder, is made with grooves at top and bottom, in which the slides travel horizontally. When one slide is correctly in position, and it is desired to change it, another is placed ready in a slot cut for the purpose, and is pushed into the place of the first one by a sliding strip, which can be made to travel horizontally in grooves—this sliding strip, by its action, placing the second slide into the position previously occupied by the first; whilst the lantern picture that was just in position is ejected.

This sliding strip, in thus placing the slides in position, one after the other, also darkens the screen while the change is taking place. The front end of the sliding strip is bevilled off at an angle of 45° from its lower corner; and, at the commencement of its action, the point engages under a pin fixed in a rising shutter, and by the time the horizontal shutter has travelled the length of the bevilled part, the vertical shutter has risen and covered the slide which is in the field.

This shutter may be rigid where room is available, or may take the form of the spring roller blind where portability is desirable; in either case, by the time the horizontal sliding strip has travelled the width of the pictorial slide, the vertical shutter, or blind, has risen to such a height as to just obscure the picture on the screen. By continuing the action of the horizontal sliding strip, the second slide picture already placed in position for the purpose is pushed into the place previously occupied by the first.

On the horizontal travelling shutter being withdrawn, the vertical slide, or blind, descends. and the second picture is now seen on the screen in place of the previous one.

◆

ISOCHROMATIC PHOTOGRAPHY.

BY FRED E. IVES.

Dr. Vogel, according to his communication in the Photographic News of January 16, appears to think that I claim to have published the first process of isochromatic photography. I made no such claim, and if my article in the Year-Book makes me appear to do so, it is because the printer took the liberty to insert a comma after the word "photography" in the first line. What I claimed, and can easily demonstrate, is, that I realized and published the first practically successful method; that that method was a very great step in advance of anything previously published; and that it was far superior to the process which Dr. Vogel announced more than four years later, and sold as a "secret," claiming that it was the "solution of a problem," &c.

Dr. Vogel is reckless when he asserts that he published in 1876 "exactly the same method of preparing isochromatic plates which I published in 1879." I have already pointed out that the success of my method is due to two things which Dr. Vogel certainly did not publish or even realize—that is, to the use of blue-myrtle chlorophyll, the solution of which is many times more sensitive and powerful for this purpose than any chlorophyll solution which had previously been tried, and to the use of a coloured screen, which anyone could obtain with very little trouble, and the colour and intensity of which could be adjusted to a nicety, and quickly changed to meet the requirements of a different emulsion, or an older solution of chlorophyll, or a subject which would be improved by giving to some particular colour a degree of intensity greater or less than that exactly corresponding to its visual intensity.

The mere mention of chlorophyll as a colour sensitizer is of very little consequence, because everything depends upon the nature of the chlorophyll, that extracted from many kinds of leaves having little or no value for this purpose. If I am rightly informed, the chlorophyll employed by Becquerel was capable of making the plates sensitive only to a small portion of the red end of the spectrum, and did not perceptibly increase the sensitiveness to orange, yellow, or green. That Dr. Vogel did not know how to obtain a suitable solution of chlorophyll, and did not know what could be accomplished with such a solution, is sufficiently proved by his avowed preference for eosine, which is certainly far less powerful than blue-myrtle chlorophyll, and is so insensitive to red that plates prepared with it are very far from being truly orthochromatic.

A truly successful process of isochromatic or orthochromatic photography must, as the name implies, be capable of photographing all colours in the true proportion of their brightness. Measured according to this standard, my method was not only the first, but it is the only successful process of isochromatic or orthochromatic photography with collodion plates. Dr. Vogel not only failed to realize this degree of success at any time, but his earliest method, published in 1873, had so little practical value, thet even he does not appear to have applied it to any useful purpose beyond photographing a ribbon, to prove that yellow could be made to photograph lighter than blue. His own estimate of the practicability of his early "process" ten years after its publication may be inferred from the following quotations from one of his recent publications: "After an investigation of eleven years, I have succeeded at last [1884] in producing collodion plates which are at least eight times more sensitive to the yellow of the spectrum than to the blue, enabling one to make with the same copy of the table of colours of my instruction book, in which blue, yellow, and rose [not scarlet or ruby-red] are reproduced in natural proportion of tone * * * The Photographic Society passed the resolution to acquire the process and publish it for the benefit of all." "It is possible that some may have similar process, but nothing has been published yet, and it has been kept by these people as a secret."

The latter assertion was made more than four years after the full publication of a superior method, in a journal to which Dr. Vogel was a regular contributor at that time.

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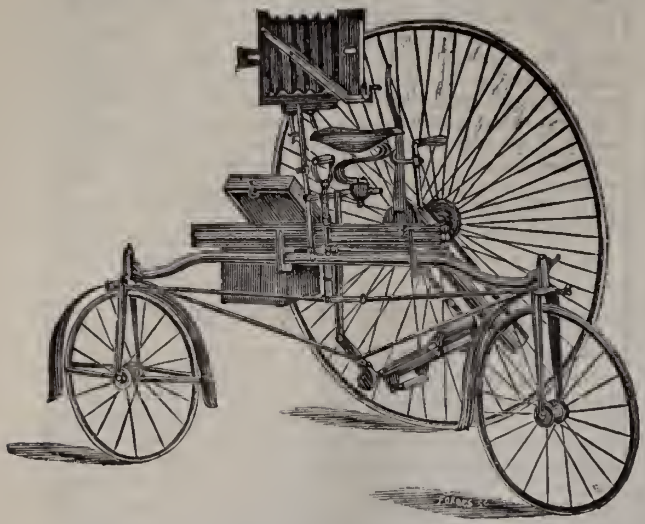
PHOTO-TRICYCLE APPARATUS AS ARRANGED BY MESSRS. CUSSONS & CO.

This consists of a portable folding camera with screw focussing arrangement, swing back, and an adapter frame placed in the position of the focus screen, allowing the dark slide to be inserted so as to give the horizontal or vertical position to the dry plate when in the camera. To the front and baseboard a brass swivelled side bar, made collapsible by means of a centre slot, is attached by hinges, and this renders the camera rigid when open, or secure when closed. The base-board is supported on a brass plate, within which is inserted a ball-and-socket (or universal joint in a new form), permitting the camera to be tilted to any necessary angle, and fixed in such position at will. The whole apparatus is mounted upon a brass telescopic draw-stand, which, by means of clamps, is attached to the steering handle or other convenient part of the tricycle, preferably the form made by Messrs. Rudge and Co., of Coventry, represented in the cut. We understand that the side bars of the camera and the adjustable stand as attached to the steering handle, have been made the subject of a patent claim by Messrs. Cussons.



THE GLASS HOUSE—HOW TO DESIGN, CONSTRUCT, AND FURNISH IT.

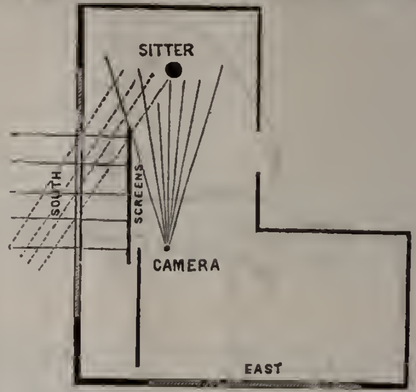
Chapter I.—Glass Houses, Old and New.

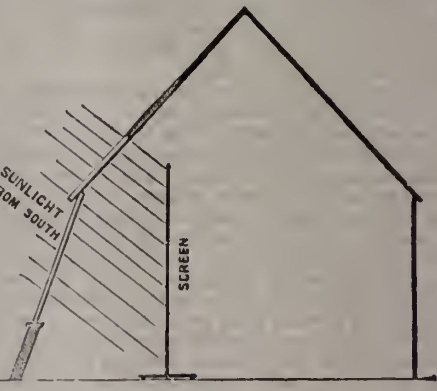
The very foundation of portraiture, whether as an amusement or as a profession, is the glass house, and the circumstance that good portraits are occasionally made without the protection and control over the result afforded by the glass house, detracts nothing from the general truth of the position that a glass house is an essential for the portraitist. Without it, the worker is completely at the mercy of wind, rain, and cold; but with a properly constructed and fitted studio, the photographer may not only defy the fury of the elements, but he may work with equal certainty whether it be night or day.

What shall be the height of the studio I am about to contruct—how broad, how wide, what its aspect, what kind of framing, glass, and construction? All these are questions which the photographer asks himself when he is about to construct his glass room; but how difficult they are to answer! Apart from the fact that the views of no two persons as to what is required in a portrait can be expected to exactly coincide, it very often—indeed, generally—happens that circumstances limit the choice of the photographer. He may have to construct his studio on a plot of ground shaded on the very side from which he would like to draw his main supply of light, or he may have no choice whatever as to the aspect of the side lights.

In order that the reader may have, as it were, a synoptical view of those conditions which the practical experience of the best photographic portraitists has proved to be adapted for studio work, it is proposed, in the first place, to give illustrations of those forms of studio which practice has proved to be specially good, notably bad, or moderately good, and to accompany these illustrations with just sufficient descriptive text to elucidate their principal points. A study of these examples will enable the photographer to determine upon a form not only suited to his requirements, but also adapted to such conditions as he may be subject to. Next in order will come a chapter on constructive details; and after this, other points relating to the glass-room will be treated of.

Blanchard's Glass House Lighted from South and from East.—The subjoined block shows a horizontal section of a studio constructed by Mr. Blanchard, where the only light available was from the south and from the east. The black lines show the opaque portions, the shaded portions represent rough glass, and the unshaded portions, opposite the word "south," show the position of the clear glass. The dotted lines may be taken as representing the sun's rays at noon; the sunlight being cut off by screens which can be moved about on castors, the arrangement of these being perhaps better shown by the subjoined vertical section taken through that portion where the clear glass is situated.

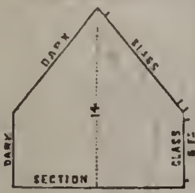


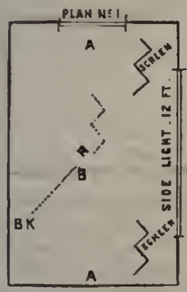


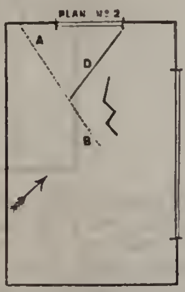
Mr. Blanchard speaks highly of the capabilities of this glass house, and the work produced in his sunlight studio fully bears out his words. It need scarcely be said that either the south light or the east light may be used according to requirements, and the screens must be shifted according to circumstances.

A Glass House Designed by Mr. Samuel Fry.—This is shown in section and in plan by the following sketches, and but little explanation is needed. No side blinds are used, but in their place two lofty folding screens, as shown on the ground plans. These are made of a light frame-work, and three folds are covered with dark-green tammy, while the other fold is covered with book muslin; but spring roller blinds cover the upper light. Mr. Fry says:—

"One of the points to which I gave most attention in the building of this room, and which has turned out in every way successful, was to have complete means of working out a number of variations in shadow on Rembrandt pictures. Look at ground-plan No. 2. At the north end, in the dead wall, is a window of ground glass. When at work at fully lighted pictures, a large background, on a frame and castors, covers this up; but when I wish to do a Rembrandt of the now popular kind, with profile and outline in vivid light, and the rest in subdued tones, this frame (D) is drawn out at the left side, the sitter is about A' and the camera on the line marked by dots. By varying the place of the sitter, a large variety of effects of most beautiful lighting are produced. Here a grey reflector is wanted for the off-side. Those who have worked at figures near a window in a sitting-room, the spectator being in the darkened end of the room, and watching the play of light on a face, and the lovely gradations, and the immense variety at command, will know what I mean. I had often felt this in a room in my own house, and determined to make in my new studio such a window. The effects obtained are just what was wanted, and the alteration of the lighting is done in half a minute. Just double the exposure is required, but if you think this objectionable, or the plan too troublesome, do not try it, for if you once begin to supply your sitters with pictures taken with this light, they will take care you are obliged to continue them.



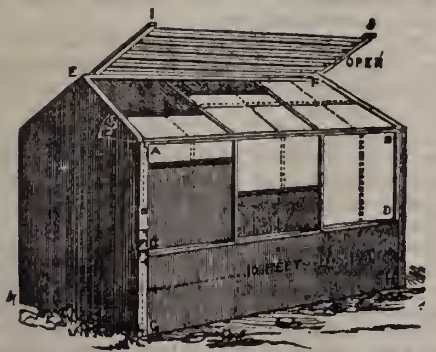




"Another kind of shadow picture, requiring no more than the usual exposure, is taken, as shown on ground-plan No. 1. The dotted screen is shown in the centre, and the sitter at B, the camera at B K. During exposure the lens must be carefully shielded, being opposite the light. The pictures produced here admit of fuller faced shadow pictures, with the details of the darker side more decided than in the other system, and without the strange outline illumination. It is suited for the *nez retrousse* and celestial, for round, plum-pudding faces, frequently giving them a grace and distinction of look that surprises none more than the possessor of the useful countenance aforesaid.

"To be able to make plain people look well in a picture, and to light up an ordinary face with animation, should be the aim of photography in good hands. Nothing does more to advance a man in the estimation of those who want pictures done than to see pictures of people they know who are shown to advantage in photographs. How can you do this, unless you possesss the means to do it by having the best possible lighting in your studio?

"In plan No. 1, as shown at A A, the sitter can be taken at either end of the room; the camera simply requires turning round. A very important point is, that in this studio there is no glare of light; thus fair complexions and blue eyes are exceedingly well given. It is rare to see in photographs the Saxon complexion adequately represented."



Heighway's Miniature Studio.—Of the foregoing illustration Mr. Heighway gives the following details:—

"A, B, C, D, represent the dimensions of the side light, five feet high by ten feet in length; A, B, G, H, being the entire side of the structure, including the three feet boarded up below the light. E, F, A, B, is the top light, having a 'pitch' of thirty-five degrees. This is designed to permit of the rain readily running off. At certain seasons of the year, when the sun attains a high elevation, its rays may intrude through the top light, and to prevent this to a certain extent, the poles E, I, and F, J, are built, on which are fitted movable seats resembling Venetian blinds, under control from within the skylight. As a substitute, a canvas may be fitted with rings running on the poles, which canvas may be hoisted or let down at the pleasure from within by means of ropes."

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A Dictionary of Photography.

BACKING OF PLATES. (*See* Halation).

BACTERIA.—Certain bacteria—as, for instance, the putrefaction bacteria—only move, according to Engelmann, in the presence of free oxygen. If these bacteria are under water in contact with plant cells containing chlorophyll, they will not move so long as they are in darkness and no oxygen is given off. On the other hand, as soon as light falls, the chlorophyll at once begins to generate oxygen, and the bacteria get into motion. Other bacteria there are, Engelmann tells us, called *bacterium photometricum*, which get into motion under no other circumstances but when light falls upon them. The animating power of the light is not instantaneous, but proceeds only after an interval, so that a certain preliminary action is necessary, as in certain photographic processes; to wit, in the case of a mixture of chlorine and hydrogen, which combines under the action of light. The animating action of the light in this case is not due to any development of oxygen. Light in great quantity, and of a constant nature, acts as a sedative. On sudden darkening, the bacteria are frightened back. An illuminated ball introduced into the fluid impels the bacteria forwards, while a brightly-lit spot in an otherwise dark drop of liquid becomes a perfect trap to the little creatures; they can get in, but they cannot get out. By directing a luminous ray into a liquid in this way, Engelmann has succeeded within a few minutes in bringing together within the space of 0·1 of a millimetre several thousand bacteria. The ultra-red rays seem to have the greatest power of animating bacteria in this way, although the tiny organisms are also sensitive to violet rays.

As regards staining bacteria for photographing, Mr. Edgar Thurston says:—

"As examples of bacteria occurring in a free state, or in fluids, I may take, from among many, the various coloured species of which colonies grow on the surface of eggs, meat, bread or potatoes; the putrefactive bacteria in decaying meat or vegetable infusions; the sputum from the lungs of a pneumonic or tuberculous person; or the blood of an animal suffering from splenic fever.

"To stain such bacteria the following mode of procedure will be found the best:—Place a minute portion of the bacterial fluid, or of a bacterial colony, by means of a previously heated platinum needle, on the centre of two cover-glasses (·004-·005), and, laying one cover-glass over the other, squeeze them gently together between the fingers, so that the bacteria are diffused over their surfaces in a uniform layer. Then slip them apart and leave them to dry. After a few minutes, pass the cover-glasses rapidly through the flame of a spirit lamp, so as to fix the bacteria on the glass. Cover-glasses so charged may be kept for an indefinite time; and if an interesting growth of bacteria is met with it is always well to reserve some specimens in this way for future reference.

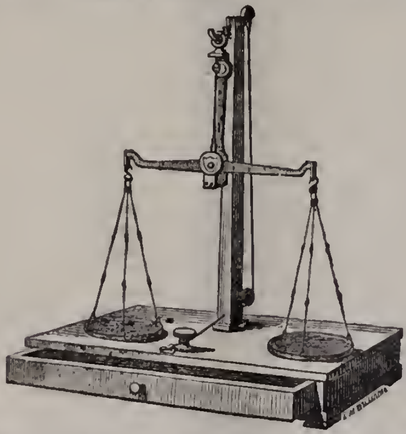
"Bacteria of which micro-photographs are to be taken must be stained with a red or brown dye, and by far the best medium is a saturated watery solution of vesuvine or Bismarck brown, which should be filtered before use. It is always best to use a freshly-made solution.

"The cover-glass, with the bacterial surface downwards, should be floated on the top of the solution, and allowed to remain there for approximately an hour, though experience will show that the time required will vary according to the specimen of dye which is used. It is then removed from the solution, washed in water, and afterwards in a half or one per cent. solution of acetic acid, and allowed to dry—or, if time is an object, pressed between folds of blotting-paper—and its surface brushed with a camel-hair brush to free it from particles of dust, &c. It is then mounted in Canada balsam, and is ready for microscopical examination. The best form of balsam for mounting bacteria is that which is dissolved in xylol, which is very easy to work with, and does not abstract the dye from the bacteria.

"Turning next to a consideration of bacteria as they occur in the organs and tissues of the body, I may cite, as examples, the various infective diseases of man and the lower animals. The organs must first be hardened by one of the numerous hardening processes, of which the one I generally adopt myself is to place the organ, or a selected portion of it, for forty-eight hours in dilute methylated spirit (1-2), and then transfer it to pure methylated spirit, in which it may be kept for an indefinite time. When it is sufficiently hardened, sections must be made by hand, or with one of the microtomes. For photographic purposes, the sections should be cut as thin as possible, for with thick sections a fogged picture will result. A perfect section, but one rarely met with, would be one which is of the thickness of a single cell throughout.

"To stain the sections, they are placed in the saturated watery solution of Vesuvian or Bismarck brown, and allowed to remain there about an hour, then washed with distilled water, and afterwards in a half to one per cent. solution of acetic acid, dehydrated in absolute alcohol, clarified in oil of cloves, and mounted, with Canada balsam, in xylol."

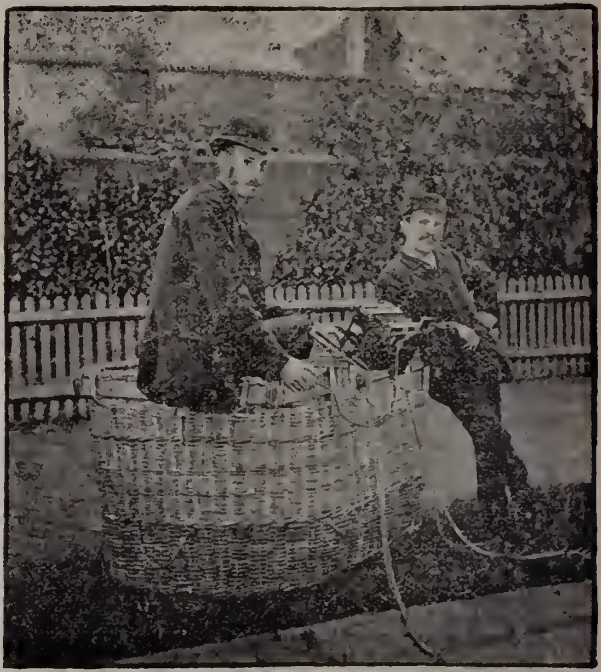
BALANCE.—For everyday work, the photographer or photographic experimentalist does not require a delicate balance such as that used by the analytical chemist, as an ordinary druggist's dispensing scales, such as is represented below, is sufficiently sensitive. Such a balance will generally indicate one-fourth of a grain, and should bear a load of two ounces.



BALLOON PHOTOGRAPHY.—Attempts to take photographs from the car of a balloon have been made from time to time with more or less success. In 1860, Messrs. King and Black made a series of very satisfactory pictures of Boston (U.S.) from a captive balloon, and about the same time M. Nadar, of Paris, did successful work in the same direction. In 1877, Mr. Walter B. Woodbury proposed an arrangement by which photographic exposures could be made from a small captive balloon, carrying no passenger, but only the camera, and the exposures are made by an electric shutter actuated by a current passing through a wire contained in the cord holding the balloon.

"The camera, with the necessary apparatus and four prepared plates, weighs about twelve pounds. It is made specially about four inches longer, so as to allow an extra space to protect the lens in case of a too rapid descent. Just above the lens, and attached to a slide that can be drawn out, is a revolving disc worked by an india-rubber spring, which will give four or more revolutions—one each time the catch is released by means of a small electro-magnet. In the upper part is an inner sliding body for focussing, carrying a drum on which are placed four prepared plates; this drum has also a spring, causing it to revolve each time one-quarter of its circumference by acting on another small electro-magnet; this brings a fresh plate into position. The instantaneous shutter is then again acted on in its turn, and so on, till the whole of the four plates have been exposed."

During late years Mr. Cecil V. Shadbolt has been remarkably successful in photographing from the car of a balloon, and the subjoined block—from a negative by H. Chubb, of Chiselhurst—shows Mr. Shadbolt's camera attached to the car by means of a clip. Mr. Shadbolt is seated in the car, while Mr. Dale, who has generally assisted in the work, is standing by.



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REFLECTING TELESCOPES FOR PHOTOGRAPHY.

BY A. AINSLIE COMMON.[*]

In the Newtonian, as has been said, the plane mirror is only used to bring the rays, that would form the image otherwise in the centre of the tube, out at the side; but as the object is not to be viewed, but photographed, the plate can be placed in the proper place to receive those images direct from the large mirror, as was done by Dr. De la Rue when he first used the reflecting telescope for photographs of the moon.

There are some difficulties in getting a proper supervision of the exposure, but these are not insuperable. A mounting for the Newtonian reflector pure and simple would be equally suitable for the Herschelian, so that if it were decided to make a large telescope, no danger would be run that success would not be certain; if the Herschelian gave such excellent results—as I think might be fairly expected—so much the better; if it did not, the telescope that has already shown its capacity would simply remain what it is now—the only telescope suitable for photography on such a scale as can be really useful.

As to the way in which such a telescope as I here contemplate—that is, a reflector of from five to eight feet aperture—should be mounted, there would be a certain safety in following the plan I have found so good with three foot, with such mechanical alterations as the use of water in place of mercury for the floating medium would render necessary. The general principles, I believe, are correct as regards the conditions that affect the performance of the telescope as an optical instrument.

The duty of the observer would now be entirely limited to seeing that the image fell always on the same place on the plate during exposure, a duty that is easily described, but not so easily done. For this purpose he must have such optical arrangements that he can from the ground watch the position of the image of a star anywhere near the object to be photographed in its relation to a cross-wire attached to, and moving with, the sensitive plate, so that if, from the many causes that can produce a shift of this star and of the image on the plate, there is a slight movement, he can at once correct it. The telescope would work entirely in the open air under the most favourable conditions, and without any disturbance from the body of the observer, as he would not be near the high end of the tube. The large mirror would be protected from dew by a slight covering round the skeleton tube, and have an apparatus to cover it up quickly, and so be in the best condition to keep its polish, and with the absence of a small mirror and its trouble at the high end of the tube, simplicity would be followed to its fullest extent without the sacrifice of one essential point.

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[*] Continued from page 76.

Such a telescope would be capable of giving photographs of all the nebulæ, with exposures of from thirty to sixty minutes, of the various clusters, and of certain selected parts of the heavens, and this should be for some years its chief work. About the value of such a work it is quite unnecessary to speak—to show that it can be done is quite enough.

In thus giving my opinion as to the best kind of telescope to use for this most important part of astronomical photography I place it first for its importance. That much could be done by a smaller instrument, or, rather, by many smaller instruments, of a most valuable character, I have not any doubt. It is quite possible now, by means of photographic lenses, to take stellar photographs that are of great value; and any equatorial reflector, and many refractors, if they have driving apparatus of fair quality, could be most usefully employed in photography, and that without any more knowledge of the art of photography than could be learnt in a few minutes; by taking photographs of a small portion of the sky that could be identified, and working entirely at that, the amateur astronomer, with any aperture over 6 or 8 inches, could make a monograph that would be good for all time, and his results would not be the mere expressions of impressions on his mind through his eye, but would be visible ones that would speak for themselves as to their value. In all departments of stellar photography, excepting of course absolute positions, I think that photography is at once available. It is remarkable that the silver-on-glass reflector has proved itself to be capable of practically unlimited increase in size, and to be so well fitted for photography at the same time that the photographic process has been brought to such a state of perfection, especially in this country, the home, if not the birthplace, of the reflector. At the present moment a gigantic stride in advance is to be made with certainty of success, and that at a cost that is insignificant compared to the results that must come. Let us hope some one who can hasten this step will come forward; if one cannot, many must, for it should not be delayed.

THE DETECTIVE CAMERA IN AMERICA.

TAKING PORTRAITS OF CRIMINALS AND OTHERS.

"Do you see that man ahead?" asked a friend, as we were strolling up Broadway, writes a New York correspondent to *The Philadelphia Times*. "Well, just keep your eye on him for a moment."

The person referred to was about 20 feet in front of us; well dressed, though in a Bohemian sort of a fashion, and was strolling along looking at the sights in the shop windows. The only thing about him at all out of the common run was the fact that he carried under his left arm a square box of rather a large size. It might have been a case of surgical instruments, for it was carefully covered with a green covering, and had quite a professional appearance.

The man strolled along leisurely, looked up at the windows, stopped for a moment to glance at the pictures in one of the big art stores near Eighth Street, then joined the throng, and kept on.

I was beginning to wonder why he didn't shift that confounded box over the other arm, when he turned suddenly, and in a very natural manner, stumbled and dodged before a tall, thin man, almost behind him. The man with the box dodged before him a moment, in the ludicrous way that is often seen on the street; then both stopped, muttered an apology, and so got clear of each other and were soon in the crowd that was surging up the street. The box, I noticed, was now under the other arm, and was carried rather carelessly. The owner seemed to have lost his interest in the stores, and was about to hail a Broadway stage and probably disappear, box and all, when my friend stepped up and touched him on the arm and said, "Well, did you get him?"

The man with the box looked up quickly, smiled when he saw who it was, then broke into a rippling laugh. I was finally introduced, and in a quiet corner of the Hotel Dam Cafe learned the mystery of the box.

"There are tricks in all trades but ours," said the tall man, lighting a cigar and watching the smoke ascend upward, ring after ring. "But I'm tired. I've been following that man you saw me pretend to run into all day. I went down town with him this morning, followed him over to Brooklyn, then back to the Jersey City ferry, and finally he started up-town, and I got him as you saw."

"What were you going to do?" I asked. "Blow him up?"

"Hardly," replied the stranger, with a laugh; then taking up the box he gave a glance around, sent the waiter to see if a man by the name of Dobbs was on the register, and quickly lifted the cover, and instead of a dynamite machine there was a simple photographic instrument known as a pinhole camera.

"Yes," continued the owner of the box, "this is a phase of the detective system, and whether I am a detective or a photographer I don't know. The latter is my profession, and I try a little of both. They tell me I have an innocent, far-away look that is quite necessary in the make-up of the detective. Yes, this machine is my idea, though I believe there are others in use in England and France. The idea is this: This little box contains the camera, and at this end there is a small round hole that closes or opens by a spring that I govern by my thumb or finger. Now, no one would ever guess what it was; but if I can get anyone in front of it and snap that spring, in the tenth of a second your image has been indelibly stamped on the plate within; in other words, it's instantaneous photography, and used whenever you want to take a man's picture without his knowing it. I try it in different ways. The man whose picture you saw me take this morning is wanted in Belgium on a charge of forgery. The authorities suspect that he is the one wanted, but as they are not sure they don't want to arrest him. In the meantime he is watched by detectives, and I take his picture without his knowing it. When I finish it up it will be sent to Belgium, and if he is the man a telegram will be sent to that effect, and he will be arrested."

"Is there much of this sort of thing done?"

"Yes, I do a good deal of it," was the reply.

"The street-dodging trick is the best. The detective on watch pointed him out to me, and the only thing I had to do was to get in front of him and get a full front view. This I can generally do by pretending to run into a man, and while we are trying to pass each other I get him perfectly, and he does not suspect it, thinking me some clumsy boor who does not know which way to turn. I have taken people in all sorts of situations. Some time ago a lady called at our office and inquired for me. She said that she believed that her husband was deceiving her, and that she wanted to learn the truth to secure evidence for a divorce. She gave me the photograph of the husband and his place of business, and I soon knew him by sight and knew his habits as well as possible. But it was necessary to have photographic evidence, so I rigged up a machine that resulted in a divorce. I found that he was in the habit of meeting the lady in the restaurant of an up-town hotel, and one day as I saw them sitting at the table I walked in rigged up as a flower-seller. I had a square board punched with holes, and my box on the other side. I walked up to the table and held up the array of bouquets so that they had to look at them, and the business was done. When the photograph was shown to the man with the woman looking at him, they say he gave right up, but he offered one of the men $500 to find out how they got the picture; that's what they say, at least.

"I have photographed people at the church and theatre. At the theatre I had a hard time on several occasions, but once I found that the man I wanted had a front seat, and I secured a position in the orchestra. There are ways of fixing these things, and I managed to get a picture distinct enough for recognition. I am also employed by artists to do perfectly legitimate work. Thus the other day I was sent for by an artist who had an order to paint a man's picture and wanted to get some photographs showing a perfectly natural expression. I followed the gentleman about all day. I took him when he had a smile on his face, as he met a friend at the L station. I got in a fresh plate and next took him as he read the ticker, from the stock exchange. I got him again in the Astor house, and, in fact, I had five or six different views before night. Another kind of business I have is to take the photographs of people who won't have them taken willingly. You would be astonished to know how many persons are superstitious about it.

Notes.

Colonel Stuart Wortley's magnificent photograph of Carnarvon Castle at low water, which forms our supplement this week, was taken with a pinhole stop; and in it we have an ocular demonstration that pictorial qualities and atmospheric effect are not sacrificed when a minute diaphragm is used.

This week appears the first of an exhaustive series of articles on the glass-house, or studio; and its inseparable associate, the dark-room.

After having given drawings and short descriptions of the glass house as designed and used by the most illustrious masters of the photographic art, we shall treat of constructive details which will enable any workman or skilful amateur to construct such a studio as he may have concluded will combine in itself those qualities to which most importance is attached.

The most approved arrangements, as regards curtains, screens, and other accessories, will be illustrated, while practical details will be given as to the most successful methods of working with artificial light. A chapter on lighting and posing will be added.

Those whose experience as regards any of these matters is likely to be of value to our readers, should communicate with us, as we desire to make our series of articles on "The Glass House" the most complete and exhaustive treatise that has yet been published.

Mr. W. Downey is, perhaps, better able than anybody else to estimate the opinion in which the various members of the Royal Family are held by the public. He has photographed nearly every living crowned head in Europe—three Sultans of Turkey, two Emperors of Russia, and the whole of the English Royal Family down to Prince Henry of Battenberg. He has been recently interviewed, and he told the interviewer that the most popular individual on the photographic record is the Princess of Wales. Of one photograph—that showing the Princess carrying one of her children on her back—over 300,000 copies have been sold. Photographs of the Prince sell pretty well, but not like those of the Princess. The photographs of the Queen are always in demand.

Apropos of photographs of the Queen, Mr. Downey says that the best one he ever took owed its success to a dog. Her Majesty wanted to be taken with the dog, a collie; but the animal was very restive, and after several failures, John Brown exercised his authority, and gave the dog a good shaking, growling out in broad Scotch, "Ye maun sit." The Queen smiled, and in consequence a happy expression was obtained.

White lead is well known to darken on exposure to the air, owing to the formation of sulphide of lead; but it is not so generally known that some samples of white lead darken perceptibly under the action of light alone, this being due to the presence of a trace of silver. Commercial lead invariably contains silver.

Captain Abney will give six lectures on the "Chemical Action of Light," at the Physical Lecture Room of the Science Schools, South Kensington, during May next. Each lecture commences at 2 p.m., and the dates fixed are May 6, 8, 11, 13, 15, 18, 20, 22. Fee for the course 10s.; application for tickets should be made at once to the Registrar of the Normal School of Science. Women may attend.

The attention drawn to the Photographers' Benevolent Association, it is to be hoped, will result in good. It is, however, useless to disguise the fact that associations of a similar kind have never been self-supporting. The Newspaper Press Fund is based on almost the same principles as the Photographers' Benevolent Association, but without the subscriptions and donations from the outside public it would long since have ceased to exist. The direct support from journalists forms but a small proportion of the receipts. What the Press Fund, with all its advantages and influence, has failed in, the Photographers' Benevolent Association can scarcely hope to accomplish. It is possible that Mr. Lambert, in his letter which appeared in our columns last week, has hit the right nail on the head, viz., the necessity for a reconstruction of the principles on which the Association is worked.

"Varnish the glass with ordinary negative varnish, and the prints will never stick." This is what Captain Abney said when others were discussing the rival merits of French chalk and wax as a repellent coating for preventing the adhesion of developed prints to glass.

Another note about working with the new rapid paper; but this time we quote Mr. Cowan. "The more you do with light, and the less you do with the developer, so much better is the picture, and so much easier the toning."

Bearing on the same subject, Mr. Warnerke makes a remark very much to the point. "When you have to print from a specially weak negative," says he, "strengthen the developer; but when working with a dense negative, use a compartively weak developer."

Photography at the Inventions Exhibition is, it seems, to be a close monopoly, and the exclusive "right" is to be put up for sale to the highest bidder. So far, the arrangements are open to some hostile criticism; but unless the executive see reason to alter their determination, a far worse feature will be introduced—the taking of portraits. For details as to the terms of contract, see page 114.

Any kind of shallow pretence that this course will give the public facilities for seeing the latest methods of working, is effectually barred by the monetary aspects—offering the "right" to the highest bidder, and not to the photographer who has really something novel to show.

To thus allow a portrait studio to be established in the Exhibition, and this without any reference to the novelty or otherwise of the processes carried on, will be to unfairly compete with photographers all through the country, and to dilute the Exhibition as far as its main object is concerned; indeed, it would be just as reasonable and fair to the tax-paying public for the "Inventions" executive to sell the exclusive right of performing stage plays, barrel-organ grinding, negro minstrelling, or tight-rope dancing.

The balloon camera is, it appears, to be used in connection with the Soudan campaign. For inflating the balloons, hydrogen gas will be manufactured at the Suakin station, and there pumped into iron cylinders 12 ft. long, and a foot in diameter. These cylinders are to be carted to the locality where the ascent is to made, and it is estimated that twelve will contain enough gas for one balloon.

Can it be true that there is neither a dry plate maker nor a manufacturer of photographic mounts in the whole of Ireland? A correspondent writes from Dublin assuring us that there is neither.

"A few years ago it cost from $2·50 to $35 to obtain a copy of the drawings of a patent; but under the system of photo-lithography now adopted, the office can supply copies of patents, with perfect reproductions of the drawings, at nominal cost—one-fourth of a dollar when single copies are wanted, or ten cents when twenty or more are ordered. The expense of producing photo-lithographic copies is more than paid by the proceeds of the sales." So writes the United States Commissioner of Patents in his report for 1884.

In a lengthy criticism on Messrs. Philimore and Dexter's "Dickens Memento," an interesting little book, containing much curious matter relating to great novelists' work, the *Pall Mall Gazette* points out that no mention has been made in the "Memento" of foreign editions and reproductions. "Most of the Phiz and Cruikshank plates have been copied, not reproduced," says the *Pall Mall*, "in America, and on the Continent;" a statement which is scarcely accurate, as some time ago we had an opportunity of seeing an Amsterdam edition of "Oliver Twist," the plates in which had been reproduced by photography. The size of the copies was much smaller than the originals, four pictures being placed on a page.

The only photograph of George Eliot is not a flattering likeness, and it may be thought that the great novelist was not exempt from the excusable weakness, which many plain people possess, of objecting to photography because it is too truthful. A passage in one of her letters in her recently-published "Life," however, shows that the truthfulness of photography constituted, in her opinion, its superiority. In writing of a photograph of Dickens, she speaks of it as a "satisfactory refutation of the keepsaking, impossible face which Maclise gave him, and which has been engraved in all its odious beautification." The wholesome hint conveyed in these words is one that should be borne in mind by those phographers who go in for excessive retouching, and consequent "odious beautifications."

Patent Intelligence.

Applications for Letters Patent.

2142. Alexander Cowan, 36, Porchester Terrace, Bayswater, London, for "The exhibition, change, and dissolving of pictures in the magic lantern."—17th Feb., 1885.

2205. Charles Groombridge, 68, Fleet Street, London, for "A method of, and means or apparatus for, regulating admission and exclusion of light in photographic cameras, microscopes, telescopes, magic lanterns, and other optical instruments."—17th Feb., 1885.

2241. Frederick Woodward Branson, 33, Chancery Lane, London, for "Improvements in photographic shutters."—18th Feb., 1885.

2265. David Hoyles Cussons, and William Tulliffe Turner, 79, Bold Street, Liverpool, for "Attaching a photographic camera to a tricycle for use in out-door photography."—19th Feb., 1885.

2285. Joseph Goodby, 7, Staple Inn, Middlesex, for "Improvements in frames for mounting or framing photographs and pictures."—19th Feb., 1885.

Patents on which the Fourth Year's Renewal Fee of £10 has been Paid.

775. C. D. Abel, Loiseau, &c., "Opera and field glasses, applicable as photographic apparatus."

Specifications Published during the Week.

2981. Walter Bentley Woodbury, of South Norwood, in the County of Surrey, for "Improvements in methods for producing blocks by means of photography."—Dated 8th November, 1884.

My invention relates to surface by the aid of which typographic prints may be obtained in the ordinary printing press, and it has for its object more especially novel methods of giving to photographic negatives or positives the necessary qualities to produce from them such surface printing blocks. These qualities have usually been obtained by breaking up the continuous half-tone of the negative or positive, produced in the ordinary way by photography, into a series of lines, simple or crossed dots, or grains similar to that produced by a lithographic stone, or by effects similar to network or gauze. From negatives or positives so produced, printing blocks have heretofore been obtained either by making reliefs in the well known way, and pressing such reliefs into the surface of metal, or by transferring impressions to zinc and then etching, also by exposing negatives so produced over a sheet of zinc covered with a substance having the property of becoming insoluble by the action of light, such as bitumen, or gelatine and bichromate of potash, and after removing the soluble parts, etching parts left bare. These processes are and have been for some time in ordinary use, and my invention consists more especially in new or improved methods for the production of negatives or positives suitable for the purposes above described.

In order to put my invention in operation, I procure a series of negatives or positives from such objects as fine ruled lines, netting, gauze, dots, or a print from a plain stone. I use these as "resist," from which I make in the ordinary way what is well known as a carbon transparency, and I transfer the same by the ordinary method to the negative or positive, and by then washing away the soluble portions I give the necessary qualities. Or sometimes I make a photo-lithographic transfer, and I transfer the same to the negative or positive, and if sufficient density is not obtained, I dust bronze or other opaque powders over the image, so increasing the force.

In another method which I sometimes adopt, by means of what is known as the dusting process, I coat a sheet of glass with a compound of gelatine or albumen, grape sugar, and bichromate of potash, and after exposure under a negative or positive I sift over it suitable granular powders, or the material used for flocking paper, thus producing a grain negative or positive suitable for the purposes already described, or I coat a negative or positive with the same solution, and I treat it in the same way as plain glass. Or sometimes, by means of what is well known as the Woodbury process, I make a relief image from the combination of negative or positive and any of the various resists mentioned, and having obtained a suitable relief image by any of the above mentioned processes, which as hereinbefore explained are well known and to which I make no claim, by rolling or other convenient pressure I make a reverse relief of the same in a sheet of fine cardboard to which has been attached a sheet of transfer paper, and this image I ink ever carefully with an ink roller and (after detaching the transfer paper, which may be temporarily attached to the card by means of india-rubber solution) I transfer in the ordinary way the image so produced to zinc or other metal or material for etching or to stone for lithographing.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is :—

1. The method of producing a printing block by transferring a suitable carbon transparency, obtained from "resists" having grained surfaces of the kind described, to a negative or positive, substantially as described.

2. The method of producing a printing block by dusting a suitable powder or material upon an ordinary photographic negative or positive, substantially as described.

3. The method of producing such negative or positive by dusting a suitable powder or material upon a film sensitive to light, substantially as described.

4. The method of producing a printing block by pressing a relief photographic image into a sheet of cardboard having a sheet of transfer attached to it, which sheet of transfer paper, after having been inked, is removed to a metal or other surface, which is then etched, substantially as described.

4594. Joseph Brown, of 43, Halsey Street, Cadogan Square, Chelsea, Gentleman, for "Improvements in obtaining printing surfaces by photography."—Dated 8th March, 1884. (*Complete Specification.*)

The following description of the process by which I effect the objects of my invention will clearly illustrate the *modus operandi*, which is as follows :—Having first selected a hand drawing, print, engraving, or photograph, which it is the intention, by this process, to reproduce on a flat or other surface of steel, iron, copper, zinc, brass, bronze, and the more precious metals, I then prepare a solution of some suitable gum, to which is added bichromate of ammonia or potash, in the proportions, as example, of about ⅔ of the gum to ⅓ of the bichromate of potash or ammonia ; these quantities would vary in accordance with the temperature at the time of operating. In certain cases, it may be advantageous to add to these ingredients albumen, or fine soap, in the proportions of about 5 per cent. to the other ingredients. I then procure either a plate or a cylinder of any of the metals referred to, on the surface of which I apply my solution, which has the effect of sensitizing it, and rendering its surface sensitive to the action of light. I next take the selected drawing or photograph, and place it face downwards on the sensitized surface, and then submit the whole to the action of light, and by this means have the image transferred or imprinted on the sensitized surface of the gum sensitizer on the plate's surface. I now proceed to develop this picture by means of either a dabber or a roller with a bituminous or acid-resisting varnish ; after which the plate is immersed in a bath of either spirits of wine or methylated spirits, which has the effect of disintegrating all those parts that have not been affected by the light, whilst, at the same time, hardening or coagulating those parts that have been so affected. The plate in this condition is now ready for the action of the various mordants to which it is submitted, and which may be either by electric action, or any acids ordinarily employed, and suitable to the metal to which they are applied, the action of the mordant being allowed to operate until the requisite depth has been bitten into the plate.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:

1st. The process herein referred to for the reproduction of hand drawings, prints, or engravings, such process consisting essentially in the method of sensitizing a flat or cylindrical metal surface, by means of a gum sensitizer composed of a solution of suitable gum, to which is added bichromate of ammonia or potash in the proportion of ⅔ of gum to ⅓ of the bichromates, such quantities varying in proportion in accordance with the temperature at the time of operation, adding to these ingredients, under certain circumstances, about 5 per cent. of albumen or fine soap.

2nd. The method of developing the drawing, print, or engraving, by the application of a bituminous ink or varnish, and the further development of the same by means of spirits of wine or methylated spirits.

3rd. In the method of mordantizing the plates, surface, or surfaces, as and for the purposes herein set forth in combination with the other parts forming the claim.

5686. William Robert Lake, of the firm of Haseltine, Lake, & Co., Patent Agents, Southampton Buildings, in the County of Middlesex, for "Improvements in frames for stretching paper for photographic purposes."—Dated 29th March, 1884.

A complex arrangement by which a frame is made to expand by causing the mitred joints to gape. The claiming clauses of a somewhat long specification are as follows :—

First. The extending frame, constructed of suitable flexible metal, for stretching sensitized papers or photographic pellicles, and comprising a cross-piece with bulged branches and bands, in combination with clamping pieces, moving upon the hinges, and with latches, for firmly pressing the said clamping pieces upon the paper, substantially as described.

Second. An extending frame provided with strips having only one hinge parallel to the joint, and with latches, placed at the end opposite to that at which the said hinge is secured.

Third. The extending frame provided with a bulged cross-piece, for separating the bands, the latter being provided with points for fixing the paper and causing it to stretch by the pressure exerted upon the branches when the extending frame is inserted in the frame or slide.

Fourth. The arrangement of the bolt, or of the pins, placed upon the bands, for the purpose of preventing the warping of the bands of the extending frame under the strain of the branches, substantially as described.

The frame above described for stretching paper by pressure exerted in the direction of the thickness of the said frame.

Patent Granted in America.

311,463. Myron T. Baldwin, Chicago, Ill. "Photograph-burnishing machine."—Filed July 31, 1884. (No model).

The claims refer mainly to means of heating the apparatus.

◆

PHOTOGRAPHY IN ONE LESSON.

Photographer photographing. To him cometh amateur with "our five and twenty shilling apparatus complete" under his arm.

Ama. "Good morrow, Master Photographer ; is there anything worth taking hereabouts ?"

Pho. "Aye, but thou must not be impatient. We must first compose the picture, and photograph it afterwards."

Ama. "Surely that newly-tarred fence and lime washed gate would come out well ; I see them bravely."

Pho. "Thou hast a quick eye, friend ; we will begin with them."

Ama. (*From under the focussing cloth.*) "But tell me, master, how is this ? I see them upside down."

Pho. "Indeed it is so, but with that thou needst not trouble. Wilt now proceed to focus ?"

Ama. "Focus? The term is new to me. What is focus ?"

Pho. "Focus is—but worry not thyself with focus; see—I have gotten the picture on thy screen."

Ama. "Yes, indeed, it is the self same fence and gate. The picture, then, is made, and nought we have to do but to the dark room hasten."

Pho. "Nay, not so; the plate must be exposed."

Ama. "The plate ?"

Pho. "Aye ; didst not thy outfit, all complete, include the plates ?"

Ama. "I know not. 'Tis true there was a parcel which, on opening, I saw six squares of glass discovered to the light of day."

Pho. "Oh, rash misguided youth! Those *were* the plates. No matter. I have one here within this slide concealed."

Ama. "Oh, master kind! Then do we ope the slide, and place the glass the camera within ?"

Pho. "By no means ; that would spoil the plate. Take heed of all I do. The screen I now remove, and substitute the slide. See, with this small cap I cover up the lens. The shutter of the slide withdraw—the cap remove—so—'tis done."

Ama. "Nay ; but thou hast not the picture."

Pho. "Marry, but I have. Come, hie we to the darkened chamber." (*They hie.*)

Ama. "'Tis woeful gloomy. Why close the door so fast ?"

Pho. "It must be so—the reason matters not to you, who only want to take the picture."

Ama. "Truly that is so. With dreary science I have nought to do."

Pho. "Watch now. This little bath thou mays't have seen before."

Ama. "Aye, at sixpence ha'penny each they're sold."

Pho. "Thou hast a memory rare. I take this bottle then, and from it pour a thimblefull or two of stuff."

Ama. The developer, is't not ?"

Pho. "Thou'rt right."

Ama. "Of what is it composed ?"

Pho. "Nay, thou askest too much. 'Tis sold in shilling bottles. Why burden thy poor brains with formulæ and chemicals ?"

Ama. "Bless thee, master, thou hast saved me. Verily, I care not for such things. The photograph alone is what I want."

Pho. "See, now, I pour the stuff into the little bath ; therein I place the plate which I have gotten from the slide."

Ama. "You agitate the bath ; why so ?"

Pho. "Ask me not foolish questions ; I agitate it 'cause it must be agitated. The picture now appears."

Ama. "It may be so, but 'tis all dark to me."

Pho. "Thou'rt impatient, friend. Ah! 'tis done. To wash it now 'twere well."

Ama. "And why ?"

Pho. "Because it must be so."

Ama. "But thou plungest it in stuff ?"

Pho. "Aye, aye, it is the fixing stuff. More thou need'st not know. Ope the door, I prithee."

Ama. "And may I take the plate in mine own fingers ?"

Pho. "Thou mayst. On paper white it lies."

Ama. "Oh, marvellous! there is the fence, and there the gate. But stay, the gate I see is tarred, the fence whitewashed. The white is black, and black is white."

Pho. "It is, indeed, but trouble not. When printed, you will see it as in nature. But now depart, for pupils more I have. Go then, and photograph, for I have made thee perfect."

Ama. "It is, indeed, a simple art, and I marvel greatly where the difficulties lie. Why in one lesson, as thou promised me, I've learnt the whole! Oh, let me hasten home and photograph my friends."

(*Hastens home to photograph his friends.*)

HOW TO DEVELOP LANDSCAPES UPON DRY PLATES.

A Method of Treating Plates whose Time of Exposure is Unknown.

BY DR. H. W. VOGEL.

In my letter concerning my travels in America, I have spoken of the preference the American photographers show for the pyro developer over the oxalate. I have frequently thought over the matter, and asked myself the question, "Now has this pyro the advantage of the oxalate in developing dry plates?" I will confess that I do use the pyro more since my journey than before. Pyro, indeed, has an advantage in working more rapidly, which is a desideratum to the portraitist, who is anxious to know at once the result of his sitting. Moreover, with the Americans, the old saying, "Time is money," has its full meaning, of which we slow Germans have no idea ; but it is doubtful whether, on the other hand, with pyro, the same beautiful gradations can be obtained as with oxalate. There is another drawback to its use, which the oxalate does not have, namely, the formation of green fog. True, this green fog may be removed very easily with a solution of iodine (1 to 1,000), or 1 grain of iodine, 4 grams of iodide of potassium, and 1,000 c. c. of water, in which the plate is laid until the green veil becomes yellow, then fixed and carefully washed. I have, by using this plan, saved all my plates which were affected with this green pest. But this operation, though easily accomplished, might as well be dispensed with, requiring, as it necessarily does, some expenditure of time, for, with the Americans, "Time is money."

On developing my American plates, I worked upon the supposition that I did not accurately know the times of exposure. I could not definitely say whether a certain plate had been over or under-exposed. I therefore proceeded as follows :—

The plates were first of all laid in a solution of 150 c. c. of neutral oxalate of potash (1 to 3) and only 5 c. c. of iron (1 to 3), and the appearance of the image watched for.

If the outlines of the image began to appear in about a minute and a half, the exposure was considered right.

They were then left in the bath, while a second bath was prepared ; 150 of oxalate of potassa, 10 of iron. Number 1 was placed in this, while a second plate was put in the first bath.

In bath No. 2 the second plate was allowed to develop further.

When it was found that no further detail could be got from the second bath, it was put in a third : 150 oxalate of potassa, 20 of iron. This was sufficient generally to develop the plate fully.

Now, as regards the treatment of under-exposed plates.

Two or even three minutes was often not enough to bring out even the high-lights in No. 1. They were placed respectively in Nos. 2, 3, 4, and allowed to finish in the latter.

If the plates came up very rapidly in No. 1, they were immediately transferred to a bath of the same strength, to which from five to ten drops of bromide of potassium were added. The development was in this way retarded, and a plate of sufficient intensity produced.

The baths were always strengthened after three or four plates had been developed therein, or a new bath made.

In this manner the plates were developed slowly and regularly ; sometimes a half-hour elapsed before a plate left the final developer. They were usually intense enough, and rarely needed any strengthening. Some, however, did need a little doctoring. I remember some of the plates which I had taken in the high plains of Arizona and New Mexico. I had given them an average exposure of seven seconds with the smallest stop, an exposure which had been shown to be correct for some negatives taken upon the Northern Pacific Railroad, but at this elevation the exposure was too long, and the plates, as a matter of course, were over-exposed.

It is, therefore, true, as Bunsen has shown, that the actinic force is greater in high altitudes than upon the sea level, but I had no idea the difference is so great.

Over-developed plates I subjected to the process of reduction with iodine already mentioned. I cannot, however, recommend the cyanide of potassium. The reduction is more under control with the former. The plates are laid in a solution of iodine and iodide of potassium, recommended above for the removal of green fog ; they are then put in the fixing hypo, by which the iodide of silver formed is dissolved. If they are not clear enough, repeat the process.

Finally, you will perceive that the negatives give perfectly clear shadows. If they look thin, strengthen them with bichloride of mercury and ammonia.

The atelier photographer may laugh over the amount of pains to save a badly-exposed plate, but he forgets that he does not have to travel miles and miles to secure his object. The amount of labour expended upon anything increases its intrinsic value, if not its exchangeability. The portraitist, when he has made a bad negative, need only turn smilingly back to his subject and say, "You have slightly moved; I think I can improve it by another exposure."

And we try, conscientiously, all in our power, to get what we can from our plates. A skilful amateur, present during my development, was astonished that I should devote so much time. But patience is a virtue of our race.—*From Photographic Mosaics, as reprinted in Anthony's Bulletin.*

Correspondence.

LENSES FOR SMALL PICTURES FOR SUBSEQUENT ENLARGEMENT.

Dear Sir,—I regret to find that I did not make my meaning quite clear. My hobby is the perhaps Utopian idea of ultimately making such a "pocket set" as can be carried in an ordinary coat pocket when on ordinary business, with a dozen plates in six double slides, and at the same time be sufficiently rapid for use on the most instantaneous subjects, and yet define well, also evenly illuminate well enough to stand enlarging up to at least 15 by 12 inches. I should like for this purpose the wide-angle single, on account of its even illumination, which, strange to say, has been my greatest stumbling block when trying enlargements of 15 diameters; but it has not been rapid enough for me. Next, I would use the wide angle rectilinear or symmetrical; but here again I have not found sufficient speed, and my present "rig" is Dallmeyer's patent stereographic, stopped down to about F 12 or F 14; thus practically using a length of focus of 5 inches for a plate of 2½ by 2, which in my case gives a picture of 2¼ by 2. But, sir, this is very cumbersome, and none but a picture- or process-mad enthusiast will make it an inseparable part of himself. Hence I suggest that ventilation in your columns may possibly be of use to many more than myself. In my case I use the apparatus from a railway carriage window, or in almost any other way; and I prefer for focussing a simple telescope fixed on the camera, as described by me in the Year-Book for 1884. In fact, I often use it held in the hand up to the eye; but —don't laugh at me, please—although I have worked at it for many years, being probably one of the earliest of the gelatino heretics, I have very few pictures (!) on the many thousands of plates I have exposed that I would care to expose to the eye or the tender criticisms of any artistic friend (if I had one). But, sir, *nil desperandum* has done much for both the "brass and glass" and the "artistic" men amongst us, and I don't hesitate to trust myself to our brethren, from whom I hope to get some valuable suggestions.—Thanking Mr. Wheeler for his contribution, I am, yours truly, Richard Parr.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

Dear Sir,—Those who have watched the career of the Photographers' Benevolent Association from its inception till the present, cannot do otherwise than sympathise with Mr. W. S. Bird, and will, I trust, assist him in his endeavours to build up an institution thoroughly worthy of the present generation of photographers.

That only meagre support has so far been afforded to Mr. Bird and his colleagues, is a noticeable and a published fact, notwithstanding that for more than a dozen years some of these gentlemen have exercised their energies towards benefitting their fellow man.

If the fraternity have been viewing their project in the light of an experiment, then Mr. Bird and those who assist him are justified in asking photographers of every grade the simple question: "Will you support us, or not?" If the answer is given in the affirmative, then success is certain; on the other hand, if it be shown that the present mode of dealing with the funds would be distasteful, were the society's operations conducted on a wider basis, then, as Mr. Bird truly pointed out, the matter rests entirely with those concerned.

Photography is by no means of less importance than many other scientific pursuits, and I am not at all sure that skilled labour meets with higher remuneration than it does in many of the arts requiring both judgment and skill equal to that expected from photographers. The standard of technical excellence is being continually raised, and the clever photographer of twenty years ago—or even ten—may not possess the ability befitting a similar position of to-day. Under these circumstances it behoves us to do our duty towards our older brethren who may have fallen by the way, since any little kindness shown in this respect is but a just recognition of talent bequeathed to ourselves.

Regarding Mr. Lambert's proposition to "make the Society self-supporting," I desire to remark that such a point has been achieved, according to the Secretary's statement, the ordinary subscriptions being equal to the outgoings.

To transform the existing Society—limited though it may be—into a sort of Slate Club, would not worthily carry out the wishes of those who have sustained the fund for so long; neither could such an arrangement perform the benevolent intentions of the entire profession in a manner satisfactory alike to donor and contributor.—Yours faithfully, W. M. Ashman.

Dear Sir,—I beg to offer a few suggestions as to extending the above Society:—

1. That the Association be formed into a benefit society, whereby, when sickness overtakes a member, he may reap some temporary aid from its funds.

2. A meeting of photographers to be called in all towns to ascertain the opinions of employers and their assistants, with names of those guaranteed to join, providing it becomes a benefit society.

3. After this is done, and the whole of the reports sent to its present officers, I think they would be able to start a thorough benevolent society—one that would aid its members in sickness and distress—on a firmer basis and with a wider scope than the present one.

In each town of importance a committee could be formed to carry out the arrangements. The whole of the contributions could be forwarded to London as usual, and could almost be worked on the same lines as the "Hearts of Oak" Society.

I think, also, that if an appeal were sent to a leading photographer or two in each town, they would gladly give their assistance in the matter.—Yours respectfully,

An Operator.

HONEST AND DISHONEST ADVERTISEMENTS.

Sir,—The heading of my letter doubtless sounds strange in the virtuous ears of your highly respectable journal; perhaps you will be good enough to allow me space to briefly explain the choice of such a subject for communication. Example of a tolerably honest advertisement:—

"Wanted, first-class photographs, portraits, cartes and cabinets, for show case. Address, &c."

Here, the advertiser's meaning is clear and straightforward. For a certain article I will pay cash. It is not the vendor's business to trouble himself about the use the purchaser makes of goods sold to him, therefore I contend that so far the above advertiser bears the stamp of an honest man.

Example of the (frequently) dishonest advertisement:—

"Wanted, first-class operator and retoucher; none but thoroughly experienced men need apply. Address (*by letter*) with *specimens*, carte of self, and references, to A. B. C., Photographic News Office, Castle Street, Holborn."

I do not by this infer that all advertisers who use your estimable office to cover an address are rogues. Many do so very reasonably because it is not pleasant for Mr. A to let Mr. B know he is about changing his staff; but the just convenience of honest men unfortunately also provides a cloak for knaves. Here is an experience. The believing operator applies, sending his best specimens (which he cannot now replace, being out of situation), and waits reply. Waiting results in further writing, and no reply to any letter, or redress for the robbery he is the victim of.

If one goes personally to the office before writing, and asks for the name and address of advertiser, a courteous reply is given to the effect that the office address is used for secrecy, and therefore it must not be told.

With such facilities for obtaining samples of work executed by other hands, it is little wonder that employers bitterly complain of many men being quite incompetent to execute work in accordance with the results shown on engagement. Doubtless the question is a difficult one to both sides. Without specimens, how is an employer to judge? And yet the risk of losing valuable samples of one's *bona fide* work is very galling to an operator.

Personally, I am about trying a new point in this question. Having lost some specimens recently, I am putting the police of a certain town on the track, and if impossible to establish a case of "obtaining goods under false pretences," shall try to sue on "illegal possession" of my property. Everyone knows that no firm of any standing does these tricks, and I therefore advise all assistants to be very shy of sending specimens to initials or anywhere before being satisfied as to the name and address of the advertiser. Our honest advertiser, who will pay to fill his show-case with good work, is an exception not often seen. Men who want specimens call them "First-class operators," and thus rob in the meanest and most contemptible manner real workers who foolishly trust their dishonest advertisements.

I hope, sir, that in the interest of the vast number of assistants who support your valuable journal, and derive great benefit therefrom, you will be able to devise some practical means of eradicating this heartless system of perfidious robbery.

I beg to enclose my card, and remain, sir, yours obediently,
AGITATOR.

[We are informed by our Publishers that in future, when undertaking the receipt of replies to advertisements, they must be entrusted with name and address for revelation to applicants in case they may deem it necessary.—Ed. P.N.]

Proceedings of Societies.

Photographic Society of Great Britain.

The monthly technical meeting was held on Tuesday last at 5a, Pall Mall East, Captain W. de W. Abney in the chair.

The **Chairman**, after alluding to the advantages of informal meetings or social gatherings, invited Mr. Cowan to exhibit and explain his newest invention in lantern slide carriers (see p. 131); but Mr. Cowan said that the original apparatus had been taken to pieces for alteration, but that he would exhibit it at the next meeting.

The conversation then turned upon the new development paper, and Mr. Warnerke gave some interesting particulars. Citrate of iron developer is, according to Warnerke, certainly equal to the oxalate, but the excess of citric acid present should not exceed 5 per cent. of the whole. Under these circumstances it is quick as oxalate. Mr. Warnerke had occasion to print 700 impressions for one negative, and he had brought the batch of prints with him. He used an ordinary printing-frame, and gave five seconds' exposure, and he found that one complete operation with the frame could be gone through in half a minute. In twelve hours he completed three hundred prints, all but the final drying. He not only did this without help, but, in spite of many interruptions, very little variation in tone was noticeable in looking through the bulk, although some prints were a little darker than others. Mr. Warnerke had found hot rolling to give an excellent surface, but it is essential to make sure that the prints are perfectly dry.

The **Chairman** said that he had found a highly satisfactory way to prevent adhesion to the glass when prints are squeezed down on this material; it being merely necessary to coat the plates with negative varnish.

Mr. **Ince** detailed his experiences on enlarging on the rapid printing paper.

The **Chairman** exhibited some impressions made by the solar spectrum on the rapid printing paper of commerce, and the intensity of the action in the ultra-violet region showed one sample to have been made with chloride, while another sample was as evidently prepared with bromide as a principal constituent. Some citro-chloride paper prepared by the Chairman, and which gave equally good results for printing out or by development, showed a maximum of action well inside the visible part of the spectrum, and would consequently be well adapted for working by gaslight.

Mr. W. **Bedford** made some remarks confirming Mr. Debenham's recent observations as to the influence of long development on the colour of prints made by the new method (see p. 98). The exposure only controls the colour indirectly, by allowing a longer stay in a given developer.

Mr. **Warnerke** pointed out that when prints are to be made from a weak negative, the developer should be strengthened, and *vice versâ*.

The **Chairman** said that his experience coincided with this view.

A long conversation upon mercurial intensification then took place, in the course of which the Chairman referred to the protective action which varnish exercises in the case of a collodion negative intensified with mercury; and Mr. Arnold Spiller said that he had found it advantageous to add a little hydrochloric acid to the mercuric chloride solution (see page 69).

Mr. **Warnerke**, reverting to the subject of the rapid printing paper, said that a recently developed print could be transferred to a sheet of ordinary paper. The wet gelatine surface is pressed into contact with a sheet of dry paper, and after a short time the paper backing can be stripped off; immersion in warm water being necessary in some instances.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 19th inst., Mr. A. L. **Henderson** in the chair.

Mr. A. **Cowan**, since the previous meeting, had—with a view to test the value of perchloric acid for the purpose recommended by Mr. Debenham—made two emulsions, one of which contained a small proportion of perchloric acid. Both emulsions gave perfectly clear shadows, and the only difference he (Mr. Cowan) could find was a slight loss of sensitiveness in the batch containing perchloric acid; the plates registered two numbers less on the sensitometer than the other batch.

Mr. J. B. B. **Wellington** had also tried it, and found some of the silver was precipitated; the colour of which was reddish.

The **Chairman** found a considerable quantity of the silver precipitated in a flocculent state, which did not redissolve when as much as an ounce of strong liquid ammonia was added; 240 grains of nitrate being employed in the experiment.

Mr. W. E. **Debenham** thought the slowing action spoken of by Mr. Cowan was rather due to extraneous matter than the addition of perchloric acid; he had never found it to slow an emulsion, but rather tended the other way. He still thought the Chairman might have dissolved his precipitate had he used more ammonia.

Mr. W. K. **Burton** said he could not say perchloric acid would prevent green fog, because in the batch he made there was no means of knowing that the fog would have been present had the acid been absent; he added 3 drops to each 100 grains of silver nitrate, and had a perfect emulsion, about the speed of ordinary commercial plates. In reply to the Chairman, he said the speed would be 18° on Warnerke's sensitometer. The emulsion was boiled twenty minutes, and he had noticed that extreme sensitiveness was obtained with less boiling than formerly, probably owing to some change in the gelatines now used.

Mr. J. **Barker** mentioned a case of green fog on a developed paper print, and passed round a plate badly fogged through being kept in a dark slide coated with black varnish.

Mr. A. **Mackie** said it was possible to keep plates a long time in dark slides before development, and instanced developing perfect negatives upon plates which had remained four months in the slides.

Mr. BURTON alluded to the darkening action wooden rollers caused to sensitised paper when left in contact only a few hours, and attributed it to a partial reduction of silver by the fumes of turpentine emanating from the wood.

Mr. COWAN exhibited and explained his new lantern slide carrier, which, besides possessing the necessary mechanical means of passing the slides through the lantern, was also automatically arranged to raise a curtain during the period of change, a new picture appearing upon the screen on withdrawing the curtain.

The following questions were then considered:—"What is the best colour to stain microscopic sections with, if it is desired to obtain considerable contrast?" "How many changes of water at 120° F. are necessary to remove all the hyposulphite from an albumen print?" "Can anyone give a good formula for rapid printing other than Mr. Wellington's, published in the NEWS?" "What is the longest period ferrous oxalate developer can be kept, and still give satisfactory results?"

Mr. A. J. BROWN said that in staining microscopic sections, they would be found selective, some for one colour, and some for another. For photographic purposes it was better, in many cases, not to stain the sections.

Mr. F. W. HART advocated the employment of an eliminator, and objected to the use of hot water for the removal of hyposulphite; he never exceeded a temperature of 70° F. in winter.

Mr. BURTON placed his prints into water nearly boiling, and allowed them to remain until cool.

Mr. BARKER found that an addition of Rochelle salt to a bromo-chloride emulsion on paper enabled him either to print out, or develop.

Mr. BURTON said any of the rapid papers could be printed out if previously floated on a silver bath. He found the new developing process was 1,000 times more rapid than the old method of silver printing; his experiments were carried out by means of a paraffine flame, the continued heat of which for five hours had destroyed much of the brilliancy of the print.

The CHAIRMAN thought fumed paper would have given a different result. He then spoke of the term "so many times rapid" as misleading, and recommended standard sensitometric measurements.

Mr. ARCHER CLARKE used ferrous oxalate developer continuously, adding a little fresh developer to start the action when required; he promised further information at a future meeting.

Messrs. A. G. Gravatt, T. S. Sillar, and W. H. Hyslop were elected members of the Association.

It was announced that on March 5th Messrs. Morgan and Kidd would give a demonstration on "Paper Negatives, and the Development of Gelatino-chloride Prints."

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

AN extra meeting of this Society was held on Thursday, the 19th inst., in the Lecture Room, Free Library, Willbrown Street, for the exhibition of lantern slides produced by the members during the year.

The proceedings were commenced by the exhibition of about fifty slides of views taken by Mr. J. H. T. Ellerbeck during a tour in Norway. This series of slides excited much enthusiasm amongst the numerous visitors, and one after another the wonderful fiords, mountains, and waterfalls were shown on the screen. The slides were on wet collodion and gelatino-chloride plates. Mr. Ellerbeck expressed the difficulties he had experienced in getting satisfactory results on gelatino-bromide plates with soda development, but showed one developed with ferrous oxalate that left nothing to be desired.

Mr. J. H. DAY showed a series of home views on gelatino-bromide plates, developed with the ferrous oxalate and soda and pyro.

The HON. SECRETARY followed with eight slides developed with pyro and soda.

Mr. WM. ROGERS showed an interesting series, showing the tones obtainable on gelatine and albumen plates. The exposures at two feet from the gas light varied from five seconds to five minutes; the development was by ferrous oxalate, the result in the last instance being a rich brown, with perfectly clear high lights.

Mr. BLANCHARD exhibited slides on bromide plates developed with soda and ferrous-oxalate, both being equally good.

Mr. CORNISH showed about twenty-four slides all on chloride plates, and Mr. A. W. BEER seventeen or eighteen on chloride plates, and also on gelatino-bromide plates. Amongst these exhibits there were many of exceptional beauty which elicited warm admiration.

Mr. GARDNER showed eight slides on gelatino-chloride plates which were greatly admired, both subjects and treatment being very perfect. These were followed by a series of Swiss views taken by Mr. Boothroyd, which were also greatly admired, and the meeting broke up, everyone seeming to have thoroughly enjoyed the wide range of travel, from Norway to Switzerland abroad, from Oxford to Leamington to the Isle of Man and North Wales at home. Many picturesque bits in the vicinity of Liverpool were also shown, and the slides, which were on nearly all the plates in the market, as well as on wet collodion, proved that in good hands all were capable of yielding every gradation of light and shade. Soda and pyro came well to the front, and before the meeting closed a lady visitor had entered into the spirit of the proceeding so thoroughly that she was heard to exclaim, triumphantly, "I knew that was soda," as one especially beautiful slide was shown.

CHELTENHAM PHOTOGRAPHIC SOCIETY.

THE monthly meeting was held on Feb. 12th, Col. DAWSON, C.B., in the chair.

Mr. GENHAM read some remarks on the washing soda developer; his formula for which has already been published.

In the course of discussion,

Col. DAWSON stated that he preferred potash, using six grains to each ounce of developer, with a little bromide in the summer.

Capt. AYLENER JONES, R.E., exhibited prints of a torpedo explosion, showing the different stages of the effect, taken with the phantom shutter electrically controlled, and opened at intervals of one-fifth of a second.

The chromo-photoscope was shown by Mr. PENNY.

NORTH STAFFORDSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual fortnightly meeting was held on Wednesday, Feb. 18th, the chair being occupied by Mr. F. J. EMERY, Vice-President.

In the unavoidable absence of Mr. G. S. Burgess, who had undertaken to give a practical demonstration of the working of the new rapid printing process,

The HON. SECRETARY (Mr. Allison) demonstrated the method of developing carbon prints, by producing several successful pictures upon opal. Following Mr. Allison in his explanation of the carbon process,

The CHAIRMAN gave an interesting description of the Woodburytype and other photo-mechanical printing processes, photo-engraving, &c., undertaking to exhibit specimen blocks, prints, &c., at the next meeting.

Votes of thanks to the Chairman and Hon. Secretary having been passed, the meeting terminated.

BRADFORD AMATEUR PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting was held on Thursday last, at the Law Institute. The minutes of the previous meeting having been read and approved, the President announced that £10 had been promised towards a prize competition amongst the members for the best pictures taken during the year in the following classes: landscape, architectural, instantaneous, composition subject, and lantern slide.

Mr. DUNCAN G. LAW (the President) afterwards read a very interesting paper on "Photographing in Savoy," illustrated with over a hundred 7½ by 5 prints of the scenery of the Savoy, at various altitudes, with lenses varying from 4 inches to 22 inches focus; he also showed a French pneumatic shutter by Guerry that had answered well in reproducing cloud effects. After a cordial vote of thanks the proceedings terminated.

HYDE AMATEUR PHOTOGRAPHIC SOCIETY.

THIS Society held its meeting on Wednesday evening, the 18th inst., a goodly number being present.

The PRESIDENT (Mr. F. W. Cheetham) gave a demonstration on "Toning and Fixing of Prints." The subject was handled in a masterly manner, the lecturer having prints in the various stages ready for manipulating, as the various processes were gone through. A lively discussion took place as to the great variety of colouring to be obtained.

At the close of the paper several members exhibited views which they had taken since the last meeting. Votes of thanks to the lecturer and others brought the meeting to a close.

Dundee and East of Scotland Photographic Association

A lantern slide competition in connection with this Society was held in Lamb's Hotel, Dundee, on Thursday, 19th inst., when there was a crowded attendance of members and their friends.

The prizes offered were as follows :—

1st.—One dozen selected lantern slides, given by Mr. W. D. Valentine. 2nd.—Half dozen ditto ditto, given by Mr. A. C. Lamb. 3rd.—Quarter dozen slides, given by Mr. George Lowden. The competition was open to members of the Society, and nine sets of four slides each were entered. Each member present was supplied with a voting paper for recording his marks, the maximum number which could be given to one slide by one member being 100. Those members who competed were not allowed to give any marks for their own slides. Ater the marks had been classified by the scrutineers, the following was found to be the order of merit:—

(1st) D. Ireland, 7,195 marks ; (2nd) D. Ireland, junr., 7,105 ; (3rd) A. Guthries. 6,365 ; (4th) W. Baxter, 5,628 ; (5th) P. Kerr, junr., 5.480; (6th) J. Geddes, 5,075 ; (7th) J. Jones, 4,847 ; (8th) J. Mathewson, 4,059 ; (9th) A. Simpson, 3,510. Great interest was manifested in the competition, and many of the slides exhibited great technical and artistic skill ; most of them were on Cowan's chloride plates.

After the competition was decided, an exhibition followed, to which several of the members contributed. A large series by Mr. J. B. B. Wellington, London, was shown, and the great variety of tones obtainable on gelatino-bromide excited general attention. Mr. Wellington prepares his own plates, and seems to be able to get nearly as great a range of tones as can be obtained on chloride plates ; the slides were of a very high standard of artistic excellence.

Mr. A. Cowan, of London, also sent a number of transparencies on his own plates, several of which were extremely beautiful, the tones ranging from clear blue to crimson. Great interest was taken in these slides by the members, as Mr. Cowan's chloride plates are coming into general use for transparency making.

A series of coloured slides illustrative of a tour in the Mediterranean were also lent by Mr. T. Feathers. A vote of thanks was awarded to the exhibitors.

Derby Photographic Society.

A conversazione was given by the officers and members of the above Society in St. James's Hall, on Friday evening last. About 300 were present, and a most enjoyable evening was spent. The walls of the Hall were hung with photographs, while pictures and albums were arranged on tables in various parts of the room.

Mr. J. Paget, who presided, delivered a short but interesting address, in which he set forth the importance of photography for scientific and other purposes, and of the interesting fields of study and recreation it opened up to amateurs. He expressed regret that the number of amateur exhibits was not larger on the present occasion, but intimated his belief that they would be sent in greater numbers at the exhibition of next year.

The quality of the pictures on view was exceedingly good, many of the exhibits eliciting the admiration of the company. Mr. Winter sent several of his finest examples of portrait photography, and Mr. J. W. Price, of the Babington Studio, sent very fine enlarged portraits of the late Mr. Bass, M.P., Mr. Alderman Renals, M.P., and the Prince of Wales. Mr. R. Keene, in addition to a collection of oil paintings, contributed some charming sketches of Derbyshire scenery, produced by the platinotype process. Mr. T. Scotton exhibited a large collection of photographs of M. R. engines and bridges, which attracted considerable attention.

Amongst the other exhibits, a collection of charming Russian coloured photographs, lent by Mr. Bolden, and some fine photographs of the Niagara Falls, lent by Mr. J. E. Kaye, attracted a good deal of notice.

A good collection of apparatus was exhibited by Messrs. Lancaster and Son, of Birmingham, while at the end of the hall, a gigantic camera, the property of Mr. Keene, surmounted by a very small pocket camera, and labelled "David and Goliath," caused much amusement.

Mr. H. A. Bemrose gave an exhibition of photographic transparencies by means of the oxy-hydrogen lantern, which was very highly appreciated, one slide especially— that of General Gordon —calling forth loud applause. Several names were handed in to the honarary secretary by friends wishing to join the Society.

Manchester Photographic Society.

The usual monthly meeting of this Society was held at the Manchester Technical Schools on Thursday evening, the 12th instant, Mr. J. S. Pollitt, the President, in the chair.

The minutes of the previous meeting were read and confirmed.

The Rev. H. J. Palmer and Mr. W. E. Rowcliffe were elected members of the Society.

Mr. W. B. Wood read a paper and gave a practical demonstration of the "Making of Gelatino-Bromide Emulsion and Coating Plates."

Mr. Schofield said that he had found so much variation in commercial bromides that he found it necessary always to test the emulsion with potassium chromate. He also thought that the colour of the emulsion ought always to be carefully noted, as the blue colour by transmitted light was a sure sign that the emulsion was sufficiently cooked.

Mr. Abel Heywood exhibited the results of a number of experiments made with various coloured papers for dark-room illumination, and showed several plates which had been exposed at about twenty-three feet distance from an ordinary gaslight, covered by various thicknesses of coloured tissue paper. The plates were exposed in strips during twenty-eight, twenty-one, fourteen, and seven minutes, and also during development, which was conducted at the same distance from the light, and in uncovered vessels. The developer used was pyro, Wratten's formula, with twenty drops of ammonia-bromide solution. The results were :—1. Light covered by two thicknesses of waxed yellow tissue paper, which scarcely lessened the gaslight at all ; result, clear glass for the portion exposed during development only, but a decided dark shade of the other exposed parts, commencing with a light stripe for the seven minutes', and ending with a pretty dense one for the twenty-eight minutes', exposure. 2. Light covered by the same paper as No. 1, with the addition of one thickness of waxed orange-coloured tissue-paper ; result, much the same. 3. Light covered by the same yellow paper as No. 1, but with the addition of one thickness of ruby-coloured tissue paper ; result, a scarcely perceptible difference between the two shortest-exposed strips, and the twenty-eight minutes' band being about equal in fog to the seven minutes' band of Nos. 1 and 2. In this case, the amount of light in the dark-room appeared to be very great, everything in it being distinctly visible. 4. Aperture at side of gaslight closed as in No. 2, but the lower aperture closed with a compactly-made and well-finished orange paper, about twenty-five pounds to the ream (demy size). This plate showed no stripes whatever, though the amount of light in this case also seemed great.

Mr. Cheetham exhibited his lamp for the dark-room, made to hang from the ceiling, all the light being thrown downwards.

Mr. Brothers exhibited two prints of a group of young persons taken on the occasion of a fancy-dress ball recently given by the Mayor of Salford. The children were grouped on the staircase in the Museum at Peel Park. The illumination was effected by means of four ethoco lime jets, assisted by the magnesium light, the exposure being about forty seconds, during some twenty-five seconds only of which the magnesium was alight.

Talk in the Studio.

South London Photographic Society.—At the next meeting of the above Society, to be held at the Society of Arts on Thursday, March 5th, 1885, at 8 o'clock, Mr. Cecil V. Shadbolt will deliver a lecture entitled, "Adventures in the Air : or, Balloons and Ballooning," illustrated by a series of dissolving views.

Condensation of Gases on the Surface of Glass.—Recent experiments by Mr. J. T. Bottomley show that the power of glass to condense air and other gases or gaseous mixture upon its surface, is much greater than is often supposed. Some spun glass which had been kept for some hours in a high vacuum gave off a considerable volume of air on the application of heat; but this air contained an abnormal proportion of carbonic acid, and rather more oxygen than ordinary air. A quantity of spun glass having a total surface area of 1,448 square centimetres thus occluded 0·45 of a cubic centimetre of air. Probably the occlusion of gases by glass may have some considerable bearing upon the work of the photographer.

International Inventions Exhibition. Tender for Right to Photograph.—The executive council invite tenders for the exclusive right of taking photographs in the International Inventions Exhibition, 1885, during the continuance of the Exhibition. The contractor will be allowed to take photographs of any part of the Exhibition or Gardens the property of the executive council, and to take photographs of exhibits under arrangement with the exhibitors; he will also be allowed to take portraits. The contractor will be granted two stands for the sale of photographs, the position and size of such stands to be decided by the council; he will also be provided with space in the Gallery above the East Arcade for a developing-room, and for such other purposes as may be necessary; and he will be permitted to erect and fit up a studio for portraiture in the same position if he desires it. The council will provide gas and water, but all fittings must be provided by the contractor. Electric light for the purposes of photography will be provided by the council at cost price. The exclusive privilege granted to the contractor is not to prevent exhibitors in group xxix. (photography) from carrying on, for purposes of exhibition and illustration, any photographic processes whatever. The exclusive privilege is not to prevent exhibitors from distributing gratuitously any photographs, engravings, or other illustrations of their exhibits, or any part thereof; but such photographs will not be allowed to be taken in any part of the buildings except by the contractor. The person tendering will be required to specify in his tender (*a*) the percentage on gross receipts which he will undertake to pay for this privilege, together with (*b*) the amount of the said percentage he will pay in advance on the signing of the contract by way of premium. A schedule of prices, at which the contractors will undertake to supply exhibitors with photographs of their exhibits, must be appended to the tender. Plans showing the position of the spaces to be allotted for the above-mentioned purposes can be seen at the Secretary's Office. Tenders must be sent into the Secretary not later than the 14th March. The executive council do not bind themselves to accept the lowest or any tender.

The Strength of Aqueous Sulphurous Acid.—1. Water will not at a medium temperature (of about 17·5° C., equal 63·8 to 64° F.) retain more than 9 per cent. of sulphurous acid gas. 2. The solution can be brought to the strength of 8 per cent. by following the process of the U. S. Ph. of 1870, but it will after a short time come down to 7 per cent. 3. The strength best suited for pharmaceutical and technical purposes is 6·5 per cent., or sp. gr. 1·034, since it will keep for a long time by following the directions laid down in the Pharm. of 1870, for preservation, and can be shipped without any risk of loss. 4. Sulphuric acid will always be present, though in so small an amount that it will not interfere with the medicinal value of the preparation. By adding some barium sulphite, and macerating for a day or two, the sulphuric acid of an old sample can be removed.—Carl Riebe in the *Druggist*.

Photographic Club.—The subject for discussion on March 4th will be "On the Preparation of Paper Negatives."

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To Correspondents.

*** We cannot undertake to return rejected communications.

A. J. Richardson.—1. Such a lantern as you describe is generally suitable for making enlargements. 2. A rapid symmetrical or rectilinear of about four and a half inches focus.

J. M. Thomas.—Some action will take place without a battery being used, but it is so slow as to be practically useless. One cell of the Bunsen battery is sufficient.

C. A. M. (Gainsborough).—1. Although the proceeding is a very barefaced act of dishonesty, you have no remedy unless the pictures were registered in proper form before any were sold. 2. If they reproduce your name and sell them as yours, you can institute a prosecution for fraud.

Van-dyke.—The immediate cause is the passing of silver nitrate from the printing paper through minute holes in the varnish film, and this silver stains the gelatine. Minute holes in the varnish film are often caused by dampness of the gelatine film, and this dampness is not unfrequently a consequence of imperfect removal of the hyposulphite. The mischief is very much increased by using damp paper for printing on. The negative has been returned by Parcels Post.

P. E. G. (Bombay).—Obtain Husnik's "Lichtdruck," published by Hartleben, of Vienna.

Colour.—1. We can hardly give you full details in this place, but must refer you to the treatise on silver printing, by Robinson and Abney (Piper and Carter). 2. It is not possible; the nearest approach is by very hard rolling.

Wm. Birrell.—Next week.

Edward Cawley.—Make up according to the formula given on page 128, and use pure solvents, not methylated.

R. Keene.—Thank you; we have noted the circumstance, and hope to say something about it next week.

E. D. G.—Perhaps it contains a trace of sodium chloride; indeed, it appears to us very probable.

C.—Burnishing, if cleverly done, gives a better finish, but if care is not taken, the prints may be spoiled.

Wick.—1. The general opinion seems to be that there is no proportionate advantage in having more than two. 2. We should prefer A for the purpose. 3. Neither is suitable; use the lens sold with the instrument.

J. L. Mackintosh.—1. Such analytical work could not be considered reliable unless executed by an experienced person. 2. Certainly it would be subject to change on exposure to air, and the change would be very rapid indeed, unless checked by the addition of such an antiseptic as alcohol.

Ad. Bowlin.—You must have made some mistake, as nothing exists which is known in English under this name. Perhaps, however, you will let us know what it is called in French or German.

C. Preston.—It always contains lead, and generally a large proportion.

Questioner.—1. Use equal parts of a saturated solution and water. 2. See a description of Mr. Beach's contrivance on page 121 of the Year-Book.

Student.—Your failure is there sult of under-printing and over-toning.

S. V.—The cement known as "marine glue" is very suitable for the purpose.

Engineer.—The simplest method for the reproduction of draughtman's tracing sis the negative process—that is, the ground is blue, while the lines are represented in white. The sensitive paper may be prepared by brushing over "bank-post" with the following:—

Red prussiate of potash	1 part
Ammonio-citrate of iron	10 parts
Water	580 ,,

The exposure varies from five minutes to half-an-hour in the sunlight. To fix, the exposed prints are simply washed in two or three changes of water. Weak images due to over-exposure may be strengthened by washing in a three per cent. solution of hydrochloric acid.

Restrainer.—Three parts of ammonium bromide are about equivalent in restraining power to five of the potassium salt.

J. Mills.—1. Yes. 2. A doublet lens, such as the rapid doublet, is preferable for the purpose; a *wide-angle* should only be used when working in confined quarters.

Tyro.—Iodized collodion certainly decomposes if kept for two or three years, and that is why your films are opalescent when dry.

The Photographic News.

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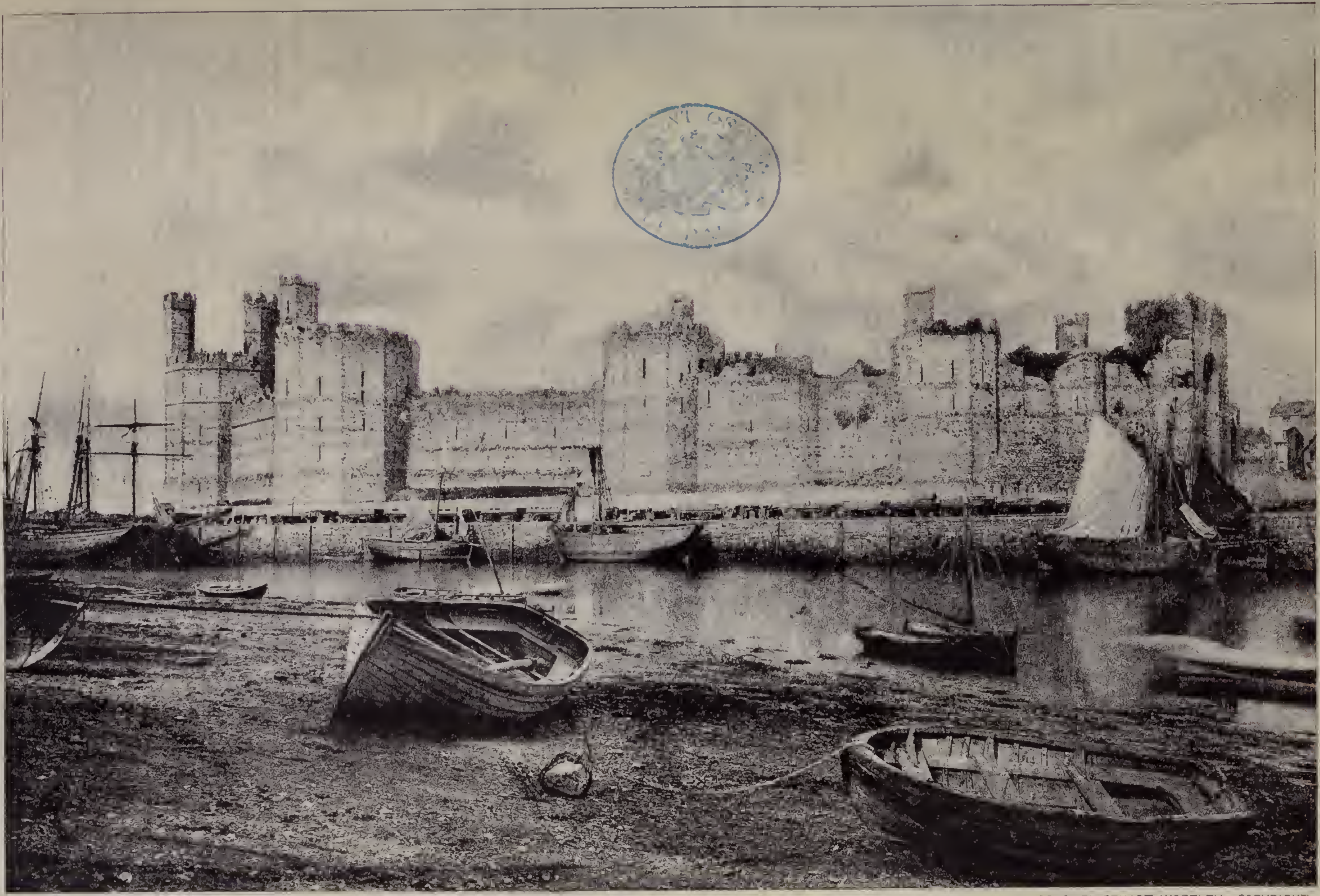

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THE PHOTOGRAPHIC NEWS.

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THE BEHAVIOUR OF THE HALOID SALTS OF SILVER IN THE SOLAR SPECTRUM, AND THE EXALTATION OF THEIR SENSITIVENESS TOWARDS CERTAIN PARTS OF THE SPECTRUM.

BY DR. JOSEPH MARIA EDER.[*]

The action of the solar spectrum on silver salts was first studied by Scheele in 1777,[†] and next by Senebier in 1782,[‡] chloride of silver being used in these instances. The chemical action of the ultra violet rays on the compound was discovered almost simultaneously by Ritter,[§] and by Wollaston in 1801,[||] while Herschell[¶] studied the action of the solar spectrum, not only upon various iron and silver salts, but also upon the colouring matter of flowers; still he does not seem to have obtained impressions of the Fraunhofer lines; these being photographed for the first time by Becquerrel[**] in 1842, but in 1843 Draper[††] obtained similar results, and also discovered the photographic action of the infra-red rays.

In 1853 and 1854 Crookes[‡‡] investigated the action of the solar spectrum on iodide of silver and on bromide of silver in wet collodion; while J. Müller Helmholtz, Rutherford, Mascart, H. C. Vogel, and Cornu worked shortly afterwards in the same direction.

Those to whom reference has just been made, aimed at the most perfect representation of the lines of the spectrum, but Schutz-Sellac,[§§] W. H. Vogel,[||||] and Abney,[¶¶] have more especially set themselves to investigate the relative sensitiveness of the various silver compounds to the different radiations of the spectrum. The two last-mentioned investigators, and also Schumann,[***] extended their studies to the behaviour of silver emulsions made with gelatine; but as many points in connection with the action of light on gelatine dry plates still require elucidation, I have undertaken further researches. In the case of these researches, which deal with the sensitiveness of various silver compounds towards radiations of different wave lengths, the construction of the spectrograph is of the greatest moment; as according to the freeness of passage allowed by the lenses and prisms used, so does the maximum of action shift towards the ultra-violet end of the spectrum.

Stokes, as early as 1882, found that quartz allows the freest passage for the ultra-violet radiations, and two years afterwards Crookes used this material for the construction of his optical instruments. He employed two prisms of rock-crystal, having a refracting angle of 55°.

Fig. 1 shows Crookes' spectrograph. A is an adjustable slit, B the collimator lens, L and E the prisms adjustable upon F, O the photographic camera. At MN is the sensitive plate; at GKT and at PQR the main limbs of the apparatus can be adjusted.

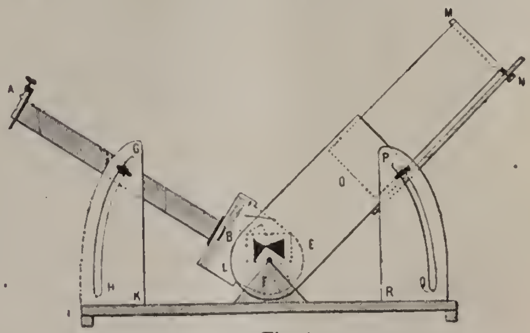

Fig. 1.
CROOKES' SPECTROGRAPH.

Calc-spar (Iceland-spar) may be also mentioned as being very transparent for the ultra-violet rays, and Mascart and Huggins have made use of it in photo-spectral work.

The influence of the prism on the extent of the photographed solar spectrum, as also on the position of the maximum of action in the case of a gelatino-bromide plate, is well illustrated by fig. 2. The above illustration (fig. 2) is made from photographs taken with a spectrograph constructed by Schumann of Leipzig, this instrument being made with quartz calc-spar lenses. The various prisms of 60° (calc-spar, quartz, light flint, and heavy flint) were used in the respective experiments. The length of the

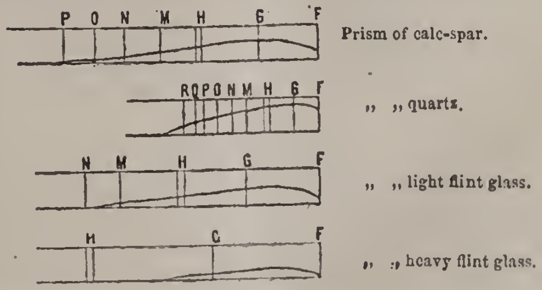

Fig. 2.

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[*] Communicated to the Imperial Academy of Vienna.

[†] Scheele "Aeris atque ignis examen chemicum." Upsala, 1777, p. 62.

[‡] Senebier: "Memoires physico-chemiques sur l'influence de la lumiere solaire.' Geneve, 1782.

[§] Erlanger Literature-Zeitung, 22nd February, 1801.

[||] Philosophical Transactions, 1802, p. 379.

[¶] Philosophical Transactions, 1840 and 1841.

[**] Biblioth. Univers. de Geneve, 1812, vol. 40.

[††] Philosophical Mag., (3), 22, 360.

[‡‡] Jour. Photographic Society, 1853, p. 77, 98; also 1854, p. 293.

[§§] Berichte d. deutsche chem. Ges., iv., 210.

[||||] Poggendorff's Annalen, cliii., 223.

[¶¶] Photographic News, 1882, p. 181.

[***] Photographische Wochenblatt, 1882 and 1883,

spectrum and the position of the Fraunhofer's lines shows the respective dispersive power of the four prisms; while the height of the curve indicates the intensity of the photographic action and the position of the maximum of action in the case of a gelatino-bromide plate.

By means of the quartz prism, a spectrum extending beyond R in the ultra-violet is obtained, but with calc-spar the action does not go so far, indeed only to P, while in the case of heavy flint glass the action does not reach the bounds of visible violet. In the case of light flint glass, however, the effect of light was traceable as far as N in the ultra-violet. With quartz and calc-spar the maximum of action is near G, but with the glass prisms more towards F. It should be stated that in every case the initial light was equal.

Fluor-spar, which has been used by Cornu to achromatise lenses of quartz, was found by Schumann to be very transparent for the ultra-violet rays. Herr Schumann tells me that he prefers to use simple quartz lenses rather than achromatic quartz calc-spar lenses. The extent to which even thin glass is mischievous in making experiments on the ultra-violet spectrum may be judged of when I mention that according to Schumann's experiments, a cover glass of 0·125 millimetre thick, cuts off a full third of the ultra-violet rays of the magnesium spark. This fact should be taken into account in photographing spectra of gases in Geissler tubes.

(*To be continued.*)

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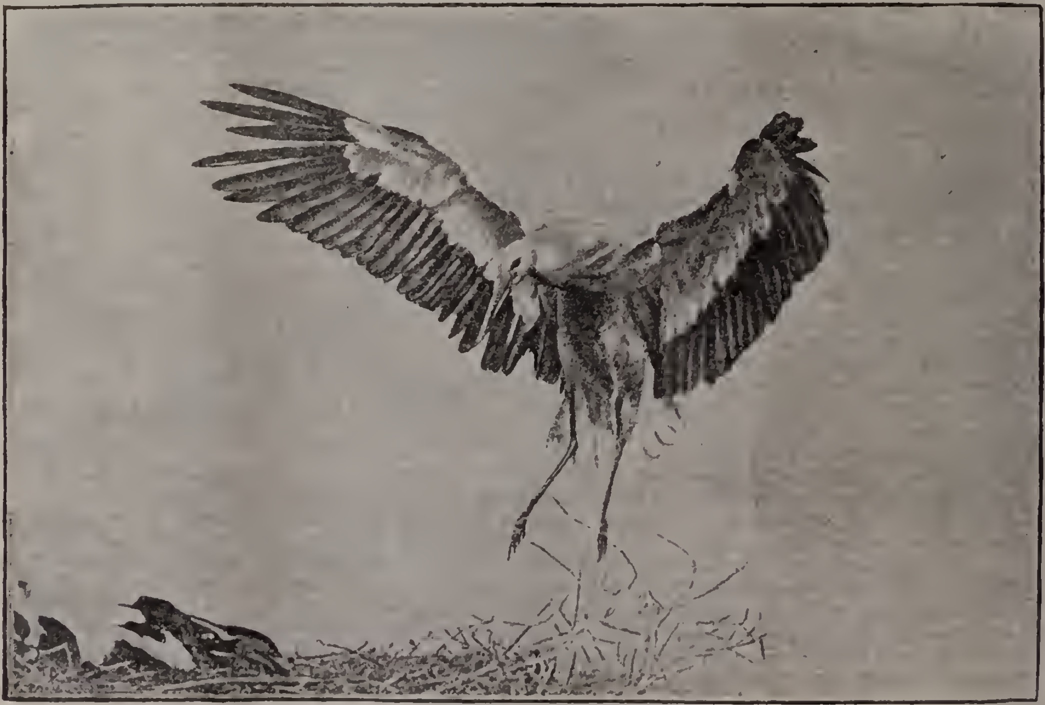
INSTANTANEOUS PHOTOGRAPH OF A STORK.

Herr Auschütz, of Lissa, is known as one of the most successful makers of instantaneous photographs, and we now place before our readers one of his latest triumphs. A stork in the act of flying to its nest of young ones! Who, in the early days of photography, would have considered such a production as this a possibility?

The picture, which we reproduce from the *Photographische Correspondenz*, is only one out of a series of a hundred and twenty stork photographs taken by Herr Auschütz, to say nothing of his pictures of pigeons and other birds. Such productions must be of exceptional value to the artist.



◆

CHEAP LENSES.

At the Photographic Club there has been, for two consecutive meetings, a discussion on "Cheap Lenses." The subject was brought up by Mr. George Smith, who stated that where small sizes of plates are in question, a lens costing a trifle will, in his opinion, give as good a result as one costing, perhaps, as many pounds.

There appears to be no doubt that there is some foundation for the view that Mr. Smith takes of the matter. At the very outset, one must ask what is the object to be fulfilled by a photographic lens? For most cases the reply is simple enough: To take photographic pictures. To take photographs; and, be it observed, to take photographs not to please photographers, but to please the public, artistic and otherwise. Now it is quite certain that to please the general public no very great degree of definition is necessary; indeed, we think one might say that in the case of nine-tenths of the general public an absence of definition quite obvious to the eye of a photographer would pass entirely unnoticed; might, indeed, if noticed, be considered as an additional beauty in the picture. Such an extent of lack of definition we should ourselves never think of considering an advantage in a photograph; but it must be borne in mind that there are many degrees between that state of affairs where there is an evident "fuzziness," and the definition given by the lenses of the best opticians,—for example, that given by the portrait lens which we have already mentioned in the Photographic News, which would divide to the 600th part of an inch. Long before such a point of perfection as this is reached, the unaided eye is unable to distinguish different degrees of approximation to it—that is to say, in the case of a picture taken by a lens of the best quality, the exertions of the optician are sometimes thrown away so far as the pictorial effect is concerned A less perfect lens would answer its purpose quite well. This, if we understand it properly, is Mr. Smith's contention, and so far we certainly agree with him.

In our opinion, the thing practically resolves itself into this:—In the case of small sizes, photographs may be taken with cheap lenses, and may be quite as good pictures as those taken by the most expensive lenses produced. When, however, we go at all beyond this, we imagine that the benefit of the more perfect instruments becomes manifest. If the small negatives are to be enlarged so as to make large pictures, or if copying of line work is to be done, or if it be a question of large sizes, the advantage of a superior lens becomes quite evident—in fact, as Mr. Trinks, who occupied the chair during one evening of the discussion, put it—for the purposes which we have mentioned, "the very best lenses which can be had are not at all too good."

It is certainly true that there are very many photographers, especially amateurs, who work only small plates, never attempt wide angles, or require straight lines in the margins, and who never copy or enlarge; and there is not the smallest doubt that for these, as a rule, a lens of the cheapest kind will do quite as well as one of the most expensive. The desire, however, of almost all professional photographers, and of many amateurs, is to have a lens which may be applied to any of the purposes for which a lens can be used. It must be capable of doing line work. It must be capable of enlarging, and it must be capable of taking negatives which may be enlarged. Certainly he will probably not get a lens that he can rely on to do all this for a few shillings.

Still we believe that we are correct in stating that the cheapest lens which can be bought *may* be good, but the chances are very much against it. In the case of our best opticians a great deal of the perfection of the instruments turned out is due to the careful manner in which each separate instrument is tested, in which any small error which may be observed by a skilled tester is corrected, and to the ruthless manner in which a lens is broken up if it be considered that an error in it, be it ever so small, cannot be remedied.

It is not every one who has the chance of searching through a number of cheap lenses to discover whether or not one of them is an excellent instrument; and of those who have the opportunity there is probably not one out of ten who can really test a lens. It is, therefore, generally advisable for a photographer who wishes to have a lens which he may turn to any of the many uses to which a lens may be put, to pay for the guarantee which the names of our best opticians carry with them that the lens will not be below a certain very high standard of excellence.

Besides, we believe that in the case of lenses, either very small or very large, the chance of getting even an occasional lens of the highest quality amongst cheap instruments is even less than in the case of those of medium size. The difficulty in these cases becomes very great, and consequently the difference between instruments of the highest quality and those of cheap make becomes emphasised.

Finally, let us say that whilst we agree with Mr. Smith that for certain purposes lenses costing a few shillings may be quite as good as those costing a few pounds, we consider that for the greater part of photographic work, even the excellent lenses offered us by the best opticians in this country and on the Continent are not in the least too good; that we shall be glad to see the day when they may be made even better than they now are.

THE INVENTIONS EXHIBITION: OFFICIAL COMPETITION WITH PHOTOGRAPHS.

Last week we commented on the fact that the Council invite tenders for the exclusive right to photograph in the Inventions Exhibition, and referred to the circumstance that the establishment of a portrait studio on the premises will unfairly compete with photographers all through the country.

The present time is one of exceptional dullness for the professional portraitist, and possibly this may be partly due to the circumstance that a large proportion of the sitting public have more or less completely exhausted the existing variety of styles and fashions, and are halting for the want of something new. Where shall we get this if not at the Inventions Exhibition? This will be a question unconsciously asked and answered in the minds of tens of thousands, when the newspapers mention the portrait studio of Messrs. A B and C, as one of the features of the great collection of novelties which is to be gathered together at South Kensington in a couple of months' time. Under these circumstances it is to be expected that a very considerable proportion of the regular sitters of provincial and London studios will put off being photographed until the occasion of their visit to the Inventions Exhibition; especially as a photograph taken in the Exhibition will serve in some kind of way as a memento of the occasion. It may be said that the photographic portrait studio will no more compete with outside photographers than the American and other bars or restaurants will compete with similar establishments outside; but this view is a mistaken one. A visitor to the Exhibition will, as a rule, neither eat nor drink more than corresponds to his needs during the actual time he is on the premises; but he will have his photograph taken for use outside—that is to say, there will be special inducements, as the hope of superior results, some kind of implied guarantee as to the novelty of style or method, or the associations of the Exhibition, all tending to induce the public to patronise the "Inventions" studio, to the detriment of outside establishments. The electric light is to be supplied by the Council of the Inventions Exhibition at cost price; and well can they afford to do this, as they intend to go in for a share of the profits, and so will become partners in the portrait business. In their invitation for tenders they say that the successful candidate "will be permitted to erect and fit up a studio for portraiture," also "the person tendering will be required to specify in his tender (*a*) the percentage on gross receipts which he will undertake to pay for the privilege, together with the amount of the said percentage which he will pay in advance on the signing of the contract."

Why the council of an International Exhibition should thus compete with the trade of the country it is difficult to see, as the mere making of portraits by well-known methods and as a simple matter of business, has nothing whatever to do with the real objects of an International Exhibition. Apart from the interests of outside photographers, we can give one very good reason why the Council should not enter into the proposed partnership. It is simply this: they have not a sufficient knowledge of the business in which they propose to embark. They simply require the contractor to pay a "percentage on the gross receipts;" and seem to leave it for the contractor to interpret this as applying to the first order, or that order actually taken in the Exhibition. In the case of negatives made at the Exhibition, the real harvest is likely to step in from such repeat orders as photo-mechanical prints for distribution or catalogue illustration, and enlargements from the portrait negatives; to say nothing of those frequent orders for small batches of prints which make a stock of negatives a steady source of income for ten years or more.

Some correspondence on this subject will be found on another page.

ARTISTIC FEELING IN PHOTOGRAPHS.

Part I.

by A. H. Wall.

The art-critic, or artist, who refuses to recognize photographs as works of fine art, on the ground that they are the result of a series of purely mechanical operations, unconsciously makes a curious mistake. He elevates into the domain of Fine Art not the actual production, but the producing agency, forgetting that hundreds of works are constantly created utterly wanting in everything that constitutes true works of fine art, although the means of their production are identical with those used by a Turner or a Raphael. If it were possible to produce such a picture as Titian painted, or such a statue as Michael Angelo moulded, by mechanical means, would their high standing and value cease to be recognized, or their moral influence be lessened? I trow not.

On the other hand, it is not, as a photographer sometimes appears to think, the mere perfection of means that constitutes the highest attainable excellence in the production of a photograph. The best of lenses, and the most perfect chemical conditions, with the greatest skill in manipulation, constantly produce photographs which have not the slightest claim to rank as fine art productions.

Simple and self-evident as these truths may seem, they are so commonly overlooked or ignored, that it sometimes becomes necessary to re-assert them.

The highest domain of art is not the technical, but the intellectual. The writer of verse may have a very complete knowledge of words, rhyme, and metre, without being a poet; and the painter be as completely a master of drawing the rules of composition and management of pigments, without producing works of artistic excellence. Forms may be correct, colours fairly true to nature, and the technical execution faultless; but if the picture embodies no creative thought or feeling, its effect falls dead and flat, or what admiration it may evoke by a display of technical knowledge, or manipulative cleverness, is indeed poor and contemptible when compared with the powers it might command over the thoughts and emotions of successive generations. It is, in fact, the degree and kind of intellect which we recognize in a work of art that nominates its position as fine or mechanical. We judge it not by process, but by result. It is to the man, not the means, that it owes its high or its low position in the estimation of all true critics. Somebody once said, " An historical painting is an epic poem addressed to the mind through the eye; a descriptive poem is a landscape depicted to the mind through the medium of words." And as it is to ideas, sentiments, and images that language owes its poetical and descriptive powers, so it is to the imagination and feeling from which such things spring that pictures owe their greatest power and their loftiest rank.

The vulgar idea of art is, that its sole aim is imitation. This is shown to be a false one directly that element of pictorial representation is scientifically analysed. Then we perceive clearly that our material means of imitating, separated from the mental, are absurdly incongruous—inconsistently feeble. We have, for instance—as Ruskin once pointed out—for our strongest light a white paint, which is as black when compared with a white object in pure sunlight; and for our deepest shadows a black, which necessarily receiving light when held up against, say, a dark object in deep shadow, shows like white. And between our black-white and white-black range scales of tones and tints, which are as one is to very many thousands, when compared with the tones and tints which trained, close observers see in nature. In like way artists' colours degenerate both in brilliancy and number when they are compared with the colours of nature, the scarlet of a flower in a bright light making the most brilliant of our scarlet pigments, seen in a painting room or picture gallery, seem a dull brick colour. But putting colour aside, as apart from our present consideration, let me ask if the photographer's command of tones and tints, lights and shadows, is more comprehensive than the painter's? Ask yourself if the numerous tints of light blue, the wonderful diversity of tones in green grass and the foliage, and the vast range of reds seen in nature, are ever fairly represented by their relative tones in photography? Skilful manipulation and development may do much for remedying defects due to eccentrically varying actinic powers, but only when the operator is sufficiently observant to detect them. He requires, you see, even here, something more than the mere images given by his lens, something beyond chemistry and mechanical manipulation, to compensate for the shortcomings of his art. How much greater, then, is his necessity for artistic and mental appliances or resources, when he aims, with the feeblest means, to produce greater results than imperfect imitation (for at the best all imitation is imperfect), can command when he aspires to create thought and touch the heart.

The landscape painter, when he goes out seeking a subject, looks out for one which is picturesque, or picture-like; that is to say, one which affects his feelings or appeals to his imagination, and sets him dreaming, or in other words is suggestive and poetical. Having grasped the general sentiment of a selected scene, he carefully analyzes it, sometimes, through habit, almost unconsciously, and calls to his aid everything within reach which can emphasize or lend strength to its expression. Grandeur and majestic power, romantic wildness, soft, gentle delicacy and loveliness, heart-stirring pathos and tenderness, or whatever may be the prevailing sentiments, influence him in the treatment of his work from its beginning to its end. With such aspirations, no mere dull, uninteresting piece of topographical accuracy will content him; he wants to catch, not the mere outer form, but the very soul of nature. He would have his canvas speak to others as Nature speaks to him, when melting him to tenderness or pity, stirring in him a vague sense of awe or terror, or filling his soul with grandly noble thoughts that soar through nature up to Nature's God; he would be, in short, not a mere mapper out of fields and forests, rocks, rivers, and seas, but a poet.

Such spiritualistic power had Turner in this way (though no artist, perhaps, ever exercised it so unconsciously) that scenes apparently dull, uninviting, and devoid of all human interest, became poems when invested with the magic of light and atmosphere upon one of his marvellous canvases. How seldom have we the slightest evidence of aspirations in this direction in landscape or figure photographs! So strongly was Turner influenced by such abstract conceptions, which are technically called FEELING, that even ordinary truthfulness was often violated in its pursuit, and he sometimes fell into a habit of exaggerating the picturesque to the very verge of caricature. Some of his greatest admirers have in print admitted this; none have attempted to vindicate, although some excuse, it. But even this fact only serves to show how supreme Feeling was in his eyes as compared with any other quality, and therefore lends force to these observations.

Another advantage Feeling possesses in its pictorial expression is its power of appealing not merely to learned judges of art, or refined and highly-educated observers, but even to the vulgar and ignorant. In the expressions you will hear from such visitors to the Turner collection, this may often be realized: " Well, I never saw anything like that in nature," said one, an old countryman, in my hearing, as with open-mouthed wonder he paused before one of Turner's noblest works—" but how grand and beautiful it is!" The speaker had probably seen very little in nature, for observation is not intuitive, but comes from education; yet he must have felt the grandeur and beauty of such a scene as Turner represented, and unconsciously he bore witness to the picture's power and truthfulness when he admitted that the sentiments it inspired when he saw it in reality were the sentiments he experienced in looking on this picture. How otherwise could it be grand or beautiful to him?

In another paper I may return to this subject with special regard to its connection with figure studies and portraiture.

POSITIVES ON GELATINO-CHLORIDE OF SILVER.

(Second Article.)

BY W. M. ASHMAN AND R. OFFORD.

In the former article upon this important subject, we showed how, by easy stages, perfection was attained with silver-chloride suspended in collodion.

We also stated our intention of presenting a formula by which good results can be relied upon with gelatine, if only ordinary care be observed, as we are able to prove that failure in many cases is attributable to an unsuitable emulsion. Thus, to produce the finest possible effects upon opal, an emulsion should be employed containing nearly as much silver as gelatine, or in proportion 1·8 of silver to 2 of gelatine. Such a mixture will be sufficiently rich for negatives of ordinary density, when only a very thin coating has been given to the opal.

An emulsion of this kind may be utilized for printing thin negatives, provided the coating be somewhat thicker. The principal drawback to this mode of proceeding depends on the colouring matter gelatine contains, and which in thick layers degrades the otherwise pearly white of the opal; hence, it becomes desirable that the opal plates should be coated as thinly as possible, and all necessary modifications made in the emulsion; and this is brought about by varying the organic conditions.

Silver compounds of an organic nature, utilizable in printing, are numerous, each exercising a definite peculiarity differing from that of its confrères. The fact has long been recognized by experimentalists in search of reliable formula for preserving ordinary sensitized paper, and is of especial importance in considering certain modifications in the process with which we are now dealing. Points worthy of attention lead us to give preference to certain haloids as being better suited to the general requirements, than those salts which confer peculiar advantages in one direction only.

Thus, rapid printing is not so much a desideratum as good printing; by that we mean necessary vigour, and an image easily amenable to the influence of a toning bath which, after fixing, shall retain all the qualities of the best silver print. Among the salts used in our experiments we may mention:—Silver-chloride, citrate, oxalate, acetate, carbonate, tartrate, tungstate, and lactate. The haloids: Chlorides of calcium, sodium, lithium, barium, potassium, and ammonium: Potassium-oxalate, tartrate, citrate, carbonate and bicarbonate, sodium-corbonate, bicarbonate, tungstate, and citrate. Ammonium-citrate, citric, and tartaric acids, &c., &c.

Changes have been rung on these and other compounds in a variety of ways, and from the results so obtained we are enabled to deduce many important points, the value of which cannot be over-estimated.

It will scarcely interest our readers to wade through the numerous experiments made, so we will confine ourselves to those which exhibit peculiarities likely to prove useful in practice.

A suitable emulsion for opal may be prepared by either of three methods, viz., an acid chloride of silver emulsion; a compound emulsion, made by the addition of two haloids in the gelatine; and a mixed emulsion; the latter is obtained by making the emulsions separately, and mixing them together afterwards.

We have noticed that where the citrate salt is employed, either alone or mixed with other salts, more rapid printing is obtained; the plain chloride yields the whitest emulsion, and a mixed emulsion composed of chloride and oxalate stands next in order, neither of which print quite as rapidly as the citrate, or with quite as much force. On the whole, compound emulsions are not so white as a mixed emulsion. Citric acid, too, in our hands, has proved to be better than tartaric acid as an addition to chloride emulsions.

If the reader will refer to page 301, volume xxvi., of the Photographic News, he will therein find an illustration by Captain Abney, showing the effect of a spectrum printed on a mixture of silver chloride and silver citrate in gelatine, the sensitiveness of which is shown to extend as far as the C line in orange; and in the same diagram it is shown that silver chloride alone in gelatine only reaches the G line in blue, the curve falling very rapidly from the starting point, which is about the same for each in violet.

It will thus be apparent that gelatine emulsions in which silver citrate is present have greater sensitiveness than gelatine mixed with chloride of silver only, since the latter is theoretically unaffected by green and yellow rays.

The choice of haloids with which to make an acid chloride emulsion is governed by many considerations, each having some drawback and some advantage. The character of the salt produced by the double decomposition, upon the addition of silver nitrate, most materially affects the resulting emulsion. For instance, the chlorides of potassium, sodium, and barium yield nitrates of these salts, which are all readily crystallizable, and hence the unwashed emulsion is useless, however vigorous the print thereon.

The chlorides of ammonium, calcium, and lithium produce salts of a deliquescent character, which, with the addition of citric acid, form a decidedly hygroscopic film. If the emulsion is very vigorous, as in the case of lithium chloride, a slight washing for five minutes in one water before the acid is added somewhat remedies this defect; but it is perhaps preferable to rely upon desiccation after drying, and subsequent preservation from damp.

Calcium chloride emulsion is less deliquescent than the last named, but the colour is not so good, nor the toning so easy.

To obviate the crystallization, we have adopted the plan of mixing two haloids: thus, we prefer to take sufficient ammonium chloride to be equivalent to two-thirds of the silver employed, and sufficient potassium chloride to balance the remaining third, thereby producing a compound salt which can be held in the gelatine film without interfering with its utility.

Again, barium has special qualities which commend it to our use, but besides the tendency to bring about crystallization, it is the occasion of a slight fog which interferes with the clearness of the print, just like that seen upon collodion negatives prepared with a bath to which barium nitrate has been added. This passes away upon varnishing; but as we are not certain of the wisdom of putting any varnish, however colourless, upon a delicate opal vignette, we can only employ such an emulsion for transparent positives which can be so treated.

Crystallization we find is much less likely to occur if the films are dried rapidly in a dry atmosphere at about 70° Fahr.

Barium chloride can be combined with ammonium chloride as above, when both its unsatisfactory characteristics are rendered less obtrusive. A plain acid chloride emulsion is the best with which to make plates intended for storing some little time, the requisites being an absence of free silver, only a slight excess of unchanged haloid in it, and the film very thin.

We have before us plates prepared some months ago from the formula given below, unwashed, as white as when first coated. We did not desiccate that coated with the lithium emulsion, hence it is somewhat sticky on the surface; but the printing quality is all that can be desired, both for delicacy and colour.

Gelatine	4	grms. dis. in	40	cub. cents.	of water
Lithium chlor. (dry)	·52	,,	10	,,	,,
Silver nitrate ...	2·2	,,	10	,,	,,
Citric acid ...	·6	,,	6	,,	,,
Thymol	·5	,,	3	of alcohol	

Dissolve each of the above at a temperature not exceeding

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[*] Instead of lithium chloride, dry calcium chloride may be employed; the quantity required would be 1·4 grammes.

90° F., add rather more than three-fourths of the haloid to the gelatine, then the silver should be added slowly to the chlorized gelatine, agitating the mixture well with a glass rod during the addition, after which the emulsion should be tested for free silver; if present, the remaining haloid is added, and finally the acid and antiseptic. If these proportions have been strictly adhered to, there will not be any free silver left; but as the balance is so easily disturbed it is necessary to test the emulsion at this point, as theoretical quantities do not give such definite results as might be anticipated, owing to the deliquescent character of many of the salts employed.

The simplest method of working is to employ a colour test, such as potassium chromate, or the ordinary bichromate solution, everyone being quite familiar with its action on free silver; therefore we advise in all cases after mixing an emulsion, by whatever formula, to place a drop of the liquid emulsion upon a glass plate, and apply a little two per cent. bichromate solution thereto. Should the well-known red colour appear, it is an indication that the quantity of haloid was insufficient, and more must be added. On the other hand, it is equally important that the haloid should not be greatly in excess, or the resulting colour of image will print unsatisfactorily; the better plan, we always find, is to keep the haloids minus, and make the necessary addition should the colour test indicate an excess of silver. By adopting this proceeding, the unreliability of equivalent proportions is overcome. A similar quantity should also be tested for printing quality by exposing a test plate a few minutes to daylight.

Undoubtedly the best results are obtained with those emulsions the colour of which, when so tested, yield a rich purple colour by reflected light, and red when examined by transmitted light. The next in order of quality is obtained from emulsion in which the printed colour is reddish brown.

The acid chloride emulsion made as above does not require either boiling or washing; in fact, it is imperative, in order to preserve its whiteness, that the temperature be kept as low as possible. Anything beyond the slightest washing would quite spoil the vigour of the prints from an acid chloride emulsion, so it will be found better to avoid washing whenever possible. Clear gelatine of moderate hardness should be chosen, a small amount of colour in gelatine tending considerably towards degraded whites. The hygroscopic character of some acid chloride emulsion films operate against their adoption in all cases; the difficulty is overcome by desiccating the plates before use.

A satisfactory emulsion having been formed in accordance with the directions above given, it should be filtered through swansdown, and is then ready for coating; the details of which are too familiar to the readers of the Photographic News to require repetition here. This much, however, may be said, that the plates must be carefully cleaned and well dusted; the coating should be as thin as compatible with a perfect covering free from ridges and thickened edges, and when set, transferred to a drying compartment capable of performing that operation in six or eight hours, after which the plates should be thoroughly desiccated, when they may be stored for use.

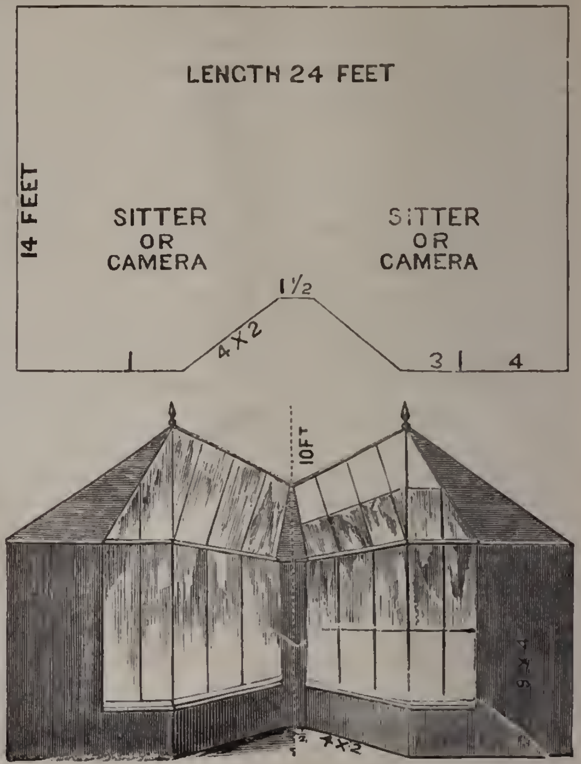
All the operations can be performed with perfect safety in moderately dull gas light, and no harm results from day light previously filtered through a single thickness of "golden fabric."

In our next we shall deal with other forms of emulsion suited to opal work, after which transparency and paper work will be considered.

THE GLASS HOUSE—HOW TO DESIGN, CONSTRUCT, AND FURNISH IT.

Chapter I.—Glass Houses Old and New—*Continued.*

Tuohy's Double Light Studio.—The advantages of this form will be appreciated by those who are rather closely hemmed in by buildings on the sides, and the following illustrations will make all clear.



Tuohy's Studio Plan and View.

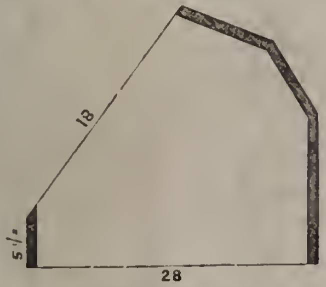
Mr. Tuohy tells us that "half the studio may be curtained down, doing away with a hood to the camera. The front of studio is everything one could desire. Its practical advantages, which I have proved, are—1. The most effectual studio for short exposures. 2. With half the studio shut, in doing away with hood to lens. 3. Best form of lighting for the high-lights. 4. The sun's rays not affecting the light at any time of the year, should you have a north light."

An Old Daguerreotype Gallery.

We know of an instance where Mr. Tuohy's plan has been varied by making the studio symmetrical in a double sense, a second bay or pair of windows being made on the side shown as plain in the horizontal section. When one is enclosed by high walls, it is an important point to obtain permission to whitewash those walls.

A Studio of Bygone Times.—It is interesting to look back on the past, and strange as may appear the arrangement of the Daguerreotype gallery as here reproduced from Cruickshank's *Omnibus*, one may perhaps learn something from it —more probably what to avoid than what to imitate. The camera is on a shelf over the door of the dark-room, and the assistant stands with watch in one hand, and cap in the other hand, regulating the somewhat long exposure. The apartment shown seems to have served as waiting-room, dressing-room, and also as a place for cleaning the plates, if one may judge by the wood-cut.

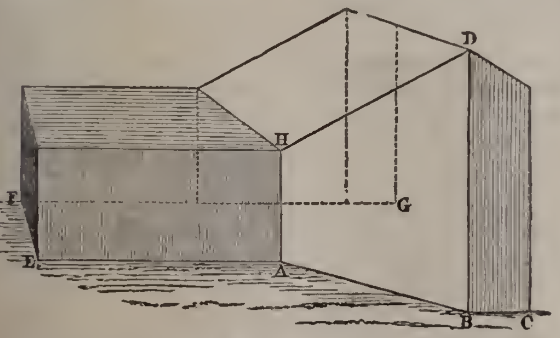
Mr. Bigelow's Glass House.—At the Convention of American Photographers held at Buffalo in 1873, Mr. Bigelow made a sketch of his skylight, and this sketch is reproduced here with Mr. Bigelow's remarks. He said :—



BIGELOW'S GLASS HOUSE.

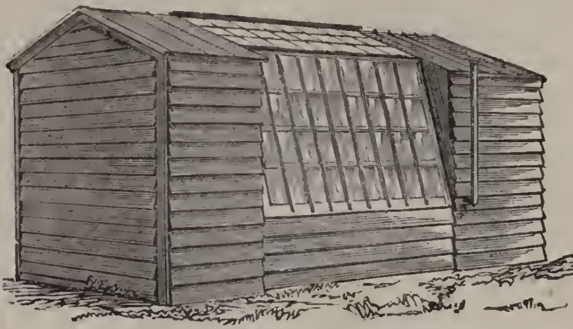
"This is a drawing of a skylight which is about eighteen feet square, the walls carried down to the right proportion. The total width of the operating room is twenty-eight feet. It is the best light I ever worked under, and I have worked under over thirty."

The Tunnel Studio as recommended by Mr. Parker.—At a meeting of the South London Photographic Society held in 1863, Mr. W. B. Parker gave some details of the form of tunnel studio which his experience led him to consider best. In general form it resembles one of the glass houses constructed by Mr. Rejlander, but with these differences—that there are two front side windows instead of one, so that we can light from either side as may be most convenient or desirable, and not be constrained as to putting the same side of the face always either in light or shadow. Again, too, instead of being about five feet wide, Mr. Parker thinks they should be not less than ten feet wide, and fitted with two sets of white blinds and one dark blind, running on rods from contrary ends, so as to secure any amount of light at almost any angle. We thus secure great control over the lighting.



PARKER'S GLASS HOUSE.

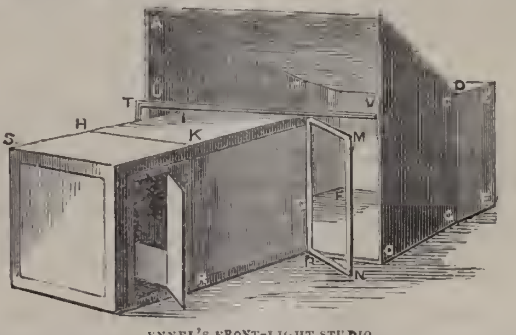
Duncan's Temporary Studio.—It not unfrequently happens that a glass house is to be erected for use during a season; or perhaps the use of the land can only be had for a few months. In such a case the design of Mr. Duncan may be adopted, only it would be well to glaze with larger panes. Still, in putting together a rough studio for temporary use, the builder will be mainly guided by the material available. Mr. Duncan thus tells the tale of its construction :—



DUNCAN'S TEMPORARY GLASS HOUSE.

"Mr. W. R. Howell, New York, had an appointment last fall to photograph each of the students of the University, likewise the Theological Seminary of Princeton, New Jersey, a pleasant country town, fifty miles from New York. There were about five hundred students to photograph, and nothing less than one thousand negatives to make. It was therefore necessary to build a temporary glass house for the purpose, which proved eminently successful. An idea may be formed of it by the sketch. Length 28 feet, breadth 14 feet, height 11½ feet; sloping each side from the top to ten feet. The studio had but one side-light, which was 12 feet by 8 and, as will be seen, sloped in from the perpendicular line 18 inches. The top-light, which was also on one side, was 12 feet by 6, facing north. It was built in the grounds of the University, in an open space. We made from twenty to thirty sittings a day, on an average, taking two or more negatives of each person."

Ennel's Front-Light Glass House.—This is illustrated by the subjoined wood-cut.



ENNEL'S FRONT-LIGHT STUDIO.

A F, glass house; A B U V, swing window; L M P N and T, French windows; H I L K, tunnel; S R, dark room.

The whole may be solid masonry, wood, iron, or what not. The source of light is entirely from the front, and the top front light and the side lights are amply supplied by reflection from the roof and sides sloping respectively upward and outward. The angle here adopted may not be the best—possibly 40° or 45° might be better.

The scale is half an inch to a foot, so that we have a space for the sitter, E E, twelve feet wide; E F, eight feet high; G F, five feet deep. The floor from this rectangular space (from the line G G) to the tunnel measures twelve feet in length; and transversely, at the north end, along the front of the tunnel—viz., from O to the opposite corner, like the parallel line A B—eighteen feet. The light of the walls at the north end, B O, is fourteen feet. The dimensions of the tunnel are: K L, ten feet; I L, eight feet; L P, eight feet; so that an area of direct light —viz., above and on the sides of the tunnel—one hundred and eighty-eight square feet (or, after all deductions, say one hundred and eighty feet) remain available; but this amount may be increased by reducing the dimensions of the tunnel in width and height, or by enlarging the angles of the sloping planes, or both. The top window, A B U V, is to swing like a toilet glass (for ventilation), and to be backed by a curtain nine feet wide, movable by two balancing-weights, as are also the two glass doors or French windows, L M P N and T, to regulate the shading. Mr. Ennel says:—

"Now fancy a room with a window eight feet by ten, facing the north, and a model opposite it at the distance of thirteen or fourteen feet. The lighting is splendid. But now add the sloping walls and ceiling, with their reflecting surfaces. Can you imagine a softer light? Perhaps not. Nor could I until I saw a similar mode of lighting in Messrs. Schaffer and Buddenberg's steam guage manufactory at Buchau, near Magdeburg. The workshop may be described as an immense hollow cube lighted from above, not by flat or slanting skylights, but by reflected light only. The section of the roof presents the shape of a saw, the vertical lines of which represent the windows, and the other lines, at 45°, the roof, painted white within. Looking, as I did, at the effect in regard to quantity and quality of the light with the eye of a photographer, I found it almost magical."

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Notes.

A paper by Dr. Eder, of which the commencement will be found on page 145, treats exhaustively of the question of colour sensitivenes, as far as gelatine plates are concerned.

The council of the Royal Academy have started a novel system in copyright law. Mr. Henry Blackburn's illustrated catalogue is a great success; and stimulated by this, someone has contemplated the introduction of an imitation, more fully illustrated with photo-zincographs than is the original. An objection has come—not from Mr. Blackburn, who certainly had a right to complain—but from the council, who declare that the catalogue of the Royal Academy is their copyright, and that the proposed illustrated version is an infringement. We have not heard that the council propose to interfere with the sanguine gentleman who seriously proposes to issue a catalogue illustrated with photographs of the *rejected* pictures!

M. Truat, of Paris, writes a book on "Photography Applied to Natural History," and gives interesting particulars as to the labours of Muybridge, Marey, Fol, and others in this direction. Truat's work is published by Gauthier-Villars, of Paris, and is illustrated with collotypes by Quinsac, of Toulouse.

With respect to the picture of Carnarvon Castle, which was issued as our supplement last week, Colonel Stuart Wortley is good enough to give us the following particulars. He says:—"The original photograph of Carnarvon Castle was 24 by 18, and the lens, a No. 12 Ross' symmetrical, was stopped down to quite a pinhole. The plate was a uranium dry plate, and was developed a few days after. The developer was alkaline pyrogallic, and anent this I may say that for gelatine plates I have often tried oxalate, but always revert to the pyrogallic acid and ammonia, which I consider on all grounds far the best."

In discussing the question of establishing technical schools for photographers, Professor Bauer, of Eisenach, points out that anatomy, perspective, æsthetics, art-history, and the science of costuming, are by no means the least important branches of instruction.

A photograph of a battle must necessarily be very disappointing from the public's point of view. The best pictures of battles are certainly drawn far away from the scene of action—say in the Strand, or Fleet Street. At the same time, a small camera is, under some circumstances, valuable to the "special" artist.

One of the oddest stories, which has also the merit of being true, in connection with photography, has just reached us. A Worcestershire woman, new to London, had her child christened in company with the children of some of her London acquaintances. After the ceremony, the presence of so many little ones inspired her with a brilliant idea. Why shouldn't they all have their portraits taken? She knew a place where they did them cheaply, and, what was more, she would defray all the expenses. Such an offer was too good to be lost, and a party of a dozen children—the lady was very particular about there being twelve—at once started off to the photographer. The latter was delighted at the prospect of a large order, and at once set to work. After some four or five of the party had been photographed, it occurred to him, on the chaperon of the party intimating that she was going to pay for all, to ask her if she knew what the bill would amount to. "Of course I do," said she; "five shillings. You advertise them at five shillings a dozen." The unfortunate photographer turned pale. He began to suspect the mistake the good lady had fallen into. "Yes," he faltered, "five shillings the dozen pictures—*not five shillings the dozen children!*" The tableau may be better imagined than described.

The latest novelty is a portrait pipe. We do not mean a pipe that takes a photograph, but a pipe that is a likeness of yourself or anybody else whom you may fancy. More than one London tobacconist now undertakes, on being furnished with a photograph, to provide you with an absolutely correct portrait in meerschaum. But why should tobacconists monopolise this branch of portraiture? Why do not photographers introduce something of the kind as a new style?

Photography is gradually coming to be recognized as a necessary adjunct to a court of law. On Monday Mr. Quilliam, the counsel for the persons charged with causing the explosions at Westminster and the Tower, made application for a page in a certain book produced in evidence to be photographed. It does not appear that the magistrate granted the application. Possibly he had not the power, which would probably lie, in such a case, with the Home Secretary.

Lecturing is an established institution in America, so much so that a firm of photographers in New York derives the principal portion of its income from the photographing of lecturing celebrities. Thus Mr. Edmund Yates, in his "Reminiscences," says that on arriving in New York on his lecturing tour, "after being photographed at Gurney's—a *sine qua non* for all lecturers—I started off," &c.

The latest fashionable craze in New York suggests that the trouble and expense which many photographers incur in retouching the negative, to give their fair sitters an alabaster-like skin, might be rendered unnecessary if the sitters would only retouch themselves before having their portraits taken. This beautiful art is termed by the New York professors who practise it "polishing," and the *modus operandi* is as follows. First, the arms and neck are rubbed very thoroughly with rose water. After this has been rubbed off, the arms and shoulders are covered with cold cream, which is allowed to remain on fifteen minutes. This is then rubbed off with a piece of fine, soft white flannel, and the arms and shoulders are covered with "baby" powder, and rubbed thoroughly. When this is completed, the arms and neck "look like polished marble, and the skin seems to take on a wonderfully fine and beautiful texture." It is right to say that "polishing" at present is only resorted to before going to a ball, but it might well be introduced into photography, and, if so, the time may come when every fashionable photographer will have to keep a "polisher" on his premises!

Promising as the new rapid printing process is, it would be as well to remember that it has but recently emerged from the experimental stage. It is natural to be enthusiastic over such an advance as rapidity and possible permanency indicate; at the same time, experiments are one thing, and solid every-day working experience another. When the photographic world went mad over the carbon process, several photographers incurred large expenses in altering their printing plant to accommodate it to the new order of things, and announced that for the future all prints sent out would be permanent. The public received the announcement with great equanimity, and—preferred albumenized pictures. Within a very few months most had to go back, sadder and wiser men, to albumen printing.

One point, at all events, should not be lost sight of. At present, the printing at the establishments of the vast majority of photographers is a perfunctory business, the possession of very little skill and judgment sufficing. The average youth can print, tone, and fix, and does so; but when it comes to a matter of judging negatives by their density and colour, of using a sensitometer, of giving each negative the exact exposure, of adapting the developer to the peculiarities required, skilled, and highly-skilled, labour must be employed. The ease with which uniformity of result can be produced is one of the good qualities of the ordinary silver printing, and it remains to be seen how the new process will bear comparison in this respect.

Talking with a photographer the other day who had photographed nearly the whole of the boys of one of the large training ships, not in a group, but singly, he told us that in scarcely one instance did he find the head-rest necessary. The use of the head-rest, as every photographer knows, is not so much for the purpose of keeping the head still, as of maintaining the position. The tendency of the muscles to relax is often very marked, and in the interval between posing and exposure, a difference will sometimes occur which alters the pose materially, though the sitter is unconscious of any change. In the case of the boys, the effect of the drill was to prevent entirely the dropping of the head, noticeable in ordinary sitters when the head-rest is not used. Sitters, and those who need it most, invariably object to the head-rest, but this is because they do not understand its true function.

Patent Intelligence.

Applications for Letters Patent.

2466. Anthony Philburn, 132, Katherine Street, Ashton-under-Lyne, for "Burnishing, rolling, or otherwise finishing photographs mounted on cards."—24th Feb., 1885.

2699. Leon Warnerke, Silverhowe, Champion Hill, London, S.E., for "Improvement in the preparation of the sensitive paper or other fabrics applicable as substitute of glass in photography."—28th Feb., 1885.

2759. Charlton James Wollaston, 47, Lincoln's Inn Fields, W.C., for "Improved means for controlling and regulating the manner and duration of exposure in photographic apparatus."—2nd March, 1885.

Patents Sealed.

319. Samuel Dunseith McKellen, of 18, Brown Street, Manchester, Watch Manufacturer and Jeweller, for "Improvements in photographic cameras."—Dated 2nd Jan., 1884.

1814. Frederick William Hart, of 8 and 9, Kingsland Green, London, in the county of Middlesex, Manufacturer of Scientific Instruments, for "Improvements in portable folding tripod stands."—Dated 21st January, 1884.

Specification Published during the Week.

5144. George James Rhodes, of 35, Dudley Road, Wolverhampton, in the County of Stafford, England, Enameller, for "A new and improved process for producing pictures on enamelled iron."—Dated 18th of December, 1884.—*Complete Specification.*

My invention relates to means of producing, by the aid of photography, pictures or designs on the surface of enamelled iron. For this purpose, I in the first place enamel the surface of the iron, whether flat or curved, choosing a colour of enamel which will form a suitable ground for the intended picture or design. I then, under a non-actinic light, coat the surface thinly but evenly with a solution of bitumen in turpentine, ether, or other volatile spirit solvent. A good coating may be made as follows:—Bitumen is added in small successive quantities to turpentine until a varnish is formed, which is brushed over the surface, giving it a light brown tint. When this coating is dry, I apply in close contact with the coated surface a transparent or semi-transparent picture or design, preferably photographic, and expose the whole to the light, which has the effect of rendering the coating more or less insoluble in those parts which are not protected by the dark parts of the transparency, the protecting parts remaining soluble. After sufficient exposure, depending on the degree of transparency of the picture or design, and the amount and character of the light, as can be ascertained by practice, I remove the picture or design, and soften and dissolve the soluble portions of the coating by cautiously applying to them oil or turpentine, and then I wash away with water the portions thus dissolved, leaving on the surface of the enamel the portions of the coating which had been rendered insoluble by the action of the light. I dry the enamel, and after warming it I sift over it finely pulverised ceramic colour, some of which adheres to and is retained by the varnish, whilst the rest which does not adhere can be removed by blowing it off, or otherwise. I then expose the enamel in a stove to a heat sufficient to carbonise the bitumen by driving off all its volatile ingredients, and finally I fire it in the usual way so as to fuse the colour and fix it as enamel. The process may be repeated several times on the same surface, so as to produce on it a design having different colours or tones, in different parts of it, suitable transparencies or negatives being employed and applied in correct register.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is: The process for producing pictures or designs on enamelled iron substantially as described.

Patents Granted in America.

312,337. Charles Dorey, Lock Haven, Pa. "Photograph burnisher."—Filed July 29, 1884. (No model).

Claim.—1. In a photograph burnisher, the combination, with a horizontal arm, of a roller adjustably secured thereto, and a burnishing plate or table located below said roller, substantially as set forth.

2. In a photograph burnisher, the combination, with a horizontal arm, and vertical supports adjustably secured thereto, of a roller journalled in said supports, and a burnisher-plate below said supports, substantially as set forth.

3. In a photograph burnisher, the combination, with a standard provided with a horizontal arm, and adjustable supports depending therefrom, of a roller journalled in said supports, a burnisher-plate or table located below said supports, and devices for vertically adjusting said plate or table, substantially as set forth.

4. In a photograph burnisher, the combination, with a frame open on one side, and consisting, essentially, of a base, a vertical standard, and a horizontal arm secured to said standard, of a bearing or bearings depending from the horizontal arm, a roller journalled in said bearings, and a plate or table located under the roller, substantially as set forth.

312,363. William H. Lewis, New York, N. Y., assignor to E. & H. T. Anthony and Co., same place. "Camera-stand."—Filed Sept. 11, 1884. (No model).

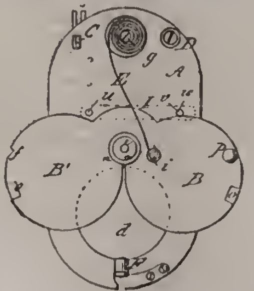
Claim.—1. In a camera-stand, the folding legs consisting of the portions connected by hinge-plates, which allow the parts to be turned outward in opposite directions, substantially as described.

2. In a camera-stand, plates combined with the leg portions so as to serve as hinges and as a lateral support to the joint, substantially as described.

3. In a camera-stand, the spring arms, combined with the table and the leg portions, substantially as and for the purpose specified.

4. A leg for camera-stands, constructed so as to be folded, and adjustable in length by an endwise movement of the parts, two of the parts being adapted to be turned outward and folded against the opposite sides of the other part, substantially as described.

312,581. C. Prosch, New York, N.Y., assignor to E. & H. T. Anthony and Co., same place. "Shutter for photographic cameras."—Filed Jan. 21, 1884. (No model).



Claim.—1. In shutters for photographic cameras, the combination, with the pivoted shutter, of a spiral spring for throwing the same, having one end secured to a stationary post, and its other end connected to the shutter in eccentric relation with the pivot thereof, whereby the spring, in the starting of the shutter, is moved gradually, and all jar is avoided, substantially as herein shown and described.

2. The combination, with the shutter, B B′, and its operating spring, E, of the adjustable post, *g*, secured by a clamping nut or nuts, and having the coiled end of said spring attached to it, whereby provision is made for adjusting the tension of the spring, essentially as described.

3. The combination of an adjustable spring-pressure device, with the double-acting shutter and its carrier or plate, and spring for throwing the shutter, whereby more or less friction may be put upon the shutter to retard or quicken its action, essentially as described.

4. The double-acting shutter, thickened or provided with projections, *o o*, on the backs of its sections, in combination with a pressure device, under which said projections pass when the shutter is closed, and the shutter-carrier or plate, A, substantially as and for the purpose herein set forth.

5. The combination, with the spring-trigger, and the shutter held and released by the trigger, of a trigger-guard arranged to secure the operation of the trigger by the sliding of a loop or trigger operating device between said guard and the tail of the trigger, substantially as specified.

6. The link or slotted trigger-operating device and cord, in combination with the spring trigger, its guard, and the pivoted shutter, essentially as described.

7. The combination, with the shutter, B B′ and its carrier or plate, A, of the spring lever or catch, I, constructed and arranged to act as a stop to the shutter when half or partially closed, essentially as and for the purpose herein set forth.

THE SUN'S ENERGY.

BY PROFESSOR S. P. LANGLEY.*

We have ascended already from our small starting-point to numbers which express the heat that falls upon the whole planet, and enable us to deal, if we wish, with questions relating to the glacial epochs and other changes in its history. We have done this by referring at each step to the little cube which we have carried along with us, and which is the foundation of all the rest; and we now see why such exactness in the first determination is needed, since any error is multiplied by enormous numbers. But now we, too, are going to step off the earth and deal with numbers which we can still express in the same way if we choose, but which grow so large thus stated that we will seek some greater term of comparison for them. We have just seen the almost incomprehensible amount of heat which the sun must send the earth in order to warm its oceans, and make green its continents; but how little this is to what passes us by! The earth, as it moves on its annual path, continually comes into new regions, where it finds the same amount of heat already pouring forth; and this same amount still continues to fall into the empty space we have just quitted, where there is no one left to note it, and where it goes on in what seems to us utter waste. If, then, the whole annual orbit were set close with globes like ours, and strung with worlds like beads upon a ring, each would receive the same enormous amount the earth does now. But this is not all; for not only along the orbit, but above and below it, the sun sends its heat in seemingly incredible wastefulness, the final amount being expressible in the number of worlds like ours that it could warm like ours, which is 2,200,000,000.

We have possibly given a surfeit of such numbers, but we cannot escape or altogether avoid them, when dealing with this stupendous outflow of the solar heat. They are too great, perhaps, to convey a clear idea to the mind, but let us, before leaving them, try to give an illustration of their significance.

Let us suppose that we could sweep up from the earth all the ice and snow on its surface, and, gathering in the accumulations which lie on its Arctic and Antarctic poles, commence building with it a tower greater than that of Babel, fifteen miles in diameter, and so high as to exhaust our store. Imagine that it could be preserved untouched by the sun's rays, while we built on with the accumulations of successive winters, until it stretched out 240,000 miles into space, and formed an ice-bridge to the moon, and that then we concentrated on it the sun's whole radiation, neither more nor less than that which goes on every moment. In one second the whole would be gone, melted, boiled, and dissipated in vapour. And this is the rate at which the solar heat is being (to human apprehension) wasted!

Nature, we are told, always accomplishes her purpose with the least possible expenditure of energy. Is her purpose hers, then, something quite independent of man's comfort and happiness? Of the whole solar heat, we have just seen that less than

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* Continued from page 30.

$\frac{1}{2000000}$—less, that is, than the one twenty-thousandth part of one per cent.—is made useful to us. "But may there not be other planets on which intelligent life exists, and where this heat, which passes us by, serves other beings than ourselves?" There may be; but if we could suppose all the other planets of the solar system to be inhabited, it would help the matter very little, for the whole together intercept so little of the great sum, that all of it which nature bestows on man is still as nothing to what she bestows on some end—if end there be—which is to us as yet inscrutable.

How is this heat maintained? Not by the miracle of a perpetual self-sustained flame, we may be sure. But, then, by what fuel is such a fire fed? There can be no question of simple burning, like that of coal in the grate, for there is no source of supply adequate to the demand. The State of Pennsylvania, for instance, is underlaid by one of the richest coal-fields of the world, capable of supplying the consumption of the whole country at its present rate for more than a thousand years to come. If the source of the solar heat (whatever that is) were withdrawn, and we were enabled to carry this coal there and shoot it into the solar furnace fast enough to keep up the known heat-supply, so that the solar radiation would go on at just its actual rate, the time which this coal would last is easily calculable. It would not last days or hours, but the whole of these coal-beds would demonstrably be used up in rather less than one one-thousandth of a second! We find by a similar calculation that if the sun were itself one solid black coal, it would have burned out to the last cinder in less time than man has certainly been on the earth. But during historic times there has as surely been no noticeable diminution of the sun's heat, for the olive and the vine grow just as they did three thousand years ago, and the hypothesis of an actual burning becomes untenable. It has been supposed by some that meteors striking the solar surface might generate heat by their impact, just as a cannon-ball fired against an armour-plate causes a flash of light, and a heat so sudden and intense as to partly melt the ball at the instant of concussion. This is probably a real source of heat-supply as far as it goes, but it cannot go very far; and, indeed, if our whole world should fall upon the solar surface like an immense projectile, gathering speed as it fell, and finally striking (as it would) with the force due to a rate of over three hundred miles a second, the heat developed would supply the sun for but little more than sixty years.* (*To be continued.*)

LANDSCAPE PHOTOGRAPHY.

BY PETER MAWDSLEY.†

I DIVIDE my subject into "four heads."

First: "Selection of View."

The foreground really constituting the picture, it is important that its details should be given due prominence on the plate. Mid-distance and distance are insufficient of themselves to form a pleasing picture; but judiciously combined with foreground and accessory to it, these will give an artistic whole which will always gratify the eye. Horizontal lines should be avoided; where such occur, the camera should be moved to right or left, and when that is not convenient, the objectionable feature should be hidden or broken up by the introduction of any movable object which may assist to do so; a branch of a tree or brushwood is generally within reach. I have found a wheelbarrow, horse and cart, or one or more figures, suitably placed, to do good service. In photographing buildings, never be satisfied with a mere front elevation, but see that it goes off in perspective; and in such cases particularly avoid an unbroken expanse of lawn or grass land; a few garden implements, lawn-mower, &c., will be of great service.

Second: "Lighting."

When possible, I should prefer to have the light from over the right or left shoulder, as the cast shadows give great crispness and brilliancy. Never photograph with the sun directly behind you, as the result would be excessively flat, all light, and no shadow. Whilst in pure landscape the above rules will generally hold good, in seascapes, on the other hand, I should prefer to have the lighting obliquely from the front, as, owing to the large volume of reflected light, the shadows would be well illuminated, and the reflections most brilliant. A first-class ship under full sail taken under such conditions would be a charming object. What I have said relative to seascapes, will generally apply to photographing snow and ice.

Third: "Lenses."

For pure landscape and seascape, there are none better than the old meniscus view lens, the only objection being its bulk, which is very great as compared with modern compound forms. It is preferable to include only a small angle of view, and to do this, a lens having a focus half as long again as the base line of the picture should be used—foreground and distance will be in harmony; whereas if a wide-angle lens is used, the foreground will appear unduly magnified, and the distance dwarfed. This characteristic, where the background is formed by a lofty range of mountains, is particularly objectionable. Most compound lenses are so constructed as to admit of the front combination being used alone, and as [this will approximately double the focus, a smaller angle of view will be included.

Fourth: "Development."

In subjects which, from the lighting or other conditions, are wanting in contrast, a strong developer which quickly brings printing density, will strengthen the high-lights and deepen the shadows; on the other hand, with subjects largely and deeply in shadow, the using of a minimum of the developer largely diluted, say with two, three, or more volumes of water, giving time and patience to the operation, will result in a negative the high-lights of which are not unduly dense; and an amount of vigorous detail will be secured in the shadows, which no other development (so far as my experience goes) will give.—*Photographic Times.*

STUDY YOUR SITTERS.

BY L. M. RICE.

As a rule, it may be truthfully said that nine out of every ten photographers make one sitting, at least, for each patron before thoroughly taking into consideration the case in hand. The old plea, as an excuse for hurrying up, to save the plate before drying, will hardly be offered in these gelatine times, and the artist may now take ample time to adjust the hundred and one things that go so far in the patron's mind toward giving satisfaction.

Does your sitter require a shadow or a plain lighting? or a side or a front view? Determine this before sitting. Is the patron an old man? Do not lose his individuality by placing him in some doubled, twisted position, or attempt a lighting for which he is poorly fitted. Study to preserve what belongs to him.

Is the subject a young lady? Well, this is something different, but no less a care for previous study. Do not get so completely inflated with the idea that if you get an excellent chemical effect, and what you conceive to be a fine attitude, that the result must necessarily please her and her many friends Remember that this lady has some ideas of her own, and it is not necessary to make a sitting or two before learning this fact. A stray lock of hair, or an unbecoming wrinkle in her dress—both of which the artist should have seen and adjusted before sitting—oftentimes calls for a re-sitting. The most natural expression is the one that comes to all subjects without thought of effect.

Is the subject a baby? Study to approach the little one carefully, and in a way that shall win, not only the child, but the mother too. Do not forget that where the babies are well handled, the parents are sure to go. The little ones have natures to study, and the better we understand them, the more captivating will be our success. Remember that it is not on the surface of things we find our highest success, but we should study, study deeply, for then we shall find our reward.—*Phil. Phot.*

Correspondence.

THE INTERNATIONAL INVENTIONS EXHIBITION.

SIR,—Permit me to direct further attention to a matter of considerable importance, and one likely to seriously affect the welfare of professional photography. It is the system of granting exclusive right to photograph according to the conditions enumerated on page 144 of your last issue, and alluded to in your "Notes" of that number.

Now, sir, it is only reasonable to suppose that an individual backed by such authority as the executive council, has an unparalleled advantage in the way of publicity over any other ordinary trader, for by judicious advertising, in addition to the newspaper mentions, he may induce innocent people in various parts of the country to withhold commissions otherwise intended for the local firms, in order to give sittings when visiting the Inventions.

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* These estimates differ somewhat from those of Helmholtz and Tyndall

† A communication to the Rochester Photographic Association.

Again, certain publishing houses have not been allotted space to exhibit their novelties, probably for the obvious reason that it would interfere with the *sole right*.

This appears to be a policy neither in harmony with free or fair trade, since the authorities, in proposing to take a share of the gross receipts by way of payment for special privileges granted, undoubtedly become virtually members of a trading firm.

Again, no one supposes that negatives so taken will only be of use during the period the exhibition is open to the public. Duplicates and enlargements will no doubt be obtainable afterwards. Moreover, should the arrangement prove lucrative, there is no guarantee that the commissioners will not run a permanent photographic establishment at South Kensington, and thus unfairly compete with professional photographers, whose business is sorely curtailed by the present general depression of trade. The primary object of all exhibitions of an international character is to foster industry, and the direct reward of industry is profit to those who compete—that is, the masses. When the authorities also take the profits, the object of the exhibition is defeated.—I am, dear sir, yours faithfully, W. M. ASHMAN.

SIR,—You have already called attention in your "Notes" to the seriously objectionable course proposed by the council of the International Inventions Exhibition, but really, the more the matter is considered, the worse it appears. Every legitimate object of such an exhibition seems stultified by being combined with a close monopoly in the exercise of a profession so honest in its emulation, and which mingles art with science, and science with art, more than—I believe I may boldly say—any other. In medical science only is there anything like so complete a training for a man as that which includes the fullest treatment of questions in art, chemistry, and optics? And what would be thought if it were proposed that medical men should tender for the sole right of exercising their abilities in a particular place, stating what share of their "profits" they were willing to hand over? And this is at an *Inventions Exhibition!*

There never was a time in which that increasing recognition of the deeply-seated contrast between different classes of men and their actuating motives was so clearly marked as at present; one sees, on the one hand, the inventor, ever active in his work from sheer love of it, and whose rich, and too often only, reward is the glow of heart at having practically solved his problem; and, on the other, the commercial speculator, ever on the look-out for "a good thing." Which of these classes was the Inventions Exhibition meant to encourage, and which of them is likely to be encouraged by this proposed monopoly? I am not assailing the capitalist who aids an inventor, and who, as he incurs the greater pecuniary risk, may justly expect a proportionate pecuniary profit. The contrast I refer to is between the commercial speculating spirit, and the spirit actuating those who lead the van in science even more than in art. Is it not too plain that it is just the earnest worker, whose profession "endows" his "research," who is to be injured, and the commercial speculator, with whom profit is the avowed motive, whose co-operation is invited?

Our country artists are to see their clients seize the "opportunity" of being "taken" at the Exhibition; our London artists to lose their legitimate chance among visitors who come to town; and the "council of the International Exhibition" are to share in such profits as may be made out of this business, filched from legitimate workers, after its extra and special expenses have been met. Thus it is that sufferers from depressed trade are to be comforted, and honest competition in excellence encouraged—a speculator is to have a monopoly at a fixed tariff!

The Executive Council do not bind themselves to accept the lowest or *any* tender. I sincerely hope not.—I am, sir, yours truly, W. H. WHEELER.

DEAR SIR,—The appearance of the notice of the executive council of the International Inventions Exhibition, inviting tenders for the exclusive right of taking photographs, suggests the idea that it would be desirable to ventilate the question as to whether such exclusive privileges are beneficial or otherwise, on the one hand to photography and photographers, and on the other to the community generally, represented particularly on this occasion by the exhibitors, whose right to have their works reproduced *in situ* is to be limited to the condition of employing the particular individual or firm appointed by the commissioners, and sharing profits with them.

With the view of starting a discussion, I beg to submit to the consideration of your readers some of the points that suggest themselves, and hope that others will bring forward argument in support of or in reply to either these or other points which occur to them, and that at all events some good, if only in the form of a clear expression of opinion, may accrue from the discussion.

In the first place, it seems an intrusion upon the right of the exhibitor to deny him the choice of the photographer who is to reproduce his exhibits. The contractor might not be working the process by which he would wish the prints to be executed, or he might wish to have the negatives taken by some photographer who has had special experience in the particular work that he requires to be done. In the great Exhibition of 1862 the work was certainly very good and satisfactory, but what guarantee can there be that a contracter selected for giving the largest share of his receipts to the management will always do likewise, and not endeavour to make his harvest by executing the work at as little cost to himself, irrespective of the perfection of the work, as possible? A strong argument in favour of exclusive concession at the time of the 1862 Exhibition no longer exists. Then the wet collodion process was employed, and there would be risk of damage by splashings from dark-slides and other spills which it would be difficult to trace to individual operators and obtain indemnity for; but the universal employment of dry plates has removed this weighty objection.

As to the desirability of public institutions competing with private enterprise, no doubt something may be said on both sides. It appears from the requirements of the tender that the tenderer "must specify the percentage on the gross receipts which he will undertake to pay," that the Executive Council becomes in some sort a partner in the photographic business to be carried on. Whether provincial or London photographers will suffer appreciably by the attraction of the studio to be erected in the building, from the desire of visitors to be photographed there as a memento of their visit rather than elsewhere, is another question.

The commissioners are evidently not desirous to be too hard upon the exhibitors in their limitation of the use of photographs by the latter, since they are to be allowed to distribute gratuitously such photographs of their exhibits as may have been taken before the articles were sent to the Exhibition.—I am, &c., W. E. DEBENHAM.

DEAR SIR,—My attention has been drawn to a notice appearing in your columns of last week, and recently issued by the Council of the International Inventions Exhibition; which notice has led me to wonder what the provincial photographers will find to do in the approaching season. This notice is literally an advertisement on the part of the Executive for partners in a gigantic scheme of photography at the forthcoming Exhibition, in which they specify what they are prepared to contribute towards the affair; and they are to fully share in the speculation by terms to be arranged.

As the natural result of this action of the Council (who will be specially interested in promoting and pushing the business), may we expect that "the privilege of being photographed" will be included in the ticket for railway fare and admission, as an additional attraction to visitors from all parts of the country? In the face of such vast monopolies as these, there is little cause to wonder at the present depression.—I am, dear sir, yours truly,

P. V. H.

DEAR SIR,—With reference to the tenders invited for the coming Exhibition, and of which notice was given in last weeks' NEWS, I contend that as it is to be solely an Inventions Exhibition, those inventions only which have made photography what it now is, should be exhibited. Apparatus of all kinds should be shown, but to have a studio erected for the express purpose of taking the public wholesale, which is nothing new, and which can be seen by everyone without going to the Exhibition, is merely an arrangement for putting money into the hands of the Council and the fortunate photographer whose tender is accepted. I should suggest that those photographs be exhibited which are done by different processes, such as Autotype, Woodburytype, &c.; and that such inventions should be shown in full working order. Photographs also should be exhibited that have been taken under extraordinary circumstances, such as astromomical, balloon, Muybridge's animals, &c. I should further suggest, that if a studio is to be erected, those who are photographed should be allowed to see the process of development, retouching, printing, toning, mounting, &c. As photography is to be shown as an invention, all its various branches should be seen in their different courses of manipulation; but to allow one photographer to have the sole right and benefit of photographing the different exhibits, and a studio of his own, in which he can make a little fortune, and not let the public be any the wiser as to how the thing is done, is, to say the least, very onesided. Let tenders for the different processes be invited, and then the world at large will see the wonderful strides photography has made, and also the many branches there are connected with it.

Gosport, March 3rd. A. J. WEST.

DEAR SIR,—Does not a paragraph in your last issue respecting the exclusive right to photograph in the coming Inventions Exhibition require a little explanation, especially the section (*a*): "the percentage on gross receipts which he (the contractor) will undertake to pay, &c.?"

Is this a new form of competition? and does the council become partner with the contractor by accepting share of receipts? Perhaps, in the interest of photography, some correspondent may be able to enlighten one who in these hard times is compelled to try and save every

SIX SHILLINGS AND EIGHT PENCE.

SIR,—It appears, from a paragraph in your last week's NEWS, that the Executive Council of the forthcoming International Inventions Exhibition propose to enter into partnership with any enterprising photographer whom they may select to take portraits at their show—probably, but not necessarily, the one who allows the greatest percentage on the work done, or puts down the greatest sum *in advance*. This is a new kind of competition we poor photographers in the provinces are not prepared for. It is hard enough to know that country cousins are only too fond of being "taken" by the regular West End swell photographers on their annual visit to town, while they bring their babies to galleries nearer home—and these are small mercies we are not always thankful for; but when they hear of the eminent firm who are going to provide a portrait gallery, with electric light and other necessaries for their working partner, like good Mussulmans they will turn their faces to the East to hail the electric light. It seems to me an *unfair* competition, that will affect the London photographers also, though not, perhaps in so great a degree as those who live in country towns, who are looking forward to sunshine and sitters after the dark days of winter. Executive Council and Co. will then be in full swing at profitable work, while others will only be allowed the privilege of "distributing gratuitously." I have had my grumble, in which, no doubt, many others will silently join. Can anything else be done? Hoping something may turn up, yours faithfully,

Derby, March, 2. MICAWBER.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

DEAR SIR,—The suggestion made by "An Operator" in your issue of 27th deserves consideration; and if some friends in different towns would convene the meeting proposed, the Committee would then have an expression of opinion from the fraternity, which is what they desire, and thus understand the reason of the Society, under its present system, receiving such scanty support. The point seems overlooked that benefit societies do not deal with the same matter as the Benevolent Institution; the former give a field sum in cases of sickness and death, but do not make allowance for its members being out of employment or other misfortunes; their benevolent fund generally consists of paying a member's subscription if he is unable to do so, or, under exceptional circumstances, granting £1 or £2. The Photographers' Benevolent Association, while not having a settled amount, covers these purposes and others which the Benefit Societies do not, according to the circumstances of the case and the funds at its disposal. This Association has also been the means of obtaining employment for many of its members, has furnished means for them to proceed to the provinces when required, and has rendered material pecuniary assistance to many whom adverse circumstances have placed in the position to need it. I would recommend every man to belong to a Benefit Society, but that should not debar him from joining the Benevolent Association; although he might not require its assistance, he would be contributing towards a fund with which his less fortunate fellow-workers could be aided in time of adversity. I should be pleased to receive intimation from any members of the fraternity who will take this matter in hand for their respective districts.

I would ask the employers requiring assistants to send me particulars of their requirements; it is by this means that considerable service is rendered. The members being found employment lessens the liability of a call upon the slender resources at the disposal of the Association as it stands at present. H. HARLAND, Sec. P. B. A.

181, *Aldersgate Street, E.C.*

HONEST AND DISHONEST ADVERTISEMENTS.

DEAR SIR, — Under the above heading, "Agitator," writing in last week's NEWS, asks, "without specimens, how is an employer to judge?" (meaning, of an applicant's abilities.)

I unhesitatingly say, if he cannot judge without them, he certainly cannot, in the majority of cases, judge with them. The specimens sent him by an applicant may be in every way satisfactory, and showing careful manipulation; but can the employer be so satisfied that the specimens before him are the applicant's own work? Suppose they are; are there not other qualifications an assistant should possess ere an engagement is entered into? "Agitator," like many others, asks for a remedy. I know of none but this: When I require an assistant, I simply advertise for an assistant in the particular branch for which I require him, asking for references and carte of self. This I consider necessary, as by a photograph—good or bad—one can judge, within a little, as to the personal appearance of the individual. This and his references being satisfactory, I arrange with him to come for a week on trial, with this understanding: If he is competent to fulfil the post for which I stipulate in the advertisement, and he is satisfied with the work, I then enter into a proper engagement with him. If, on the other hand, things are unsatisfactory, I pay his fare both ways, and there's an end of it. This is legitimate and fair to both parties.—I am, yours obediently, C. E. W.

VULCANIZED FIBRE.

Sir,—In the Photographic News of the 20th ult,. I noticed a letter from Mr. Frank Haes, in which he states that he has successfully used vulcanized fibre for "carriers for double dry plate backs."

I think he would have obtained a far greater success if he had used the hard quality, as I find the flexible contains a slight degree of glycerine which is most fatal for our work.

The hard material is not affected, like the flexible, by the atmosphere. I find the best glue for cementing this article is fish glue.—I am, sir, yours truly, John G. Moore.

TRANSFERRING PRINTS TO GLASS.

Dear Sir,—It may interest some of your readers who have not already found it out, to know that good transparencies may be made by transferring the films of prints on the new paper to glass.

I follow pretty closely the instructions issued with commercial negative paper, except that I get on better with the pyro and ammonia than with the sulphite developer. The process is as follows:—After development, squeezee on glass, leave for ten minutes, then immerse in water at about 36°C. The paper is ready to be peeled off in a minute or two, leaving the gelatine film firmly fixed on the glass. The image is fixed in hypo if necessary (the warm water generally is sufficient), and may of course be toned.

In trying a short time ago to strip in this way negatives produced on this paper in the camera, I found that where there were strong high lights, as skies, of which the image had gone right through the film to the paper back, it was almost impossible to strip them without tearing the film, if sufficient ammonia had been used in the developer to make the image properly insoluble. This effect also occurs in prints with very deep shadows, but this case is not so common as that of dense lights in negatives.

It seems to me that the simple plan of coating the paper first with a film of gelatine, and then with the emulsion, would make this paper all that is needed by those who are anxious to dispense with glass plates in the field. The soluble film next the paper would render the stripping easy, and the grain of the paper would then no longer detract from the qualities of the prints. A quicker emulsion than that used at present would also be an improvement.

I am a novice in photography, and have no facilities for coating paper, &c., and very possibly am wrong in my ideas, but I hope that some of your readers may think this worth trying, and give us their views on the subject.—I am, dear sir, yours obediently, Arthur T. D. Berrington.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 26th ult., Mr. J. Hubert in the chair.

Mr. J. M. Turnbull, on behalf of the Edinburgh Photographic Society, handed the chairman, as a gift from that Society, copies of the presentation prints issued to their members during the last three years.

The Chairman briefly expressed himself regarding the sympathy existing between the two Societies, and called for a vote of thanks, which was accorded.

Mr. Turnbull then passed round an improved shutter actuated pneumatically. The ordinary plan of revolving one plate of ebonite in front of another was here adopted, the speed being capable of adjustment. The improvement claimed was an elliptical opening to obviate the evil sometimes met with by the circular forms.

Mr. A. J. Brown contended that the best position for all double-acting shutters was between the lenses.

Mr. Turnbull agreed that such was the case; but when inconvenient, the next best position would be at the back.

Mr. J. Barker passed round a few prints, toned and untoned, to show the capabilities of a suitable gelatine emulsion for printing out; he promised to publish the formula shortly. He said the paper printed twice as rapidly as silvered albumenized paper, and that any colour of image could be obtained if the prints were soaked in dilute ammonium thiocyanate solution previous to toning. Coating he found a difficulty.

Mr. J. B. B. Wellington mentioned a coating method similar to that described on page 739, volume xxvii. He poured a quantity of emulsion on the paper, and drained off the excess.

Mr. Barker used a measured quantity; three drachms would cover paper 8 by 5.

Mr. J. H. Trinks suggested a method used on the Continent for coating commercial gelatine paper, viz., passing the paper along the surface of warm gelatine in a tray floating on warm water, thence over glass rollers.

Mr. A. Cowan showed the result of further experiments with perchloric acid in an emulsion; a batch kept at 150° F. for three hours was very coarse and rapid; this mixed with the slower batch mentioned last week gave very fine results. There was no fog in any of the plates; he had employed as much as one drachm of acid to 1,000 grains of silver without evil effects.

Mr. A. L. Henderson contended that as Mr. Cowan had not made two batches, with and without the acid addition, it was no proof that green fog had been retarded. He considered much depended on the quantity of iodide used.

Mr. Trinks said he found the simplest method of converting a gelatine negative into a chloride film was by treating it with cupric and sodium chlorides mixed, and he passed round the results. He also showed the facility such a film had for receiving a deposit of gold.

Mr. Henderson exhibited a plate-cleaning machine, and illustrated its action. Plates previously washed and soaked in potassium silicate solution were passed between two sets of red rubber rollers—a sort of wringing machine; attached to these rollers were squeezees, so that plates emerged comparatively dry, the thin layer of water-glass acting as a substratum, besides causing the emulsion to flow easily. He also passed round samples of a mixture he wished tested by emulsion makers; he would not then say its composition; it would be found useful as a substratum, an antiseptic, and to facilitate the speed of development.

At the close of the technical business, Messrs. C. and F. Darker entertained the members with some highly interesting and instructive experiments.

After some further experiments, the Chairman announced that the adjourned discussion on Messrs. Darker's lecturette would then be taken, and that Mr. C. Darker would answer any questions.

Mr. A. J. Brown said, regarding safety jets and safety valves, it was most important their action should be better understood by amateurs, who, in out-of-the-way places, generally officiated with the lantern. He wished to know whether the vibrating valve shown in action by Messrs. Darker was an indication of safety or danger; and he should be glad to know whether any safety jet was reliable, as no one had a right to issue a jet under that name without it was really safe.

Mr. Turnbull said he had used the spirit jet for years without accident, and he considered the oxy-calcium mixed jet with spirit perfectly safe.

Mr. Darker then related some cases where this kind of jet had not proved free from accidents, when the spirits of wine was allowed to become heated, and the vapour caught light.

After a short discussion, the Chairman, in suitable terms, moved a vote of thanks to Messrs. Darker, which was carried by acclamation.

It was announced that on Thursday, March 19th, Mr. A. L. Henderson would give a lecturette entitled, "Some Recent Experiments in Emulsion Making."

Liverpool Amateur Photographic Association.

The monthly meeting of this Association was held on Thursday last at the Free Library, William Brown Street, the President, Mr. J. H. Day, in the chair.

The minutes of the last meeting were read and confirmed.

Mr. Philip A. Cox was elected a member of the Society.

Mr. B Boothroyd read a paper entitled "A First Trip to Switzerland."

A discussion then followed on the merits of soda development, and Mr. Boothroyd showed four transparencies exposed 2¾ feet from the gas jet; No. 1 being exposed 17 seconds; No. 2, 30 seconds; No. 3, 60 seconds; and No. 4, 120 seconds. Nos. 1 and 2 were developed with full strength, and Nos. 3 and 4 with additions of ¼ water and ½ water respectively. Pyro 1 grain to ounce of soda solution. The four transparencies showed a range of gradation from clear glass to ample density, and wanted nothing but the clearing solution (which was purposely omitted for experiment) to make them quite fit for lantern slides.

Dr. Kenyon spoke of using nothing else, as he had had such success in his experiment, especially when using pyro combined with sulphite of soda neutralized with citric acid.

Dr. Paul, F.R.C.S., showed a number of photo-micrographs taken by himself. He said that a desire to photograph his sections led him first to learn landscape photography. He laid stress on being able to use ordinary apparatus, such as one had. He found lime-light best, and gave exposures varying from almost instantaneous with low powers, to a maximum of almost three minutes with high powers. He used the light direct from the lime-light to the plane mirror, and thence through the object; and focussed with a magnifying glass, retaining the eye-piece in the microscope. As the photo-micrographs were shown, Dr. Paul pointed out in the clearest manner the various points of interest, and a hearty vote of thanks was accorded to him and to Mr. Boothroyd.

It was then resolved that the Hon. Secretary, in conjunction with one or more members of Council, be authorised to acquire for the Society a first-class lime-light lantern.

Mr. Crowe exhibited some slides from negatives taken from the top of an omnibus which created much interest, it being evident that none of the figures which crowded the streets had been given time to pose themselves, many of the attitudes being comical in the extreme.

Glasgow Photographic Association.

A general meeting of the above Association was held in the Religious Institution Rooms on Thursday, February 19th, the President in the chair.

After the routine business was gone through, Mr. David McSkimming was elected a member.

Mr. Paton then gave a most interesting demonstration with the new rapid paper.

Chicago Amateur Photographers' Club.

At the Annual Meeting, held on February 16th (postponed from last month), the old officers were unanimously re-elected.

In the course of the technical discussion which followed, Messrs. Burnham and Greene called attention to the fact that both of them had latterly experienced much trouble from the curling of albumen paper on the silver bath. Both gentlemen stated distinctly that the cause usually assigned—dryness of the paper—was not a factor in the case, for they used the paper in a thoroughly "limp" condition.

No one could explain the matter, but Mr. Greene thought the cause was connected in some way with the extremely cold weather.

Mr. Bicknell had found a tube to carry the breath to the edge of the paper a decided improvement on the plan of blowing on it without such an instrument.

Notts Photographic Association.

At a meeting of the above Society held at the room, 9, Shakespeare Street, on March 2nd, Mr. Blandy in the chair, an interesting and instructive paper was read by the President (Mr. G. Shepperley), on "The Intensification of Dry Plate Negatives." A new practical description of the process, with illustration, was listened to with marked attention by a more than usually well-attended meeting, and at its conclusion a hearty acknowledgment was awarded.

The Secretary (Mr. Sands) showed a new "finder," which met with approval.

Some small instantaneous views, 1¼ in. square, of Nottingham Market Place, were also exhibited.

A lively discussion then ensued upon the subject of the evening, by Messrs. Bourne, Collins, Douahay, Sands, and several other members.

Talk in the Studio.

Improvements on Obernetter's Method of Photo-Engraving.—Mr. Pearson, of Birmingham, informs us that he has applied the method of Obernetter (see Photographic News, 1884, p. 67; and Year-Book for 1885, p. 113) to the production of type blocks, and he often finds it advantageous to use sine plates instead of copper. The method of working for making type blocks may thus be epitomised. A grained negative is made of a gelatino-bromide plate by first exposing the plate in the camera, or under a transparency, then exposing it under a fine network to give the grain, and afterwards developing. When fixed, the image is converted into chloride of silver by some well-known method, and the plate is placed with its film side in close contact with a slab of polished zinc, when the metal is gradually etched by the action of the chloride of silver. The action is still more rapid if the negative is moistened with a strong solution of chloride of zinc. Copper can be used instead of zinc, but in this case it is well to assist the action by an electric current. The negative film is stripped from the glass, laid on the metal plate, and backed up with any conducting surface. The positive wire of the battery is connected with the metal to be etched, and the negative pole with the conducting surface at the back of the film. In order to avoid using a reversed negative, the film may be stripped, whether the battery is used or not.

Gelatine as a Test for Moisture in Linen, etc.—Mr. W. B. Woodbury patents the following method of testing for damp with sheet gelatine:—Gelatine in thin sheets is cut into pieces of suitable size and form, but preferably in the shape of a pointed star. When such pieces are placed upon the linen or other article to be tested, if there be the least moisture in the latter the star-shaped leaf will absorb sufficient to cause it instantly to curl up at the points; but if, on the other hand, the linen or other article be perfectly free from moisture, the star will remain flat.

Toughened Filter-Paper, by E. E. H. Francis.—Filter-paper which has been immersed in nitric acid, rel. den. 1·42, and washed with water, is remarkably toughened, the product being pervious to liquids, and quite different from parchment paper made with sulphuric acid. Such paper can be washed and rubbed without damage like a piece of linen. The paper contracts in size under the treatment, and the ash is diminished; it undergoes a slight decrease in weight, and contains no nitrogen. Whereas a loop formed from a strip 25 mm. wide of ordinary Swedish paper gave way when weighted with 100 to 150 grams, a similar loop of toughened paper bore a weight of about 1·5 kilo. The toughened paper can be used with the vacuum pump in ordinary funnels without extra support, and fits sufficiently closely to prevent undue access of air, which is not the ease with parchment paper. An admirable way of preparing filters for the pump is to dip only the apex of the folded paper into nitric acid, and then wash with water; the weak part is thus effectually toughened.—*Chemical Society's Proceedings.*

Use of Sulphocyanate of Ammonium in Developing Carbon Prints.—M. Cornet finds that a cold solution of sulphocyanate of ammonium may be used instead of warm water for developing carbon prints, and M. Chardon used a solution containing twelve per cent. with success; but he found it rather slower in its action than warm water. It is difficult to see the practical advantage of using a cold solution of ammonium sulphocyanate instead of warm water; but M. Chardon points out that in the case of over-exposure it is advantageous to add from three to five per cent. of the sulphocyanate to the warm water employed for developing.

Substitute for Yellow Glass in Isochromatic Photography.—When isochromatic plates are used, it is generally necessary to cover the coloured original with a sheet of yellow glass; but as it is difficult to obtain thin patent plate of just the tint required, it is found convenient to use white patent plate coated with a film of coloured collodion. Some time ago Obernetter proposed to tint the collodion with turmeric, but Dr. H. W. Vogel prefers to use an aniline colour for tinting the collodion; the so-called methyl-orange being the colour which he finds to be most satisfactory. This colouring material, when dissolved in plain collodion, yields a film which is much to be preferred to any glass in the market, as it allows the yellow, green, and red to pass much more readily. Azaline plates, with a yellow glass, require about six times the normal exposure; but with glass coated with the above-mentioned coloured collodion, only three and a half times the normal exposure is required.

THE ASSOCIATION OF PHOTOGRAPHIC ASSISTANTS IN VIENNA.—This body, which corresponds in some measure with the Photographers' Benevolent Association of London, has now a journal of its own—*Der Photographischen Mitarbeiter*. It is edited by the president of the Association, Herr Hans Lenhard.

THE NEW YORK COMMITTEE FOR TESTING GELATINE PLATES.—The New York Amateur Association is beginning to find that real difficulties stand in the way of issuing candid and thoroughly satisfactory reports on commercial gelatine plates; and the whole question was brought up for discussion at a meeting held on the 28th of January last. That the plates of every maker vary more or less, few who have worked with commercial plates can doubt; and, moreover, it is notorious that plates deteriorate when kept under certain conditions. Let us suppose, in the first place, that in every instance the plates reported upon are samples specially sent by the manufacturers to be tested; and in the second place let us assume that the samples are purchased in the ordinary way of business by some representative of the committee. In the first case we may be sure that all the plates will be good ones, and in the second the plates may either be favourable or unfavourable samples of the makers' general turn-out. There is scarcely any analogy between testing a batch of plates and reviewing a book, as in discussing the merits of the book one may assume that each copy of the edition in question possesses equal value to the reader; but who can assume that all the plates turned out by any maker during a given period are of equal excellence?

THE COST OF A PATENT.—At the County Court before Mr. Collier (judge), an action was brought by Mr. William Walker, patent agent, West Derby, against Mr. H. B. Sharpe, of the firm of Newton and Co., South John Street, opticians, for the recovery of £18, a balance alleged to be due as charges for obtaining provisional protection and making out final specifications and completing patent. Mr. H. L. Riley appeared for the plaintiff, and Mr. Broadbridge for the defendant. Mr. Sharpe, it appeared, had invented a form of spiral legs for photographic and other apparatus, and had employed the plaintiff to secure a patent in respect to the invention. The sum of 12 guineas had been paid into court by the defendant, in addition to £2 paid before the action, and the defendant alleged that these sums were sufficient to satisfy the plaintiff's claim. After hearing the evidence, his Honour decided that the sum paid into court was sufficient, and a verdict was therefore given for the defendant.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting, on March 11th, will be on "Daguerreotype."

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To Correspondents.

*** We cannot undertake to return rejected communications.

ONE IN THE WEST.—As far as the mounting of the pictures on glass is concerned, you will find full details in the article on Mr. Matthew Whiting at Home, on page 67 of the present volume. The frames are made by the process known as "spinning," the principal requisite for this being a lathe arranged to run at a very high rate of speed.

W. BARRY.—Thank you for the second batch of pictures, which are certainly a step in advance on the last. Your article is in type, and we will write to you in the course of a few days.

R. BLAKEWORTH.—We can hardly spare time to try it and report, but no doubt you can find some one who will undertake the task.

G. C. H.—1. The illumination is far more uniform. 2. One can hardly judge without seeing the articles, but it is hardly likely that a good instrument can be made for much less than the largest sum mentioned; but everything depends on the quality of the material and the excellence of the work. 3. Send a print for us to see.

A READER.—The most comprehensive series of articles is that contributed by Major Waterhouse to the PHOTOGRAPHIC NEWS. See also Abney's "Instruction in Photography" (Piper and Carter).

R. J. WILSON.—Unless our view of the case is an incorrect one, you cannot very well defend your copyright, unless each subject is registered in due form before any sales are made. It does not appear to be essential to print the word "copyright" on each impression. See an article by Mr. W. S. Bird on page 100 of our volume for 1884.

F. M. S.—1. Our impression is that there is no thicker paper made, but your best way will be to write to the mill and enquire.

F. A. GRUT.—We think not; but write to the Autotype Company, Oxford Street, London, and ask the question.

WM. BIRRELL.—1. It should be kept at a heat of 140° to 150° Centigrade for about half an hour. 2. No, the thinnest is several times as thick as ordinary tinfoil.

HERBERT.—There is no such book.

STUDIO.—1. Small; only 4 feet wide by 3 feet high. 2. Four feet from the floor.

T. STOKOE.—It only happens in cold weather, and those who have communicated their experiences to us have found no difficulty to arise on this score. Your second communication to hand—next week.

A. G. BROPHY.—1. It does not by any means meet the case as you now put it, and, moreover, it is out of print. 2. It would be better to try and get it made by a local workman, as the London artificer is notoriously unwilling to go out of his usual course. 3. It ought not to cost more than a few shillings.

J. M. THOMAS.—Read Mr. Debenham's article on the subject, PHOTOGRAPHIC NEWS volume for 1884, p. 804.

M. D.—See page 113 of the YEAR-BOOK.

EBBW VALE.—1. Cold water will answer quite as well. 2. It appears in another column.

JOHN ADAMS.—That of Mr. Woodbury, to be had from the Sciopticon Company, Colebrook Row, Islington.

BRAGANCA.—1. About ten seconds. 2. Yes; leave it out altogether, or reduce it to a small fraction of what you use at present.

PACO.—1. We cannot recommend special makers. In this case you can well judge by mere inspection. 2. Gold alone is to be preferred in all ordinary cases. 3. There is none. 4. Not having had any experience in this direction, an opinion would be valueless. 5. We will write to you. 6. Perhaps two or three minutes; but it is much better to allow ample time. One can learn a little by careful observation, but not much. 7. Chalk is carbonate of lime.

J. D. W.—Considering that you have obtained no impression on an ordinary plate, we do not think that you are likely to be able to get a satisfactory negative on an isochromatic plate. It will interest us very much to have details as to your work.

D. W. L.—We are inclined to attribute the spots to the action of the mount. Test as advised on page 57 of the present volume.

ARTIST.—1. Churchill, New Burlington Street. 2. It is published by Hartleben, of Vienna, and can be had through any foreign bookseller. 3. A transparent positive. 4. Soak it in the following until it becomes white, then wash:—

Water	4 ounces
Hydrochloric acid	¼ ounce
Bichromate of potassium	1 drachm

K. K. A.—There is no means known of getting the kind of tone you require, and as the image is merely to serve as a guide, there is no necessity for a black tone.

GEORGE THOMPSON.—No. 2 appears to us to be preferable.

O. E.—Heavy rolling is the only means.

MEDICO.—The snow scenes are admirable, and we hope to reproduce some of them.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1384.—*March* 13, 1885.

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ON THE TESTING OF LENSES.

In the *Photographischen Wochenblatt* of 26th February, there is an article on the testing of photographic lenses. In writing on "cheap lenses," we gave it as our opinion that comparatively few photographers know how to set about testing a lens. Bearing this in view, we would willingly give our readers the advantage of all that the editor of the *Wochenblatt* has to say on the subject; but, unfortunately, his article is very long. We shall, however, endeavour to give the gist of what he writes.

In the following four questions he conveys an idea of what direction the testing operations are to take—that is to say, what qualities we have to investigate in various lenses.

1. "What degree of definition will the lens give, and through what angle?"

2. "What is the relation between the aperture and the focal length—that is to say, what is the rapidity of the lens?"

3. "What is the relation to the focal length to the circle on the ground glass which the lens will illuminate?"

4. "How nearly do the chemical and visual foci of the lens coincide?"

The writer of the article pertinently remarks that although it might be supposed that we could find an answer to question No. 2, and that part of No. 1 which refers to the angle of view included, in the lists of opticians, such is not the case. The practice which some lens manufacturers have of stating as the apertures of their lenses the diameters of the combinations, instead of the opening of the stop; and of giving the back focus—which it is quite unnecessary to know—instead of the equivalent focus, renders their figures quite useless except for comparing the lenses of one particular list together. Again, some opticians, in stating the size of plate that a lens will cover, take care to be well within the mark, so that there will be fair definition to the very corners. Others mention the very largest plate that will come within the circle of illumination.

It will be noticed that in these questions nothing is said of curvature of field, depth of focus, or of presence or absence of distortion. It is, however, explained of depth of focus, that this is entirely determined by the focal length of the lens and the aperture, being quite independent of the form of the lens. It is pointed out that the investigation into the quality and extent of definition will naturally result in a discovery of what curvature of field exists.

It is often taken for granted that lack of marginal definition is synonymous with curvature of field. Now there can be no greater mistake than this. Lack of marginal definition may arise from curvature of field, but it may also be due to either of two other defects, namely, lack of correction of marginal rays for spherical aberration, or astigmatism. It is easy to tell whether lack of marginal definition is due to roundness of field, or to either of the other two defects mentioned. If it be due to roundness of field, pure and simple, it will entirely disappear if the ground glass be brought into a certain position nearer the lens. The marginal definition will then be as good as the central definition was before the ground glass was shifted. If the lack of definition be due entirely to spherical aberration of oblique pencils, or to astigmatism, any change of the ground glass will only make it worse. With a given amount of lack of marginal definition, that lens will be the best in which the fault is entirely curvature of field. In this case, the form of the object may be such—as, for example, in the case of a group with the figures at the edge nearer the lens than those in the centre—that the fault will not be evident. Indeed, for certain subjects, the lens which exhibits, with a flat object, lack of marginal definition due to roundness of field only, will do better than one with a flat field; but with the other faults, no disposition of the subject will make matters better.

The difference of effect produced by spherical aberration of oblique pencils, and of astigmatism, may readily be seen if a cross thus: + be drawn on a piece of paper, and be focussed with a lens so that it falls on to the margin of the ground glass either near the top or near the bottom. If the lack of definition at the margin be due to spherical aberration, both the horizontal and the vertical line of the cross will show with equal distinctness. If it be due to astigmatism, one line will be sharper than the other.

In most cases, lack of definition at the margin of the ground glass when the centre is sharply focussed, is due to both curvature of field and spherical aberration of oblique pencils, often with some astigmatism superadded.

The test for absolute central definition should be made without the ground glass, a very short focus eye piece being used, or still better, the focussing glass may have a clear spot in the middle. The quality of definition at a distance from the centre of the ground-glass is examined in the same way, the eye-piece being moved in the direction of the axis of oblique pencils nearer to or farther from the objective till the position of maximum sharpness is reached.

Extent of curvature of field is judged of by the aid of the ground-glass. An object such as a straight brick wall is selected, the camera is placed opposite it with the axis of the lens perpendicular to it, and the focussing is performed for the centre of the ground-glass. It is then observed how far it is necessary to approach the ground-glass to the lens to cause a spot of the image near the edge of the ground glass to be in as sharp focus as it is possible for it to be.

A good deal is said by the editor of the *Wochenblatt* on the disadvantage of the non-coincidence of visual and chemical foci of a lens, but he gives no means of testing whether they do or do not coincide, probably considering that the plan of fixing several numbered cards at slightly different distances from the lens, of focussing for the central one, of taking a photograph, and of observing whether or not the card which was sharpest on the screen is sharpest on the photograph, is so well known as not to require description. There is probably no better plan for the photographer to adopt than this, although it is true that an experienced optician can tell merely by examining the image of a flame which is cast by an objective whether the latter is under or over corrected. Imperfect achromatism causes the flame to be fringed with the various colours of the spectrum. If there be under-correction, the fringe in red towards the centre of the flame; if there be over-correction, it is violet.

Curiously enough, there is no word said about testing for absence of distortion. It is true that in professedly rectilinear lenses we seldom find distortion present to such an extent as to make the instrument useless for architectural work. We may, however, come across one which will show that slight error which will render it unfit for some kinds of copying work. It is only necessary to focus a straight line—say, a stretched thread—near the periphery of the circle which the lens will illuminate, and to test with a straight-edge whether the line given in the image is straight or not, to discover whether or not the instrument gives any distortion. It must be borne in mind that if there is distortion, it increases enormously with the distance from the axis of the lens. It is therefore advisable to use a focussing glass so large as to include the whole illuminated circle, and to turn the camera so that the straight line comes as near the edge as possible; any distortion which may exist will then be made very evident.

The last words of the article in the *Wochenblatt* are deserving of all attention:—"These tests must be conducted with an amount of care and exactitude which require much time and uninterrupted work, if any useful result is to be attained."

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THE UTILISATION OF SILVER RESIDUES FROM OLD EMULSIONS.

How much silver is present in silver precipitates or compounds obtained from waste materials? This is a question often asked, and the following table will answer it as regards certain compounds. When in a pure state—

Sulphide of silver contains...	... 87	per cent. of silver
Chloride of silver contains...	... 75	" "
Bromide of silver contains...	... 57	" "
Iodide of silver contains ...	... 46	" "

In obtaining silver haloids from old gelatine emulsions, the gelatine is ordinarily decomposed by strong acids or alkalies, after which the silver salts can be washed and collected on a filter.

Such a precipitate, although not consisting of absolutely pure salts of silver, is extremely rich in the metal; and Dr. Eder has made some experiments to determine the value of silver compounds recovered in the manner alluded to. The following table shows his results:—

	I	II	III
Water	1·25	0 58	—
Organic matter (gelatine)	4 89	10·37	—
Silver bromide	92·04	—	—
Metallic silver, soluble in nitric acid	0 57	—	—
Yield of silver obtained on fusion with sodium carbonate and potassium cyanide	52·09	41 82	35·07

The sample No. I was silver bromide, which was obtained from the emulsion by treatment with sulphuric acid and subsequent washing. It was quite friable, and darkened when exposed to light.

Sample No. II was a similar, but less carefully washed sample, and it was compact rather than friable. It contained about twice as much gelatine as the first.

No. III was merely tested as to the amount of silver present. It consisted of residues from emulsion making, and also old films. The whole was treated with sulphuric acid and washed.

When caustic soda is used to decompose the gelatine, the silver residues are always dark coloured, and contain a large proportion of metallic silver; but if we may deduce general results from Dr. Eder's analyses, it may be taken that such residues as one obtains by destroying the gelatine of old emulsions contain approximately half their weight of silver.

◆

THE BEHAVIOUR OF THE HALOID SALTS OF SILVER IN THE SOLAR SPECTRUM, AND THE EXALTATION OF THEIR SENSITIVENESS TOWARDS CERTAIN PARTS OF THE SPECTRUM.

BY DR. JOSEPH MARIA EDER.*

In the case of my own photographic investigations, a large spectrograph by Steinheil, of Munich, has done me good service, and the same may be said of a small direct-vision instrument, made by the same optician. Fig. 3 represents the large instrument in section. The light first passes through the slit at A, this slit being adjustable by a milled head at O. The adjustable slit A is in the focus of a convex lens, B, and after having passed through this, the rays traverse three prisms, C, D, E, these prisms being made of light flint glass, and having a refracting angle of 50°. The resulting spectrum is projected on a plate at the end, G, of the photographic camera, G, H, F.

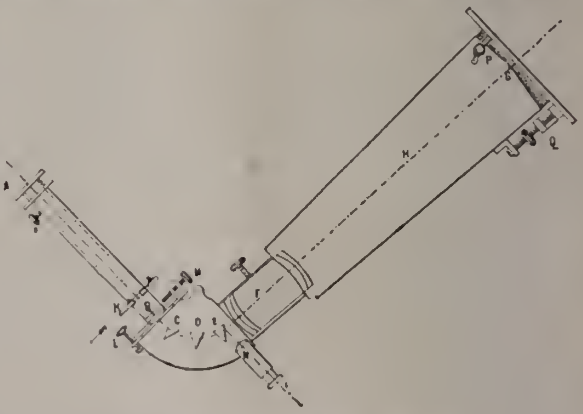

Fig. 3.—STEINHEIL'S SPECTROGRAPH (SECTION).

The objective of the collimator, B, has an aperture of 34 millimetres, and a focal length of 325 m.m., while the photographic objective, F, has an aperture of 54 m.m., and an equivalent focus of 600 m.m. The glass of which these lenses is constructed is selected with the view of allowing the ultra-violet rays to pass as freely as possible, consequently the instrument now described gives considerable brightness of the spectrum in the blue and violet parts of the spectrum.

The refractive power of the prisms are as follows:—

D, μ equal 1 57852
F, μ " 1 58829

With the spectrum, a scale can be photographed; an image of this scale being formed by the objective N, and reflected into the camera from the face of the last prism, as shown at N, E, F. In the collimator at K there is fixed a so-called guillotine shutter, this being required in order to give exposures of the necessary rapidity when working with direct sunlight. The adjusting screws, L and M, serve for shifting the collimator in order to bring any required part of the spectrum into the middle of the plate, while at P and Q are provided the means of inclining the sensitive plate.

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* Continued from page 146.

It may be mentioned that the slit of the apparatus, A, may be accurately adjusted to one-thousandth of a millimetre, and an accurately constructed micrometer screw governs the adjustment. A slit-opening of 0·02 m.m. gives very well-defined Fraunhofer's lines, but I sometimes work with an opening of 0·01 to 0·1 m.m., but in this case the lines lose some of their sharpness.

Fig. 4 is a general view of the large Steinheil spectrograph. The slit is at A, and it is made to approach towards or recede from its objective by means of an adjustment at O. The guillotine shutter, K, has a round opening, and it can either be actuated very quickly by means of a spiral spring, or it can be made to remain open at will by means of a catch-arrangement. The nature of the adjustments, L and M, has already been explained, and it is scarcely necessary to say that the arc-like box, M, N, V, contains the three prisms. At N is the scale, F is the photographic objective, H the camera, and R the runners for the dark slide. On a plate 12 by 16 centimetres, one can obtain three spectra by shifting the slide. Sliding screens made of blackened metal S, S, are provided for the purpose of cutting off any portion of the spectrum which may not be required, and the screws, U and V, serve to enable the worker to keep the direction of the collimator towards the sun. Under these circumstances the use of a heliostat, which always makes some change in the quality of the solar light, is avoided.[*] The whole instrument is balanced by adjustable weights, T, T. The length of the spectrum given by this instrument corresponds to a distance of 12 centimetres from the line A to the line N, and it is not practicable to photograph satisfactorily with it beyond N, owing to the absorbtion which takes place in the optical parts. Excellent definition is obtained, and but moderate exposures are required. As example, it may be mentioned that with a slit 0·04 m.m. wide, and a gelatino bromide plate, an exposure of from one-tenth of a second to one second, will serve when direct sunlight is used. Eosine plates require from double to four times this exposure, while with cyanine a somewhat longer exposure is necessary. Plates stained with iodine-green, methyl-violet, &c., require an exposure of from ten to one hundred and sixty times.

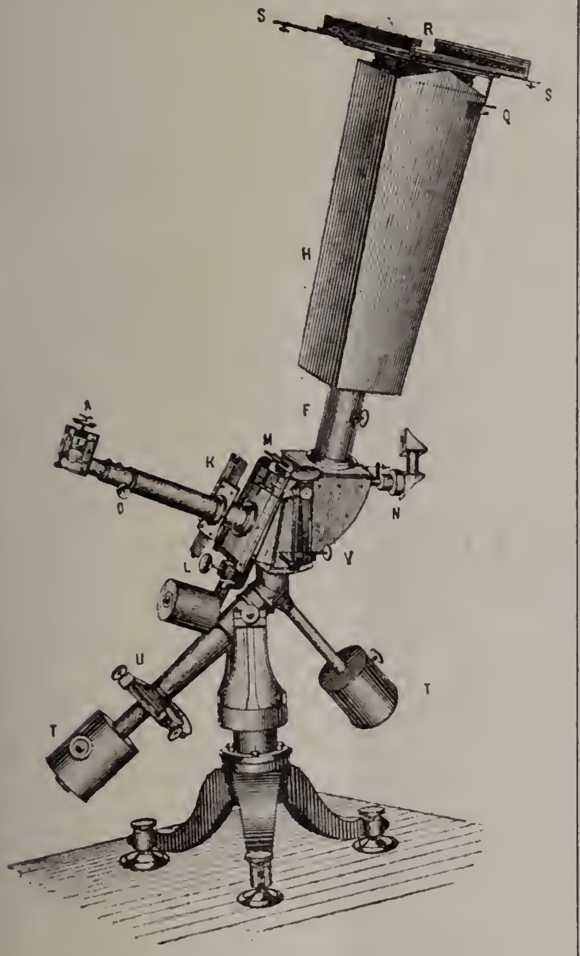

Fig. 4.—STEINHEIL'S SPECTROGRAPH (General View.)

When the apparatus is directed towards the blue sky or a cloud, the lines obtained are not so sharp as when direct sunlight is made use of. Under the former circumstances strong optical sensitizers—*e. g.*, eosine, &c.—are very well marked in their action; but weak optical sensitizers—*e. g.*, the majority of colouring matters—are so feeble that it is quite easy to overlook their action altogether.

The small direct-vision spectrograph already referred to was made after the design of Dr. W. H. Vogel, and it is represented in section by Fig. 5. Before the slit B is placed a condensing, lens A, which serves to concentrate the light upon the slit, and the other side of the slit is an objective, C, having a focal length of 81 m.m.

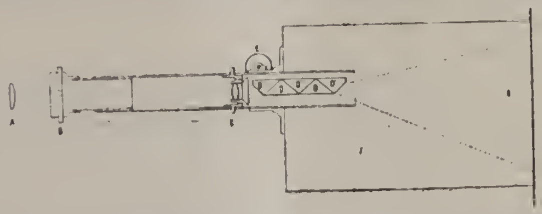

Fig. 5. DIRECT-VISION SPECTROGRAPH.

The prism system consists of three crown glass prisms D′, having refracting angles of 100° 20′ 0″, and of two flint glass, D, having refracting angles of 105° 0′ 0″. The refractive energy of the prisms is as follows:—

Crown.—For D, $\mu = 1{\cdot}6533$
For F, $\mu = 1{\cdot}6669$
Flint.—For D, $\mu = 1{\cdot}5107$
For F, $\mu = 1{\cdot}5168$

The dispersion from D to F is equal to 4° 6′ 40″, and consequently about 15° for the whole spectrum. The other parts of the instrument almost explain themselves, but it may be mentioned that E is the adjusting screw for focussing the lines upon the sensitive plate at B. The dark slide can be so shifted as to enable five spectra to be obtained on a single plate.

The spectrograph in question gives scarcely any spectrum of the ultra-violet, and, indeed, but little beyond H. Still, notwithstanding this, and the circumstance that the photographs obtained are less clear than those produced with the larger instrument, the small apparatus possesses the advantage of being portable and convenient to handle.

The influence of the two instruments upon results becomes very obvious when we compare the chemical action of the solar spectrum as mapped out by their aid. The small direct-vision spectroscope, with a prism of crown and flint combined, weakens the action in the visible violet considerably, as the following diagram (fig. 6) indicates.

The effect is most noticeable when a gelatino-chloride emulsion is used, and the development is with a ferrous citrate developer. Curve 1 in the above diagram (fig. 6) shows how the maximum is close upon 11, when the large spectrograph is used, the dotted line showing the result when a short exposure is given; while in the case of the small direct vision instrument the maximum lies between G and F. Indeed, the difference between the two curves is so great that one can scarcely believe that the same silver salt is being dealt with.

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[*] Light reflected from silver mirrors is deficient in the ultra-violet rays, and platinum forms a much better reflector for the ultra-violet (De Chardonnt, Cornu.)

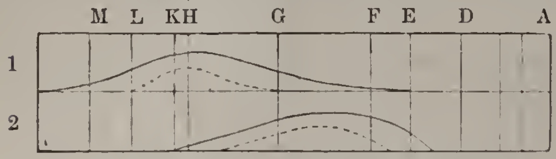

Fig. 6. SPECTRA ON SILVER GELATINO-CHLORIDE.
1. With large Steinheil spectrograph. 2. With small direct-vision instrument.

Even when the large spectrograph is used, the maximum of action shifts to a very notable extent, according as the violet or the bluish-green is in the middle of the field, and this result throws doubt upon some of the distinctions which have been drawn between various modifications of bromide and chloride of silver. It is, however, a striking circumstance that, as far as my own observations go, the sensitizing action of red, yellow, and green colouring matters is so energetic that the maximum is shown in the same place, whichever apparatus is used; but as experiments about to be described were all made with the large instrument, they are unquestionably comparable among themselves.

Bromide of Silver in a Gelatine Emulsion.—When a solution of ammonia silver nitrate is mixed with excess of ammonium bromide in the presence of gelatine, a finely-divided form of silver bromide is formed, and this silver bromide is red when viewed by transmitted light. A plate coated with this emulsion and dried, shows, after short exposure to the solar spectrum and development with ferrous oxalate, or with alkaline pyrogallic acid, an action from the violet to the bluish green (from H to a point near F), and the maximum of action between G and F. If, however, a longer exposure is given, the action will extend in both directions; as, for example, from M to E. The curve 3 (Fig. 7) gives a representation of the action of light on such a plate as that referred to; the dotted line showing the action with short exposure, and the solid line showing the action when a longer exposure is given.

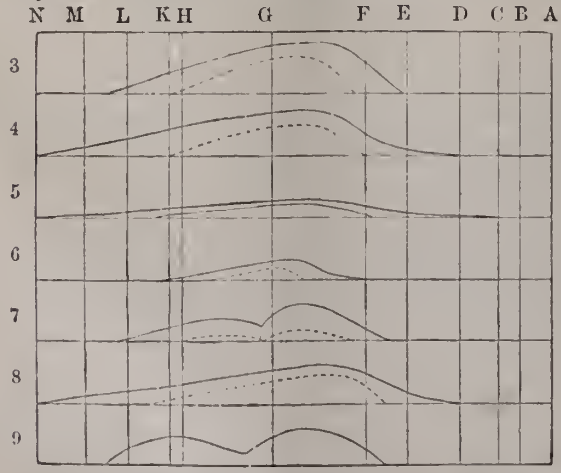

Fig. 7, 3 to 5, spectrum curves on various forms of silver gelatino-bromide. 7, On silver gelatino-iodide. 8, On iodide and bromide digested together. 9, On mixed iodide and chloride.

When the above-mentioned ammoniacal emulsion is digested at a temperature of 30° to 40° Centigrade for half an hour, or it is boiled, the silver bromide passes into the finely-divided granular condition. Under these circumstances, the grains become larger, and a thin layer of the emulsion allows blue light to pass through, while the general sensitiveness to white light is considerably exalted. At the same time, the sensitiveness to the violet and green of the spectrum increases, while the maximum of sensitiveness shifts a little towards F, taking a position about midway between G and F. Notwithstanding this, the action between G and F appears to be less energetic than before; the curve representing the action of the spectrum becoming flattened down in this locality. Curve 4 (fig. 7) shows this, and it will be seen how the action extends from D to N (or even farther) when the exposure is prolonged. The dotted line shows the result of a short exposure.

When the digestion is prolonged to the extent of from three to ten times that referred to as necessary to produce the cited result, the condition of the silver bromide approaches towards decomposition, the curve obtained on its exposure to the spectrum changing at the same time. It becomes still more flattened, gives no easily recognizable maximum, the photographic image lacks vigour, and a notable exaltation of sensitiveness is the result, not only with respect to the white light, but also towards the less refrangible rays of the spectrum. Curve 5 (fig. 7) shows these differences.* Gelatino-bromide emulsions having the capability of giving results corresponding to the curves 3, 4, and 5 may be readily produced at will. That corresponding to curve 2 is produced with most certainty when the silver bromide is formed in the presence of a large proportion of gelatine (*e. g.*, 5 per cent. of the fluid), and a minimum of ammonia is used in conjunction with short digestion. An emulsion corresponding to curve 4 is produced by a moderate digestion of that giving curve 3. Most commercial gelatino-bromide plates give analogous results in the spectrum, and such plates are best adapted for general spectral work, such as is detailed in this paper. It is therefore unnecessary for me to apologize for giving working details for making the required emulsion.

Thirty grammes (463 grains) of silver nitrate are dissolved in 250 cubic centimeters (8 oz. 7 drachms) of water, as much ammonia is added as will serve just to redissolve the precipitate first formed. In another vessel 22 grammes (339·5 grains) of ammonium bromide, 0·3 grammes ($4\frac{1}{2}$ grains) of potassium iodide, and 40 grammes (617 grains) of hard Winterthur gelatine, are dissolved in 250 cubic centimeters (8 oz. 7 drachms) of warm water. The first solution (silver) is now added gradually to the gelatine solution, and care must be taken to thoroughly agitate during the time of mixing, and during the operation the temperature of the solutions should not exceed 30° Centigrade (86° F.) The emulsion is now digested for half an hour at a temperature of from 30° to 40° Centigrade (86° to 104° F.), after which it is poured out into a dish and allowed to cool. In about six or twelve hours time it is cut up into small shreds, and then washed for ten hours in running water. It can now be melted, and plates may be coated; but if it should be necessary to remove some of the water, this may be done by soaking the shreds of emulsion in alcohol. The emulsion will keep months if immersed in alcohol. The small amount of iodide present makes the images clearer than they would otherwise be, and prevents the spectral lines running into each other; but no drawback seems to result from this use of iodide. The first experiments on the action of colouring matters were made without iodide in order not to complicate the result.

A gelatino-bromide giving results corresponding to curve 5 may, as already mentioned, be made by a prolonged digestion of the preparation just referred to, but more easily when the amount of gelatine present during the time of the digestion is reduced to the proportion of half per cent. of the fluid, the rest being added immediately before the cooling. A silver bromide in a similar condition is contained in emulsion made by Henderson's "cold emulsification method."

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* Photometric experiments described in my *Ausfuhrliches Handbuch der Photographie*, vol. i., page 183, prove that bromide of silver in this condition gives a developable image with a very short exposure, but the intensity of the image does not increase proportionally with the action of the light. The action soon reaches a maximum which cannot be exceeded, consequently modelling is lost in the high lights.

Iodide of Silver in Gelatine Emulsion.—When iodide of silver is precipitated with excess of potassium iodide, it is several hundred times less sensitive than the bromide. With very long exposure, and development by alkaline pyrogallic acid, a weak image in the neighbourhood of G is obtained, and by a still longer exposure this stretches out towards H and F; the maximum being between G and F, curve 6 (Fig. 7).

If ready-washed bromide emulsion is mixed with from ten to fifty per cent. of washed iodide emulsion, the sensitiveness of the mixture to white light sinks somewhat, but, on the other hand, the clearness of the plates becomes greater, and the tendency towards halation becomes less. In the spectrum there now appear two maxima; one between G and H, and another between G and F, this latter being generally the stronger of the two. Between these maxima is found a point of minimum action. The action of the spectrum on the mixture of gelatino-bromide and gelatino-iodide is shown by curve 7 (Fig. 7).

The behaviour of mixed iodide and bromide, pointed out by Abney, and clearly made apparent in the course of my experiments, left it an open question whether these two maxima could be made to merge into one by prolonged digestion, or whether they would retain their individuality.

My own experiments show that the separated maxima made with the mixture of the two emulsions (bromide and iodide) lose their identity when the mixed emulsion is digested for a period of half-an-hour to one hour. A similar result is obtained when the two haloids are formed together by adding silver nitrate to a gelatinous mixture containing potassium bromide, with potassium iodide, and digesting the emulsion. The sensitiveness of such an emulsion towards the less refrangible rays of the spectrum was found to be greater than of a pure bromide emulsion, and the maximum of action is shifted a little towards F; this being shown in curve 8 (fig. 7). The best mixture to use is one containing the haloids, in the proportion of one molecule of iodide to from eight to twenty molecules of the bromide. Although the emulsion, rich in iodide, may be more sensitive to the green, it must be remembered that the emulsions poor in iodide give more vigorous and better images.

The photographic behaviour of the iodo-bromide emulsion forces us to the supposition that a kind of double salt containing the two haloids is formed; a supposition made more reasonable by the fact that a mixture of equal molecules of chloride of silver and iodide of silver melts at a much lower temperature than its constituents. According to Kohlrausch, the melting-point of silver chloride is 485° Centigrade, that of silver iodide 540°, and that of chlor-iodide 260°. The action of heat and that of light thus jointly point to the probability of a true combination. It must also be remembered that the existence of the crystallized bromo-chloride of silver, which is known to mineralogists as embolite, must be taken into consideration.

Chloride of Silver in Gelatine Emulsion.—When ferrous citrate or ferrous oxalate is used as a developer, this salt is less sensitive than bromide of silver to white light. Curve 1 (fig. 6) shows the spectrum image on a gelatino-chloride emulsion, the photograph being produced in the large Steinheil spectrograph. The maximum is close to the boundary of the visible violet near K H, and the action extends from N to F. A mixture of chloride of silver emulsion with ten to thirty per cent. of iodide emulsion gives two separate maxima; one of these is near H (chloride), the other between G and F (iodide), and the whole will be made clear by an inspection of the curve 9 (fig. 7). By digestion or boiling, these maxima become united as in the case of the brom-iodide emulsion, only not so easily, and not in every case. Chlor-iodide emulsion bears stronger developers than a simple chloride emulsion, and the sensitiveness of the chlor-iodide approximates more nearly to the sensitiveness of bromide, but without reaching that of the latter.

(To be Continued.)

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WALTER B. WOODBURY.

One of the familiar names in the history of photography is that of Woodbury; in a work by a French writer, Davanne, this name is placed next in rotation to those of Talbot, Daguerre, and Nièpce; and Mr. Woodbury's most notable achievement is the invention of the permanent printing process which bears his name. For a score of years, photographic and other scientific literature, also the records of the Patent Office, bear witness to the wide range of his knowledge, and to the ingenious activity of his inventive powers.

It is doubtful, indeed, if the inventive faculty has not been too powerful for his material interest, impelling him on new lines of research before garnering a harvest from seed earlier sown. Photographic inventors have rarely won any conspicuous reward; the field open to them scarcely admits of great financial success. Such a complete invention as the Woodburytype, for example, became practical only through a long series of experiments, by which each stage of operations is perfected; the labour employed must be trained to manipulative skill, and half the term of a patent may expire before success is sufficiently assured to attract capital, by which the process may be developed into a profitable industry.

The subject of notice has had his successes and his disappointments, and taken each with equanimity. Recently, however, his health became seriously undermined before its cause was suspected; and without health, the prosecution of his business enterprises was impossible. The crisis of affairs being serious, and becoming known to his friends, the regard, sympathy, and good will towards Mr. Woodbury found expression in the shape of an influential committee, determined to appeal to the photographic and literary world for subscriptions to a fund which should afford him means and leisure to recover his health; and therefore the opportunity of establishing his stannotype process, and completing improvements in block-printing, which he has begun.

In the advertising columns of this journal will be found the names of the gentlemen forming the committee, and the first list of subscriptions received.

Mr. Woodbury was early attached to photography, and at about the age of seventeen determined to carve out a career for himself, and started, with a modest photographic outfit, for Australia, in 1849. Here he acquired for himself mastery over his materials, and in a few years we hear of him in Java, single-handed, improvising a studio, struggling with the difficulties incident to a tropical climate, and creating quite a sensation with excellent portraits, produced, from beginning to end, with his own hands. The first month, working twelve hours a day, realised a considerable sum of money, but this eventuated in a serious illness of three months. In 1859 he returned to England with a series of exquisite views taken in the Island of Java; these were purchased by Negretti and Zambra.

In 1860 Mr. Woodbury returned to Java, and established himself in the capital, Batavia. Those who remember the difficulties that beset the collodion process five-and-twenty years ago will appreciate the obstacles to be overcome in a hot and humid climate, with a vertical sun in the midday hours. For success a fund of resource was necessary, and Woodbury was equal to the task.

Health giving way under the climate, he returned to Europe, and having already in his mind the genius of the process which bears his name, he determined to give his faculties free play, and devote himself to invention.

From 1864 to 1884, Mr. Woodbury took out no less than twenty patents, some, of course, dealing with the production of photographs in relief, and printing from metal intaglios; others for producing designs on wood, paper, metal, cloth, &c.; and a series dealing with improvements in optical lanterns, stereoscopes, kaleidoscopes, barometers, hygrometers, and photographic apparatus. In the course of this period he contributed to the *English Mechanic* an exhaustive series of papers on the various scientific experiments which could be shown in the optical lantern, and these articles were subsequently republished under the title of "Science at Home." His contributions to the Photographic Journals and Year Books have been numerous, and a correspondence he entered into with Professor Tyndal was published by that gentleman in the columns of *Nature*. Mr. Woodbury also edited, illustrated, and published a work containing a series of views from all parts of the world, entitled, "Pleasure Spots of the World."

Woodbury claims, with justice, to have initiated in France the method of photo-gravure, since worked to great perfection by the house of Goupil; his name is associated with improved actinometers, with balloon photography, with the process of artificial but inimitable water-marking of paper, called photo-filigrane, and many more items of interest and utility.

Sufficient has been said to show his multifarious activity of mind, the variety and value of his contributions to photographic art, and his many years of scientific service. The committee believe that its action on behalf of Mr. Woodbury will meet with a prompt and generous response. Contributions had better be sent direct to the Treasurer of the Fund, Mr. W. S. Bird, 74, New Oxford Street.

A Dictionary of Photography.

BARIUM, Ba=137 (βάρος, weight; the most common compound of barium being the native sulphate or heavyspar).—A metal belonging to the alkaline earth group, and of which some of the compounds have been employed by the photographer. The oxide of barium, BaO, is ordinarily known as barytes, and when brought into contact with water, it slacks like quick lime, and gives rise to the hydrate of barium, BaH_2O_2. This hydrate is moderately soluble in water, and yields a strongly alkaline solution.

The *Sulphate of Barium*, which has already been referred to as being known under the name of heavyspar, is, when finely ground, largely used as a white pigment, and is sold as "permanent white." Sulphate of barium, when precipitated by mixing a soluble barium salt with a soluble sulphate, is employed to give opacity to the gelatinous coating with which the transfer paper of the carbon printer is coated, and there are several other analogous uses for it. The nitrate of barium is occasionally used as a means of converting the protosulphate of iron into the corresponding nitrate, solutions of the two salts being mixed together in equivalent proportions, when sulphate of barium is precipitated, and the nitrate of iron remains in solution. Nitrate of baryta is often added to the negative bath as a cure for pinholes. An old bath always contains sulphuric acid or soluble sulphites, and when nitrate of barium is added, the insoluble sulphate is thrown down, and this appears to carry with it the excess of haloids which causes pinholes. At one time the addition of nitrate of barium to the sensitizing bath for albumenized paper was advocated, but it is seldom used now-a-days.

The chloride, bromide, and iodide of barium are readily soluble in water, and may be used in salting paper, or in the production of chloride, bromide, or iodide of silver by double decomposition; but it does not appear that any special advantage results from the use of the haloid compounds of barium.

BAROMETER (βάρος, weight, and μέτρον, a measure).—This instrument, in which a column of mercury is so balanced against the pressure of the atmosphere as to show all variations of the latter, is so well known as to need no description in this place; but the following remarks from the pen of Captain Abney, relating to the barometer as a prognosticator of sunshine, will be read with interest. Captain Abney says:—

"There seems to be a great argument in favour of the fact that the probable amount of sunshine varies with the height of the barometer, and this has long been recognised by the manner in which our so-called weather-glasses are marked. At 30·5 in. they read, set fair; at 30 in., fair; at 29·5, change; at 29 in., rain; and at 28·5 in., much rain. It may be almost predicated that the more free from cloud (*i.e.*, the more sunshine there is) the fairer the weather appears, and so we may look upon the weather-glass indications as 30·5 in., sky clear; 30 in., few clouds; 29 in., average number of clouds; 29·0, cloudy; 28·5, very cloudy. This is as Mr. Whipple classifies them in a communication to the Meteorological Society in 1879. In it he dismisses the relation of the height of the barometer to the amount of sunshine, and comes to a conclusion which for Kew in the years 1877, 1878, shows that readings of the barometer as regards amount of sunshine are most misleading.

"At Kew, for those two years, the maximum sunshine appears when the barometer has a height of about 30·15 in., and when higher the cloud-mist returns, till at 33·6 in. the sun shone no more than when the mercury stood at 29·2 in. In London and neighbourhood, if this record is any guide, the weather may be expected to be most favourable for landscape work when the barometer is at about 30 in., as then there should be a proper proportion of cloud and sunshine to give those effects of light and shade which photography can render so well. When the sky is perfectly cloudless, a photograph is not so rich in gradation as when there are white fleecy clouds about, which act as reflectors to light up the cloud-shadows.

BASE and BASIC.—*See* Acids, Bases, and Salts.

BAS-RELIEFS, PHOTOGRAPHIC.—Very beautifully-modelled bas-reliefs may be obtained by moulding from a film of bichromated gelatine which has been exposed under a negative, and developed by the action of hot or cold water in the following directions, be found quite practicable.

Clear sheet gelatine, about a thirtieth of an inch in thickness, can be obtained from most of the lithographic material warehouses, or may easily be prepared by drying a gelatinous solution on a levelled and slightly-waxed glass plate, and this sheet gelatine is the starting point of the work. A piece of it is soaked in a cold 3½ per cent. solution of potassium bichromate until it becomes quite flaccid; after which it is laid on a sheet of clean glass, and all excess of the solution is chased away by means of a squeezee, so as to establish contact between the glass and the wet gelatine. The glass plate bearing the sensitised film is now placed in a moderately warm place to dry, from four to eight hours being sufficient. The dried film can be easily detached from the glass by lifting one corner by means of a penknife, after which it should be exposed under a negative until all details become apparent on the gelatine, a quarter-of-an-hour in moderate sunshine being an average exposure. The exposed film is next soaked in water for some hours, in order that the parts unacted on may become duly swelled. It is next laid, face upwards, on a sheet of glass, and is squeezeed down, as before, after which the surface is dabbed with a soft cloth to remove adherent water. A little oil is now applied to the surface of the relief, and all excess of this having been removed by a soft rag, four pieces of wood are so placed as to form a border, when all is ready for pouring in the plaster of Paris. This substance, mixed with water to the consistency of a thinnish cream, is now poured into the mould to a depth of about an inch; while in order to remove any air-bubbles from the face of the relief, a broad camel's hair pencil is passed through the liquid plaster, and worked to-and-fro, a few times, over the gelatine. When the plaster is set, the border is removed; and by holding the plaster cast in one hand and the glass plate in the other, a very gentle force serves to make the sheet of gelatine slide off the glass plate, but the gelatine still remains on the plaster, One corner of the sheet being now lifted and turned back, it becomes quite easy to strip it from the plaster without in any way damaging the finest details of the original or the cast.

The plaster mould having now been produced, one may cast or mould from it in type-metal, copper (by electrotyping), ebonite, or other materials.

ART IN PHOTOGRAPHY.

BY J. K. TULLOCH M.D.[*]

If I am right in my conception of what is meant by the "fine arts," I must exclude photography from this category. The question has been discussed times without number; since it is still frequently debated, I suppose it is as far from settlement as ever. I think a good deal of the confusion has arisen from forgetting that in the term "technical art," we have a complementary expression which in a great measure helps us to understand what is meant by "fine art."

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[*] Read before the Dundee and East of Scotland Photographic Association.

"Technical art" is the power of producing the best results by the simplest means. Thus, to borrow an example from photography itself, there are various degrees of art in coating gelatino-bromide plates: one must use a spreading rod, another a touch with his finger occasionally, while a third has art enough to coat as he would a plate with collodion, and using neither finger nor spreading rod. This is technical art, and is simply the power of making the most of things. Fine art in no way differs from this, except in that it refers to making the most of things by the head in place of the hand, and is limited only by the limits of the imagination of the individual. The very essence of fine art is that the mind is free to do its best. Painting is fine art, in that the picture is a true representation of the ideal of the artist. Sculpture, poetry, and music are fine arts, in that they each represent effects in the individual minds of the authors. If a photograph be a work of fine art, then every photograph (provided it be technically good) ought to reflect the ideal of the photographer. On the other hand, should there be a single blade of grass in his picture which he would rather have out, it is enough to prove that he is the creature of circumstances, and that his photograph is not the work of his head, but of his hands, and consequently not a work of fine art. Fine art is not in canvas, or marble, or words, or notes—these are but the exponents; but fine art resides in the brain and imagination of the artist, and he is at liberty to choose his medium of communication according as is a painter, a sculptor, a poet, or a musician. In no sense can the camera and chemicals be said to be only the brushes and pigments: the latter are humble servants with no will of their own; the former are masters of the situation, and with their own notions of what they shall take, or what they shall leave.

Since, then, we cannot make our own terms with our stubborn friend, we can advise with him, and if we have no further say in the matter, we can at least determine the point of the compass to which we shall turn our lenses, and the time of day at which we shall expose our plate. If by these means we are not always able to pourtray only the beautiful and suppress the commonplace, nevertheless we can add materially to the pictorial value of our productions by arrangement on our part.

In examining the hundreds of pictures in an art exhibition, the designs are so numerous and varied that one would conclude that the artist had no settled plan of building up his picture so that it might tell its story systematically. Yet this is not so. You will find that the story which the picture tells has, like other stories, a beginning and an end. A pattern mosaic has neither, and you have experienced the restless feeling of the eye as it wandered over the surface, not knowing where to begin or where to leave off. Contrast this sensation with that of viewing a well-composed picture. Here the eye picks up at once the evident leading point, and, without being entirely arrested there, it passes on by inperceptible gradations over the whole canvas till it settles naturally in the quietest and most remote corner. Confusion is never beautiful, and there ought to be no dubiety as to the order in which we are to pick up the various points before us.

Photography is so apt to give us confusion from its painful definition, that whatever plan promises to disentangle the mass for us ought to be known and practised. You will find that even in groups, artists never give the same equal prominence to each member as we do in our photographs. We are tied down by our lenses; we must arrange our groups in semi-circle, or certain of the number shall be unrecognizable; still, to be right, there ought to be a leading point in the picture which the eye could at once pick up. Unfortunately, in everyday life this arrangement would not be tolerated by those who were placed slightly behind, so that one's hopes of improvement here are visionary. It is not so in landscape, however, and we can pick and choose our leading object without engendering jealousy. I shall show you a photograph with an unmistakable leading object, and you will find that it lends to the picture distance and breadth not attainable without it.

With regard to the position of this point, it must not be so placed as to rivet the attention to the spot. Were it placed in the centre, for instance, the eye would refuse to leave it, which is not what is intended. To place it too far to the side again lessens its influence, so that individual taste comes in here. I shall now show you certain photographs where, from the absence of this point, the effect of distance is poorly rendered, and confusion is introduced. There ought not to be two such points. This, then, is the first requisite: that every picture have a leading point; the second requisite is balance.

I do not know if there is any deeper reason for a picture having a certain balance than that the eye demands it. I have noticed that different individuals have different ideas as to how much balance ought to be introduced into a picture, but all are agreed that by no means must both sides of a picture approximate in value sufficiently as to make it uncertain to which side the attention ought to go first. This is only a repetition of what has been already stated—viz., that there ought not to be two leading points in any picture.

As to the position of this balancing object, as a general rule you will find that if the leading point of a picture be placed well to the side, balancing object ought also to be kept well to the other side. On the other hand, should the leading point be towards the centre, the balancing object ought also to approach the centre. The eye, however, must be left more or less to determine these points, as it is a matter of individual taste. If the leading point in any picture approaches the centre, the balancing object is less important from the fact, of course, that with the leading point here there is not the same sense of want of balance. As, however, the centre ought never to be occupied by this point, we have to consider balance in every picture.

A very common fault in street photography is to have had the camera so placed as to show equally both sides of the street; the effect is always monotonous. Artists invariably throw the bulk of the interest to one side, showing only enough of the other side to balance well; variety is introduced by this means. In interiors where, from the restricted space, this cannot be done, you will find, if you examine examples by good painters, that they concentrate the interest on one side by introducing figures or groups of figures, or by some other means. A picture that can be cut into identical halves is in reality two pictures, not one.

The last requisite in a picture which I shall mention is breadth. It is by no means easy to explain what is meant by this term; many are under the impression that it refers to a "slap dash" execution; but this is not all the meaning. Breadth is not incompatible with fine finish and great detail. Breadth is that quality in a picture which renders the design evident from a distance. A picture painted with proper breadth of effect may be examined from a distance, but ought not to suffer by closer examination. It is true that artists often suppress detail in order to gain breadth, but if the detail were not more forcible than it should be, it would not break up the effect of the larger masses, and would not require to be suppressed.

The evident design of a picture ought to be quite distinguishable from such a distance as puts the detail entirely out of sight.

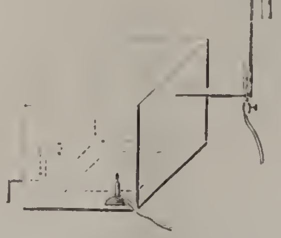
The question now comes, how can we influence breadth in photography. As far as I am aware, only in two ways: first, by selecting such subjects as have themselves fine large masses of light and shade; secondly, by choosing the most suitable light. It is evident that unless there be bold colour contrasts, it is useless to expect breadth of effect in a photograph taken in a flood of diffused light, which necessarily robs the scene of its shadows. On the other hand, where the contrasts are naturally strong, such as under trees or by waterfalls in enclosed places, diffused light will give the best effect, as a rule. Many more points could be taken up in this neglected branch of our art, but as this short paper is only intended for mere beginners, it would only introduce confusion to enlarge further at this time. The three cardinal points for them to remember are, first, to try, if possible, to have a definite leading point; secondly, to look to the balance; and thirdly, to choose the lighting which will separate the various parts of the picture most effectively.

Notes.

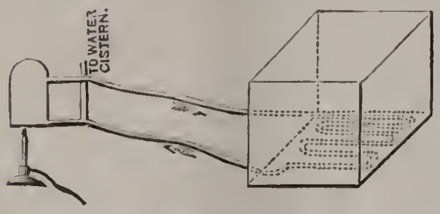
"Miller's Dale, Derbyshire," from the camera of Captain Abney, is a picture in the truest and best sense of the word; but when it comes to the reproduction of such delicate gradations as exist in an original like that from which our supplement of this week is reproduced, it is a question whether any photo-mechanical process will altogether hold its own against a direct print from the negative.

The next ordinary meeting of the Photographic Society of Great Britain will be on Tuesday, the 7th of April, instead of the 14th. The drying of plates was talked of at the last meeting.

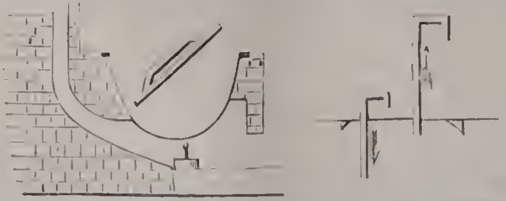
Mr. Cadett finds that a drying box like that shown below answers well; in fact, it is easy to dry plates in two hours. Explanation is unnecessary, except to say that the box is made of wood; its sides are about 30 inches square, and a sheet of iron about 18 inches square is let into the bottom. Neither the door nor the internal fittings are shown, as each person can arrange these matters to suit his own views.



Captain Abney uses a very similar drying-box, but he heats it with a hot water apparatus, as shown below. The small boiler at the left-hand side of the drawing may be made of sheet copper, and the zig-zagged tube, through which the water circulates in the drying-box, is ordinary soft gas-pipe, technically called "compo pipe;" half-an-inch in diameter being a convenient size for this pipe. The boiler (in which, by-the-bye, the water should never actually boil) need not be in the same room as the drying-box.



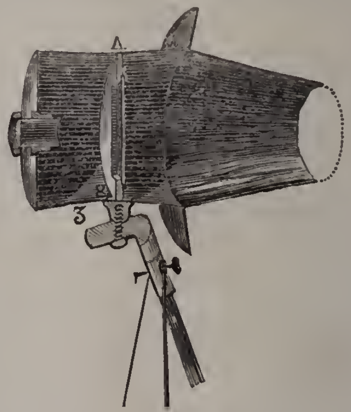
An excellent plate-drying arrangement, which exists ready to hand in every house, and is available for the use of any person whose diplomatic tact is equal to the task of dealing with the authorities below stairs, is here represented. Suffice it to say that if the "copper" is actually made of copper, and the lid is placed as represented in the sketch, a sufficient draught will circulate to dry the plates in the shortest night, even if the source of heat is only a large night-light. In other cases it may be necessary to use a gas flame, an oil lamp, or several night-lights.



As blocking up the window of the back kitchen and locking the door generally imposes the obligation of rising very early on the part of the plate maker, it is an excellent plan to make a light-tight and ventilating lid to the copper, this lid being shown in section at the right-hand side of the sketch. Still, a regard for the truth compels us to say that our experiences with the light-tight lid have not been nearly so satisfactory as with the ordinary wooden lid placed aslant; more heat is required, and the drying is slower.

A photographer has been advertising cartes of Khartoum. Seeing how much that ill-fated city has occupied the attention of our Ministers of late, there must be more "Cabinet" views of it than cartes.

M. Léon Dumuys, writing in *La Nature*, tells his readers how to make a camera out of a hat. The frame inside the hat takes a plate of ground glass, which serves as a focussing screen, and the author recommends a kind of portfolio slide containing sensitive films. M. Dumuys, however, does not say whether he or anybody else has actually taken a picture with the arrangement.



A curious law case has been decided in the County Court at Bridgewater. Mr. Palmer sat to Mr. A. Squibbs, a photographer having a studio in the town, and seems to have given some kind of permission for the resulting picture to be exhibited in the shop. The photographer, however, had a coloured enlargement made from the negative, and this was taken round the town by a canvasser. Mr. Palmer, disapproving of this course, and finding remonstrance of no avail, put his foot through the canvasser's case, and spoiled the enlargement. After much argument, the judge ordered him to pay 3s. 6d. for the damage done to the case, 3s. 6d. the value of the glass broken, and 1s. the value of the card on which the photograph was mounted.

Why does not the Amateur Photographic Association have an exhibition? We asked this question some weeks ago, and it is still unanswered. The executive of the

Association is well manned; the Earl of Rosse, Mr. James Glaisher, the Prince of Wales, the Archbishop of York, the Marquis of Drogheda, and Dr. Arthur Farre being members.

A representative exhibition of the works of amateurs would be a novelty, and should certainly be organised, as there is no denying that in photography the amateur often equals—even if he does not surpass—the professional.

One characteristic of an Amateur Exhibition would be entire absence of "shop"; the real amateur show being in this respect a striking contrast with the exhibitions of so-called amateur work which enterprising tradesmen make in their shop windows or their places of business as a means of advertising their goods.

"Taken by an amateur, and with our own guinea set of apparatus," is a kind of announcement now getting quite common at such exhibitions; but the pictures are generally on sale!

When an exclusively amateur photographic exhibition is organized, and prizes are offered for amateur work, it will be necessary to clearly define the amateur as distinguished from the professional. In making the distinction one can take a hint or two from the 'cycling world, and the definition will stand something like this. An amateur photographer is one whose pictures are not sold, who has not taught the art of photography either for money or as a means of selling apparatus. The "maker's amateur" is the *bete noir* in 'cycling competitions just now, and he may become disagreeably prominent in photographic circles when an amateur exhibition is organized.

The numerous objections to the establishment of a "Joint Profits" Portrait Studio at the Inventions Exhibition may be summed up in a few words. The Council have no right to establish a business or trade in the building, when such business or trade has neither any bearing on the main objects of the Exhibition, nor is necessary as a means of supplying the personal wants of the visitors while they are on the premises.

If the Council should obtain a sharp business man as a partner in this concern, they will only realize a trifling sum as their share of the profits—unless, indeed, they can control the outside business done with negatives taken at the Exhibition—a sum quite insufficient to compensate for the reproach which will rest upon the Exhibition. Readers should refer to pages 136, 144, 147, and 155.

On page 164, and incorporated with Dr. Eder's comprehensive paper on the behaviour of the haloid salts of silver in the spectrum, will be found his revised formula for an emulsion for general work. This is of value as embodying the latest experience of Dr. Eder.

Mr. W. K. Burton estimates that the development paper is about one thousand times more sensitive than ordinary albumenized paper.

FERROUS TARTRATE—A DEVELOPER FOR RAPID PAPER.

BY W. LANG, JUN.*

The developer which I bring to-night before the notice of your Society is that of ferrous tartrate. As far as I know, this body has not been employed in the development of the latent image, and perhaps the reason for this is not far to seek, inasmuch as ferrous tartrate is a very insoluble body. If you take a solution of ferrous sulphate, and add to it a solution of neutral tartrate, you get a copious precipitate of the tartrate of iron. If we take a freshly made solution of ferrous sulphate—and here I would urge the necessity of having always this salt freshly made up—and add a little ammonia, we get a bulky precipitate of ferrous hydroxide, and this, quickly dissolved up in a solution of tartaric acid, forms a clear solution, and constitutes the developer which we are now considering. Taking 4 drachms of a concentrated solution of ferrous sulphate, I add 4 drachms of water, and thereafter 1 drachm of strong ammonia, losing no time, as the ferrous hydroxide oxidises very fast; I dissolve up the precipitate in a concentrated solution of tartaric acid. When the hydroxide is on the point of being completely dissolved, the addition of the acid has to be made very cautiously, otherwise, if an excess be given, the ferrous tartrate will come out of solution sooner than you want it. In putting forward the ferrous tartrate developer to-night, I do so with considerable diffidence, and more with a view to place on record the fact that I have been making a series of experiments with this form of a developer; and further, I would have it understood that it is not put forward as capable of developing a film where the haloid salt of silver consists of pure chloride; in fact, in experimenting with Warnerke's paper, which contains chloride with no admixture of bromide, I find it impossible to develop an image free from general veiling. As you are aware, silver chloride for a long time was supposed to be incapable of development. The first to devise a means of bringing out the latent image was Dr. Eder, and he employed a solution of ferrous citrate, obtained by double decomposition when a solution of ferrous sulphate and one of citrate of potash or other alkaline citrate are brought together. This develops silver chloride, giving an image having tones more or less red. Abney followed with his ferro-citro-oxalate, made by dissolving ferrous oxalate in a strong solution of citrate of potash; this gives, however, a black image.

The other developer for silver chloride, due also to Capt. Abney, is that of hydrokinone, an organic body that possesses in combination with an alkali a great affinity for oxygen, and it seems to me that if there is to be a future at all for this alpha paper the true developer of such a paper is to be found in hydrokinone. I think it is questionable whether an iron developer can be used at all in the development of an image which has afterwards to be tried by means of gold. Unless the iron developer be thoroughly eliminated from the film (a very difficult matter), precipitation of gold is bound to take place within the film when the paper is immersed in the toning bath, and a more or less mottled image the necessary consequence, while the same cause operates in giving degraded whites. The ferrous-tartrate gives an image very closely resembling the sun-printed one on a small albumenized paper. I have experimented with a great number of reagents to see if I could delay the precipitation of the ferrous tartrate, among others an infusion of quilla-bark, which in some circumstances prevents solid bodies coming out of solutions; but I could not find any appreciable difference when this body was used, and when it was not. The addition of boracic acid to the concentration of tartaric acid solution has certainly a beneficial action, the solution remaining longer clear; and this acid I now invariably use along with the tartaric in making the ferrous tartrate solution The deposit of the salt seems in no way to injure the image, even should the dish in which development is being carried on be not kept in motion. Development I find can be greatly assisted by a flat camel-hair brush. If weaker solutions than what I have specified be employed, I find the whites become degraded. As I have already mentioned, the getting the iron out of the film is what is really required; the alum solution which is recommended for this purpose will decompose traces of the iron developer left in the film, but it must be remembered that the alum at the same time hardens the film, and tends to lock up, so to speak, within its pores, these very traces it is meant to destroy. Could the alum not be profitably replaced by some other sulphate—say, a sulphate of alumina? This is a salt that is much more soluble in water than ordinary alum, and consequently would act more energetically, and I do not think that it has quite so hardening an effect on the gelatine. I have recently made some experiments with this salt, and they seem to promise fair, only I would not like yet to speak positively as to its action. Again, I think the form of gold toning bath has a good deal to do with the final results. In my hands the acetate bath tends to weaken the picture. I have been using with advantage the sulphocyanide toning bath, and a very slight immersion therein is all that is necessary, the strength of bath being 6 grains sulphocyanide ammonium to 1 grain gold for every ounce water. Sulphocyanide ammonium is also a fixing agent; but the strength here indicated is rather weak for the purpose, so that the hypo bath must be resorted to as usual. Before closing this communication I may mention that I have tried several other organic iron developers for the development of this alpha paper made by dissolving the freshly precipitated iron hydroxide in the respective acids, viz., formic, lactic, acetic, &c. I find that they all act as developers; but the tones are inclined to be somewhat black, none of them producing the bright red tones procurable with the ferrous tartrate.

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* Abstract of a paper communicated to the Glasgow and West of Scotland Amateur Photographic Association.

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THE PRODUCTION OF A BRILLIANT DEPOSIT OF PLATINUM UPON GLASS, ETC.

BY PROFESSOR RALPH BOTTGER.*

In order to succeed in coating porcelain or glass with a perfectly faultless film of platinum, of the brilliancy of silver, it is indispensably requisite to make use of a perfectly dry chloride of platinum, which must be as free from acid as possible. To that end pour some oil of rosemary over the perfectly dry chloride of platinum in a small porcelain mortar, and knead it up with the pestle, renewing the oil about three times, and continue this operation until at length there is produced from the brownish-red chloride a soft plaster-like mass, the colour of which is as black as pitch, and wherein no particles of undecomposed chloride of platinum are discoverable. The oil of rosemary assumes hereby a more or less yellow colour, in consequence of its partially taking up chlorine from the chloride of platinum. When at length we have arrived at converting the whole of the chloride of platinum into the black plaster-looking mass spoken of, rub it well up with the pestle, after pouring the oil of rosemary off, with about five times its weight of oil of lavender, and continue to do so until it has become a perfectly homogeneous thin fluid. It must then be left to stand for half-an-hour or so, for it is not until after that interval that it can be used with advantage for platinising.

For the production of the brilliant platinum film, all that is now required is to apply the mass as uniformly as may be, and in the thinnest possible coat, to the objects of porcelain, earthenware, or glass by means of a soft, delicate brush. The thinner the coat of the above described preparation, the more brilliant the film of platinum subsequently proves. When, in fine, the articles have been gone over as thinly as possible with the fluid comformably with these instructions, all that is required further is to subject them for a few minutes to a very low, scarcely-perceptible red heat, either in a muffle, or in the flame of a Bunsen's gas blow-pipe used with caution. The articles receive from this baking (supposing always that the temperature described has not been exceeded), without requiring any subsequent treatment, an incomparably beautiful lustre, as brilliant as silver.

If, by any oversight, the coating of platinum upon the articles has turned out faulty, or in the case of breakages occurring during the baking, every trace of the metal may be recovered with facility, from the objects that have suffered, by means of the following very simple galvanic process, without being obliged to have recourse to the use of aqua regia. Nothing more is required than to pour common hydrochloric acid over them, and then touch them with a zinc rod. On doing this, as quick as lightning, in consequence of the hydrogen evolved both at the upper and lower surface of the film of platinum, which acts as the negative pole, we see the shining metallic coating peel off in the form of infinitely thin leaves from the base of porcelain or glass, and, notwithstanding the specific gravity of the metal, ascend partially and float on the surface of the acid. On separating the hydrochloric acid by the use of a filter, the whole of the platinum, which would be otherwise lost, is recovered, so that no complaint arises as to the waste of any of the metal in question.

In conclusion, I have to observe that one should prepare at once only as much of the platinizing fluid as is required for the day's use, inasmuch as it loses in efficiency by keeping.

That which, according to my observations, forms the active principle in the fluid, which results from treating chloride of platinum with oil of lavender, as above described, is an organic platinum salt, which, in point of fact, one can obtain, after some time, in the form of small elongated octohedral crystals, of a pale yellowish colour, by washing out carefully with alcohol a tolerable quantity of the fluid. The crystals have the property of taking fire with a brilliant flame on being brought near a lighted candle, leaving a residue of compact platinum of a dazzling whiteness.

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* A communication to the London and Provincial Photographic Association.

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Patent Intelligence.

Applications for Letters Patent.

2793. William Richards, 8, Quality Court, London, W.C., for "Improvements in the conduction of artificial light."—3rd March, 1883.

3074. James Logan Watkins, 7, Furnival's Inn, Middlesex, for "An improved tripod stand."—9th March, 1885.

Patents Sealed.

15,202. William Griffith Honey, 3, High Street, Devizes, Wiltshire, for "A new or improved holder for manipulating a photographic plate." Dated 19th November, 1884.

Specification Published during the Week.

5134. Louis de Roux, of Begles, near Bordeaux, in the Department of the Gironde, in the Republic of France, for "Improvements in engraving by photography."—Dated 16th December, 1884.

The inventor develops a carbon negative on a copper plate, and moulds from this with fusible alloy.

5647. James Thomson, of 21, High Park Street, Liverpool, in the County of Lancaster, for "Improvements in photographic camera stands for use out of doors on land or at sea."—Dated 27th December, 1884.

The patentee appears to claim the use of extra struts between the camera and the tripod; also the use of a swing or pendulum stand.

6688. Samuel Dunseith McKellen, of 18, Brown Street, Manchester, in the County of Lancaster, Watch Manufacturer and Jeweller, for "An improvement in cameras for photographic purposes."—Dated 16th January, 1884.

The claim is:

1st. The swinging or oscillating movement of the front board in a photographic camera, between the sides of the fork, to obtain front and back spring, and the use of two set screws to fix front board in any required angle or position, substantially as described.

2nd. In a photographic camera, the combined arrangement and use of a fork, stretchers with long slots, set screws, and front board, whereby the said front board, fork, and stretchers may be folded down upon or within the recess in baseboard, or raised again into any required position, without unscrewing or detaching any part, substantially as hereinbefore described.

6743. Norman Macbeth, of the Victoria Foundry, Bolton, in the County of Lancaster, Engineer, for "Improvements in the production of printing surfaces by the aid of photo-reliefs." Dated 22nd January, 1885.—*Complete Specification.*

My invention relates to the production of printing surfaces or plates by the aid of gelatine films or photo-reliefs. Plates, blocks, or printing appliances, prepared in accordance with my invention, are suitable for use in the printing or multiplication of pictures, designs, or works of art containing graduated shades or lines, varying from high lights to solid black or dark shades, and may be adapted for use either in surface printing, in which the raised lines, grains, or points receive a coating of ink, or in the copper-plate, or other like printing process, wherein the depressions are charged with ink.

In the carrying into effect of my invention, I prepare the surface of a block or plate in the manner hereinafter indicated, and between this prepared surface and the smooth surface of a hard block or plate of steel, or other suitable material, I apply a gelatine relief film, and subject the whole to such a degree of pressure as will cause the gelatine film to impress the prepared block or plate. To further prepare this block or plate for the printing operation, I grind down or reduce the most prominent parts of the surface as will be hereinafter mentioned.

The block or plate to be prepared may be of wood, lead, or pewter, or of any suitable metal, alloy, substance, or material capable of receiving a permanent impression from the film. I prepare the surface of the block or plate by scoring with fine vee lines, or with cross lines, or with stipple marks, or by otherwise producing a grained, lined, or roughened surface, suitable to receive ink to a greater or lesser extent, according to the required tone of the picture. By preference the grooves or depressions are all wider at the top than at the bottom, as in the cases of lines produced by means of an ordinary diamond-pointed burin. The lines or marks may be made directly upon the material of the block or plate by cutting, engraving, etching or pressing, or the material constituting the printing surface may be formed by electro deposit, in the form of an electrotype copy, or impression obtained from a lined, grained, roughened, or suitably prepared block, plate, or material which may be used in the successive obtainment of a large number of plates having uniformly prepared surfaces. Thin electro deposited shells, or films of copper or other suitable metal, or alloy produced in the indicated manner, may be backed up with lead, or with a suitably impressible metal, alloy, or substance.

Before exposing the block or plate so far prepared, I usually fill all the grooves or depressions with cement, or with a powder or substance which is not compressible to any great extent, and which can be readily removed at a later stage in the process. For this process I may use such materials as fine chalk, silica, sand, powdered glass, shellac, pitch, or glue, or any other substance adapted to the requirements, or I may use a thin film or sheet of metal, or other substance which is grained or lined on one side, so as to correspond reversely with the grains or lines on the block, as, for example, I may use such a thin film or sheet to produce by pressure the required grained, lined, or stippled surface upon the block or plate, and leave it upon the same during the subsequent operation. Upon the surface of the block or plate so prepared and treated, I apply the photo-relief film, and upon this I apply a hard smoothed and polished steel block or plate, and I subject the whole to pressure in a hydraulic or other suitable press or apparatus. This has the effect of pressing the photo film into the prepared surface of the softer block or plate, owing to the unyielding nature of the hard steel, whereby parts of the said prepared surface are depressed or lowered to an extent which varies in proportion to the varying thickness of the relief film. The filling substance applied as aforesaid tends to prevent the crushing of the ridges or prominences of the prepared surface, my object being to as much as possible retain the cross sectional formation of these ridges, lines, grooves, or depressions, so that the bottoms of the depressions shall be lowered as well as the tops of the prominces. As a consequence, the less compressible is the filling substance the better adapted it is to my purpose, so long as it can be readily removed at the proper time. For the purposes of my invention I can use a negative or a positive relief film. If a negative relief film be used in the process, the pressing operation will furnish a positive, lined, or grained relief upon the block or plate, the more prominent parts corresponding to the dark portions of what would be a positive picture of the subject of the photo relief used in the process. If a positive relief film be used, a negative relief will result from the pressing operation, the more depressed parts in this case corresponding to the dark portions of the picture.

(To be continued.)

10,558. Count Stanislas Julian d'Ostrorog, of 5, Conduit Street, New Bond Street, in the County of Middlesex, trading under the name of "Walery," for "Improvements in obtaining pictures on enamel fixed by fire."—Dated 2nd December, 1884.

(1). In producing photographs on enamel, the process of applying a powdered colour to a surface on which a photographic image has been imprinted in such a manner that the powder adhering to the surface forms a picture, and then transferring the said picture to enamel, and fixing it thereon by burning.

(2). In producing photographs on enamel, the process of obtaining the picture in powdered colour, then spreading collodion thereon, so forming a pellicle in which the colour is held, then transferring the pellicle to the surface of enamel, and lastly, fixing the colour to the enamel by burning.

(3). In producing photographs on enamel, the process of laying upon the enamel a pellicle carrying a photographic picture in powdered colour, then fixing the picture on the enamel by burning, then applying other colours, and lastly, laying on over the rest another pellicle carrying a picture similar to the first, and again fixing by burning.

(4). The production of enamelling with photographic pictures thereon, substantially as herein described.

Our readers will find tolerably full particulars as to the dusting-on method of enamel photography in an article which will be found on p. 241 of our volume for 1882.

Patents Granted in America.

312,937. Wm. W. Walker, Williamsport, Pa. "Portable dark-room for photographers." Filed August 12th, 1884. (No model.)

Claim.—1. A portable dark-room consisting of a flat box, and hinged sides and top, provided with coloured glass, and adapted to be secured to the said box, substantially as described.

2. In a portable dark-room, the combination, with a flat box, of hinged sides and top adapted to be secured to the said box, and provided with curtains, sleeves, or bags at their ends, substantially as described.

3. In a folding dark-room, the combination, with a flat box, of a top and of two sides hinged to the same, adapted to be held erect on the box, or to be placed into the box when folded, substantially as described.

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A SELENIUM ACTINOMETER.

BY H. MORIZE.

The purpose of this instrument is to measure the relative intensity of the luminous solar rays at different heights above the horizon. The selenium actinometer consists of a cylinder of selenium prepared according to Bell's process; that is, 38 discs of copper are insulated from each other by means of discs of mica; these latter being of a less radius, the channel thus left between two coppers is filled with selenium by rubbing the hot cylinder over with a rod of this substance. When the cylinder has been suitably annealed, the selenium takes a greyish aspect, and is ready for use. The copper discs of the even series and those of the odd series, are respectively connected by means of conductors. By this arrangement the resistance of the selenium is decreased, and the sensitiveness of the apparatus is heightened by augmenting the number of the discs and that of the ridges of selenium. The cylinder is fixed on insulating glass feet in a glass case, from which the air has been exhausted in order to eliminate the disturbing influence of dark heat-rays. The whole is placed on a support sufficiently high to escape the effects of the light reflected by neighbouring objects.

The case is fixed in such a manner that its axis is parallel to the axis of the globe, so that at every hour of the day the luminous rays may fall almost normally upon the selenium, and illuminate always the same portion. By a slight movement in the plane of the meridian the cylinder may even be brought daily into such a position that the luminous rays are absolutely normal to its surface. If we then pass a constant current through this apparatus and through a galvanometer the latter will indicate by its deviations all the variations of the illumination of the selenium. In order to compare these variations a scale must be adopted. If we suppose the selenium placed in perfect darkness its resistance will be at its maximum, and the deviation of the galvanometer at a minimum. We mark this point of absolute darkness as zero. The greatest effect which light can produce will be to annul the resistance of the selenium. If we, therefore, withdraw the latter from the circuit we obtain a deflection, which we mark as 100, or maximum light. If the interval between 0 and 100 be divided into 100 equal parts we obtain actinometric degrees which are always comparable. In practice the Clamond battery should be employed. During the determination of the zero and 100 points the external portion of the apparatus should be kept at 0°, and by repeating these determinations at different temperatures, a table may be constructed for referring the actinometric degree obtained at any temperature to what it would be if the apparatus were at 0°.—*Chemical News.*

Correspondence.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

Dear Sir,—I am glad to notice in your issue of the 6th inst., that the officers of the Benevolent Association have requested photographers who are willing to co-operate with them in this matter to send in their names.

Would it not be as well if the Association were to issue a circular, and send to the leading photographers in each town with the request that they would convene a meeting to ascertain the views of all interested, and to pass a resolution as to whether it should be simply a Benevolent Society, or a Benevolent and Benefit Society? I venture to say if the latter, it would be a success.

I shall be glad to do my utmost, but think the moving powers should be the employers; the assistants will gladly respond.—I am, &c., An Operator.

ISOCHROMATIC PLATES.

Dear Sir,—In reply to my short article in the News of January 16, in the matter of priority in isochromatic processes, Mr. Ives, in his communication to the News, February 27, makes very strong efforts to depreciate my wet eosine process—a process *not* sold by me as a secret, as Mr. Ives asserts, but rewarded with a prize of honour by the Berlin Society for the Advancement of Photography, and published—also to elevate his own chlorophyl process. Whether Mr. Ives has tried my process as I have described it, I don't know; but I know that this process is practically employed in first-rate German reproduction establishments, as Haufstaengl, of Munich, and the "Photographische Gesellschaft," Berlin, &c., with the best success, for plates up to 30 inches. I think that is a proof that the process is not quite so poor as Mr. Ives asserts. On the other hand, Mr. Ives tries to scoff at my first successful experiments to get an isochromatic photograph in 1873. I beg to reply to this only, that my *modus operandi* has been the original for all following isochromatic processes, even for those of Mr. Ives.—Faithfully yours,

Dr. H. W. Vogel.

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Proceedings of Societies.

Photographic Society of Great Britain.

The ordinary meeting of this Society was held on Tuesday, the 10th inst., at the Gallery, 5a, Pall Mall East; Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. J. J. Ackworth, W. Noble, and J. Webster were elected members of the Society.

The Chairman, after stating that there was no paper to be read that evening, invited Mr. T. Sebastian Davis to open a discussion upon the subject of drying gelatine plates.

Mr. Davis commenced by saying that it was a matter of importance to amateurs and those experimentalists who desired to make small batches of emulsion, that they should possess a reliable means of drying their plates within a reasonable time, and he had lately given some attention to the subject. Speaking of wooden racks in a drying box, Mr. Davis said failures often resulted through the grooves of the racks being too close together, and it was his experience that plates would not dry evenly unless they were 2 inches apart; a less distance prevented a good circulation of air. His plan gave uniformity, and he was quite sure that films evenly dried within a reasonable time obviated a number of difficulties otherwise attending the use of gelatine plates.

Mr. J. Cadett, in relating his experience in drying small batches of plates, said he succeeded better when the inlet passed directly on a metal plate heated below by gas, and supplemented by another jet burning beyond the elbow in the outlet. For commercial purposes nothing was better than a room with hot-water pipes circulating through it.

Mr. W. E. Debenham said it had been stated and accepted that a certain speed was essential to perfect drying of gelatine plates, the minimum being eight hours, and twenty-four hours the maximum. Those periods were, no doubt, very good; but it did not follow that good results could not be obtained otherwise. He could show plates which had been quickly dried where the heat was nearly enough to liquefy the gelatine, and they showed no signs of frilling or fog. On the other hand, he could demonstrate that slow drying was not bad, as instanced by Mr. Wellington's transparencies, which were four days drying without heat over calcium chloride.

Capt. Abney had succeeded with Mr. England's plan; but when he increased the size of his plates he tried the method of admitting heated air at the top of the chamber, the outlet at the bottom serving to supply the gas jet, which was sealed from external air. Plates near the top of this box dried in three to four hours, and frilled; those near the bottom occupied four days, and were not so good as they ought to have been. He now used a coil of composition pipe in the bottom of a box fitted with the usual inlet and outlet pipes, and connected the coil to a hot-water tank outside, the heat of which was easily regulated with a small ordinary gas jet. By this means a steady heat, 80° to 85° Fahr., could be maintained, and eight hours would dry most plates; he objected to go beyond ten or twelve hours with his plates. The dimensions of the box he gave as 4 feet long, 3 feet 6 inches high, and 3 feet broad (see page 168).

Mr. W. England briefly described the construction of his box, which has been described in these columns, also in the Year-Book and "Studios of Europe." He still used it for experimental purposes, but preferred an ordinary room for commercial work.

Mr. W. Bedford formerly used a cupboard similar in principle to the one described by Mr. Cadett, and it acted very well. One day the door was inadvertently left open, and the plates dried in much less time; since then he dried his plates in an ordinary room. Plates put back to back, in racks with grooves an inch and a half apart, and left in a box with chloride of calcium, dried well in twenty-four to thirty-six hours, and this he thought a suitable plan for small batches..

Mr. J. Spiller said he used quick lime in the desiccator, this being much cheaper for the purpose, and quite as effective as chloride of calcium.

The Chairman thanked those gentlemen who took part in the discussion, and then announced that, owing to the Gallery being unavailable on the usual evening in April, the next ordinary meeting would be held there on Tuesday, April 7th, and he hoped the members would bring examples of their work, either mounted or unmounted, to adorn the walls; he should also be glad if as many as could make it convenient, would bring examples on the "New Rapid Printing Paper," not forgetting to let them see some failures as well.

The next technical meeting was announced for Tuesday, the 24th inst.

South London Photographic Society.

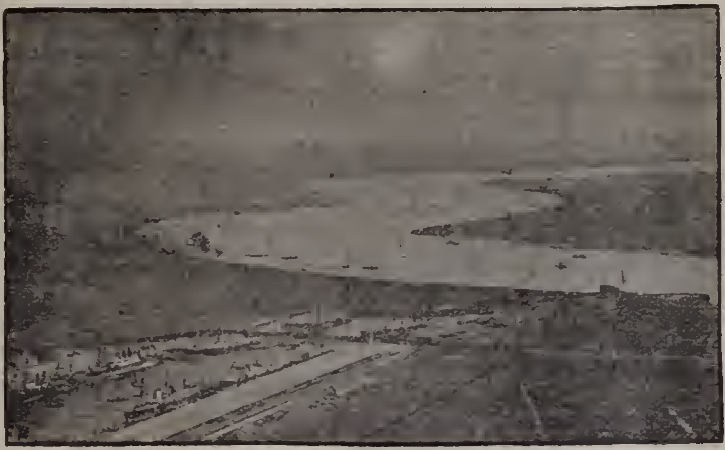
The ordinary meeting of this Society was held on Thursday, the 5th inst., at the House of the Society of Arts, John Street, Adelphi, W.C., Mr. W. Ackland, President, in the chair.

The minutes of the February meeting were read and confirmed, and Mr. J. A. C. Braufield was elected a member of the Society.

The Chairman announced that the subjects decided upon for artistic competition at the February meeting would remain in force until April, an arrangement which he thought would be agreeable, since there were very few competitors, and the lecture would occupy the whole of the evening. He then called upon Mr. Cecil V. Shadbolt to deliver his lecture entitled, "Adventures in the Air; or, Balloons and Ballooning."

Mr. Shadbolt, in his opening remarks, told his audience that he did not intend to give them a highly scientific lecture, yet, while endeavouring to make it entertaining, he still proposed it should be as instructive as possible. The lecturer then dealt briefly with the history of ballooning, from the earliest notions regarding floating in the air, down to the present time. Many of the earlier notions were illustrated by means of lantern slides, and although the ideas were clever enough in conception, they were decidedly extravagant. The hydrogen soap-bubble experiments of 1772, and those in which smoke was employed ten years later at Lyons, were alluded to, also the famous Moutgolfier balloon, which in 1783 ascended to an altitude of 2,000 feet; after remaining aloft an hour and three-quarters, it descended within 25 feet of the starting point. The celebrated ascent in September, 1784, at Finsbury (the first in this country), was then spoken of, also Blanchard's exploits, who was the first to cross the Channel, a feat accomplished in 1785. The "Eagle" hot air balloon was next described. In an attempt to cross the Channel from France to England the balloon burst, and the voyager lost his life. Charles' gas balloon; the great Nassau balloon, which performed a journey of 1,200 miles in a few hours; Green's balloon, in which the late Colonel Burnaby made his first ascent; and the Captive balloon of Paris, constructed to carry thirty passengers, were all dealt with. M. Nadar's Giant balloon, which the lecturer said was twenty times larger than any other balloon yet made, not only carried all the necessaries for a long aerial voyage, but also included a photographic car, suitably arranged for map making by means of the camera, some lithographic plant being also included. It was found that this huge balloon was a failure, its unwieldy size being unmanageable; and upon the occasion of its descent, after a journey of two hours, it caused considerable damage, not only to the balloon and the occupants of the car, but also to every obstacle met with. M. Nadar had both his legs broken, and the other occupants were more or less seriously injured. Regarding the miraculous escape of the worthy President of the Photographic Society of Great Britain, in company with Mr. Coxwell (the celebrated aeronaut), when they ascended for scientific observations at Wolverhampton, in 1862, the lecturer said that when those gentlemen reached an altitude of something over 27,000 feet, Mr. Glaisher, who was occupied with the instruments, became insensible. Mr. Coxwell, who was able to get into the hoop, had not sufficient power to raise his hands and open the valve. By singular good fortune he was able to seize the cord in his teeth, and so release the valve, when he too became unconscious. As a result, a rapid ascent was made, so that ten minutes afterwards they were restored to consciousness. In referring to the successful ascents made by Mr. Dale and himself, in the "Sunbeam," and also the "Monarch," the lecturer dwelt on the importance of correctly adjusting the size and the length of the netting to withstand the forces to which it was opposed. These points were illustrated by means of a very excellent series of transparencies, which also included illustrations of some of the difficulties attending ballooning in rough weather. He advised everyone to make an aërial trip if they had the opportunity; but certainly not to attempt it in rough weather. He then described the novel sensations experienced by those who start on an aërial voyage for the first time; of an indication of the actual start being recognized by an absence of the swaying motion given to the car before they are cast loose. When once on the move, the beauty of the receding landscape quickly removes all thought of fear. Soon the novice would occupy a little time in scrutinizing the balloon and car, wondering why the ropes were not stouter, and what would happen if one was to give way. People who, he said, encouraged these fancies would act wisely to remain at home. His own feelings were not similar, as he could well occupy his thoughts photographing the receding landscape, or the beauties of cloudland.

Mr. Shadbolt then caused a series of photographs he had taken from the car of the "Monarch" to be placed upon the screen, the majority of which were as perfect as there was any necessity for. They included a bird's eye view of Bexley, Kent, from an altitude of fifteen hundred feet; Stamford Hill and neighbourhood at a distance of two thousand feet, foot passengers and a train in motion being distinctly visible in this picture; the Crystal Palace and grounds at eleven hundred feet; Blackheath at two thousand seven hundred feet, and again at five thousand feet, just as two clouds were closing in beneath the car. Descending again to five hundred feet above the river Thames, other pictures were obtained, including a steamer bound up the river, and another picture at four hundred feet, showing the work proceeding in the Royal Albert Docks, ships passing up and down the river, and in the distance a fleet of fishing vessels sailing to the Nore; this picture was much applauded.



A very hearty vote of thanks having been accorded to Mr. Cecil V. Shadbolt, and another to Mr. Steen, who manipulated the lantern, it was announced that several forms of tender to contract for the sole right of photographing at the International Inventions Exhibition had been sent, and were on the table; any member desirous of competing could have one of the forms.

It was also announced that the next meeting will be held on Thursday, April the 2nd; after which the meeting adjourned.

Hyde Amateur Photographic Society.

This Society held its monthly meeting in the Mechanics' Institute on Wednesday evening, there being a goodly number of members present.

After the minutes of the previous meeting had been confirmed—

Mr. **George Batty** gave a demonstration on dry plate development. Having exposed six plates during the day, he at once proceeded to develop them. Three of the plates had been exposed on one subject, one being correctly exposed, the second considerably under-exposed, and the third very much over-exposed. This had been done in order to show how to bring them all into useful plates for future use, and in all three cases Mr. Batty was successful.

During the evening, Dr. **Sidebotham** exhibited a clip for holding the camera in any position, say on the top of a tram car, on the edge of a boat, or on the branch of a tree.

Several other members exhibited specimens of work.

At the close, a vote of thanks was accorded to Mr. Batty for his very valuable demonstration.

Photographers' Benevolent Association.

The Board of this Association met at 181, Aldersgate Street, on 4th inst., Mr. **Bird** in the chair.

The minutes of the previous meeting were read and confirmed.

Messrs. F. W. Cushing, W. J. Evans, D. Goff, J. Newton, and W. Wheeler were elected members of the Association.

An application for assistance from the widow of a late member then received the consideration of the committee, who subsequently made a provisional grant of £12.

The meeting discussed various methods for improving the Association, and decided to issue a circular-letter to the photographic fraternity (see page 176).

The meeting then terminated.

London and Provincial Photographic Association.

At the usual weekly meeting of this Society, held on Thursday, the 5th inst., Mr. W. H. **Hyslop** occupied the chair.

Messrs. **Morgan** and **Kidd** gave a demonstration of the working and development of their new contact paper.

Mr. **Archer Clarke** showed some crystals of ferric oxalate that had been precipitated from a ferrous-oxalate developer. After this solution had been mixed with another chemical not mentioned, Mr. Clarke stated that this developer, as prepared, could be used day after day. He promised a paper on the subject shortly.

Mr. J. B. **Wellington** showed his combination carrier and dissolver for a single lantern. The dissolver was fixed in front of the lens, and consisted of two pieces of ebonite, which, by working vertically, opened and closed a diamond-shaped diaphragm. The pieces of ebonite were put in motion by a wheel at the top of the dissolver, communicated by a telescope rod with a strip of wood, working horizontally along the top of the carrier. A short length of brass cogs on the top of this strip of wood fitted into the cogs of a small wheel at the end of the telescope rod mentioned. The action of pushing a slide into its place caused the small wheel to revolve just enough to close the diaphragm, the return of the sliding strip opening the diaphragm, and showing the fresh picture; the displaced slide travelled to the opposite end of the carrier.

Mr. J. **Barker** gave a formula of chloride paper for printing out:—

Gelatine (Nelson's and Coignet's, equal parts)	175 grains
Chloride amm.	18 „
Rochelle salts	50 „
Nitrate of silver	75 „
Methylated alcohol	2 drachms
Water	5 ounces

Dissolve the salts in the water, then add the gelatine; after this has soaked, apply heat and melt, raise the temperature to about 100° Fah., and add the silver. Keep the emulsion at the same temperature for ten minutes before adding the alcohol; the emulsion can now be poured out to set. A very slight washing only is needed, or it can be used without washing if preferred.

Referring to the subject of coating concave mirrors with platinum for microscopical and astronomical purposes, brought up at a former meeting, Mr. Charles Darker handed to the Chairman a sheet of glass coated with a film of platinum; at the request of the members he read a communication on the subject that he had received from Professor Ralph Böttger (see page 170).

Glasgow and West of Scotland Amateur Photographic Association.

The eighth general meeting of the above Association was held on the 5th inst., Mr. **Archibald Robertson** (President) in the chair. After the routine business was gone through,

Mr. **Wm. Lang**, Junr., read a paper on "Ferrous Tartrate as a Developer for 'Rapid' Paper" (see page 169).

Mr. **John Urie** read a paper on the Daguerreotype process, which gave great satisfaction to the young members; he developed several plates.

Mr. **John Urie**, Junr., exhibited his new patent automatic printing machine.

Coventry and Midland Photographic Society.

The usual monthly meeting of this Society was held at the residence of Mr. F. J. Lloyd, on Tuesday, 3rd March, 1885, Mr. Councillor **Andrew**, President, in the chair.

The minutes of the three previous meetings were read and confirmed.

It was resolved, after some discussion, that "In future the Society have a fixed place of meeting, instead of their present arrangement of meeting at members' homes, and that it be left in the hands of the Managing Committee to procure a room for that purpose."

Mr. T. Willdigg was duly elected a member of the Society.

Mr. **Henry Hughes** then gave a demonstration with "rapid chloride paper." He then proceeded to make the exposures with a fan gas jet, the negatives being landscapes and portraiture of varying density; the exposures were 25, 30, 35, 40, and 50 seconds, and owing to the light being weak, some of the landscapes were slightly under-exposed. The prints were then developed with oxalate, iron and bromide as a restrainer, and should have been up fully in three, but took from four to seven minutes; they were then soaked in alum for five minutes, washed and toned in a chloride of lime bath—1½ grains of gold to the pint. He said he found this act very rapidly; the colour was told by letting in a little white light, and looking through the prints, a little light not affecting them at this stage. It was of no use trying to tone prints that were over-developed, as they lost the power to tone after being in the developer more than three minutes. The only way it seemed to affect the print was to clear the white; under-exposure and over-development left them with a cold greenish hue. He thought it would be better to slightly over-expose, and check in development. He was, however, experimenting with an accelerator which he hoped would be useful in under-exposure. The prints were then fixed in a solution of 5 ounces of hypo to 20 of water, five minutes being found sufficient.

North Staffordshire Amateur Photographic Association.

The ordinary monthly meeting was held on Thursday, March 4th, Mr. C. **Alfieri**, President, in the chair.

Communications and letters were read from the Editor of Anthony's *Photographic Bulletin*; the Secretary of the Versailles Photographic Society; Dundee Association; and Glasgow Amateur Association.

Mr. B. S. Burgess exhibited a Plucker's telescopic stand. Mr. Allison exhibited a superior half-plate set of apparatus, also an amateur set of excellent workmanship, by C. E. Elliott. The President showed some instantaneous shutters of his own manufacture, made expressly to work with Grubb's lenses.

It was resolved that ladies be admitted as members on payment of half the usual fee for gentlemen.

Mrs. W. B. Allison and Mr. L. Kelsall were elected members.

Bradford Amateur Photographic Society.

The monthly meeting was held on Thursday last, at the Law Institute, Mr. **Duncan** G. **Law** (the President) in the chair, a large number of members being present.

The minutes of the previous meeting were read and confirmed.

In connection with the Prize Competition in the autumn, it was proposed that the number of exhibits should be limited to three in each class; the prizes to be in apparatus; and that a charge of one shilling entrance fee be made to each exhibitor to cover expenses.

Mr. W. H. Foster, of Hornby Castle, was elected a member.

Mr. G. D. **Scorah** (the Hon. Secretary) then exhibited a number of lantern transparencies by means of the oxyhydrogen lantern; the first being a series of twenty-one views of Savoy from negatives by the president, the slides being made on wet collodion.

The **Secretary** also showed thirty-six views of Yorkshire, also on wet plates.

Good slides by other members were shown, by the collodio-albumen and other dry processes, but the opinion of the meeting was that those by the wet process were superior in brilliancy.

Dundee and East of Scotland Photographic Association.

A meeting of this Society was held on March 5th, in Lamb's Hotel, when there was good attendance. Mr. W. D. **Valentine** presided

After the routine business was disposed of,

Dr. J. K. **Tulloch** read a very interesting paper on "Art in Photography" (see page 166).

A hearty vote of thanks was awarded to Dr. Tulloch, and a lively discussion ensued as to whether photography was entitled to rank as a fine art or not.

St. Helen's Association of Science, Literature, and Art.

Photographic Section.

A meeting was held 25th ult. at the Association Rooms, 4, Salisbury Street, Mr. Councillor R. G. **Brook** in the chair.

The **Secretary** read a letter from the Dundee Photographic Association, announcing an Exhibition early next year.

Mr. **Thomason** showed his new half-plate camera, which was very much admired; and Mr. **Brook** a new lantern, which was tested in the usual way; after which the meeting closed.

Sheffield Photographic Society.

The monthly meeting was held in the Masonic Hall on Tuesday, March 2nd, Mr. **W. Hatfield** in the chair.

The minutes of the last meeting having been read and passed, Mr. O. S. Platts was elected a member.

A discussion on the selection of a resort for the first trip ended in favour of Wyam and Froggat, to take place early in April.

Messrs. W. Johnson and H. Rawson, who were elected to purchase a lantern for the use of the Society, then brought forward a beautiful one with all the latest improvements, which seemed to give entire satisfaction, and the April meeting night was fixed to try it with slides of the members' own making.

Owing to the great amount of business which had to be done, the subject for the night, which was "Lantern Slide Making by Various Processes," was only briefly gone into by the President and several other gentlemen.

Imperial Russian Polytechnical Society.

Photographic Section.

The ordinary monthly meeting was held on Monday, Feb. 10th, Lieut. Gen. **Birkin**, President, in the chair. There was a large attendance of members.

The minutes of the previous meeting having been confirmed,

The **Chairman** called upon Mr. Chesterman to communicate what data he had been able to collect upon "Balloon Photography." The speaker touched upon several experiments that had been made abroad, and showed a sketch of a camera on Mr. Woodbury's principle, for use with a captive balloon; he also explained Mr. Elsdale's method of employing free balloons with clock-work adjustment for regulating the time of their descent. Further, thanks to the courtesy of Mr. Cecil V. Shadbolt, he was able to show several photographs, taken from balloons by that gentleman, which were much admired, as it enabled the members to form some idea as to the degree of distinctness obtained at different altitudes.

A discussion ensued as to the utility of captive balloons for military purposes, and General Timascheff was of opinion that owing to the angle of view, it would be difficult to compute distances with anything like accuracy; he therefore advocated Mr. Elsdale's plan, although the calculation of air currents and force of wind would be no easy matter.

The **Secretary** handed round some prints on a new rapid printing paper of his own preparation, and proceeded to demonstrate the process. He explained that printing on gelatino-chloride of silver was very fully treated in the work under that title, by Messrs. Eder and Pizzighelli, to which he referred the members. After experimenting for over six weeks, the following formula had given him the best results:—

No. 1.—	Nitrate of silver	100	parts
	Citric acid	100	,,
	Water	1,000	,,
No. 2.—	Chloride of sodium	35	,,
	Bromide of potassium	25	,,
	Gelatine	40	,,
	Water	1,000	,,

Mix both solutions together at a temperature of 60° C., then add 250 parts of Heinrich's gelatine, previously soaked in water. When set, press through canvas with meshes of 4 millimetres then the shreds of emulsion will only require an hour's washing in running water. After washing, re-melt and add 60 grammes of glycerine; then coat paper of an even texture, previously damped, and the edges turned up to form a tray. In answer to one of the members, he said that he did not use foreign paper, but had taken a sample which, after testing several bands, gave the best results for accurate measurements with the different recording instruments at the Physical Observatory; *i.e.*, the expansion was very slight. The developer was made by using equal parts of a solution of 20 grammes oxalate of potassium and 1·3 of bromide of potassium in 100 grammes of water, and a 5 per cent. solution of ferrous sulphate, containing a trace of citric acid. After development, the prints are put in a strong solution of alum, well rinsed, and toned in a bath made with—

Acetate of soda	15	parts
Water	1,500	,,
Chloride of gold	0·4	,,

and a minute portion of chloride of lime; finally fix in hypo. (1 in 7), wash, and squeeze on to glass polished with French chalk.

A Member said that he had used some paper of English manufacture, and found it full of pinholes; this, it was said, was the fault of careless manufacture. After stripping some previously developed pictures, the Secretary asked the members to adjourn to the studio, where he would expose and develop several pictures; two minutes' exposure to the light of a paraffin lamp was found sufficient. Several sheets of paper having been distributed for trial, the proceedings terminated with a hearty vote of thanks to the Secretary.

Leeds Photographic Society.

The usual monthly meeting was held on Thursday, March 5th, Mr. **Washington Teasdale**, F.R.M.S., in the chair.

After the confirmation of the minutes and other formal business,

Mr. **Thos. W. Thornton** said the sub-committee appointed to arrange for the Lantern Exhibition and the Technical Lantern night had desired him to draw the attention of the members to one or two points which appeared to them necessary in order to make future exhibitions more successful. The first was the size of transparencies. In his opinion the best size was 3¼ square, for although slides made on quarter plates could be exhibited, yet the four condensers usually found in lanterns would only illuminate equally a circle of about three feet diameter, and it appeared to him to be incurring extra cost and weight without any corresponding advantage. Then all slides intended for exhibition should be properly marked, the one in general use being three inches and a quarter outside, and two inches and three-quarters inside. The reason of this would readily be seen when it is remembered that it is usual to place the lantern in such a position that a properly marked slide will just fill the screen. It very frequently happened that a series of slides would be completely spoilt by one or two that were, on account of their density or other defect, unfit for exhibition, and this, he thought, was caused by the fact that many of the members were new to lantern slide marking, and therefore were not in the best position for judging as to what would look well on the screen. He suggested that all slides intended for exhibition should be delivered to a sub-committee composed of lantern experts, at least fourteen days before the date of the exhibition, so that they might have the opportunity of leisurely examining each slide, and select for exhibition such as they thought suitable. The experience they had gained at the recent exhibition was not only instructive, but had also been amusing. Notwithstanding the request that all slides should be delivered some time previous to the exhibition, many were handed in after the exhibition had commenced; some were numbered on the black paper forming the mark, and arranged in anything but consecutive order. There are only eight corners on which a slide can be marked, and the exhibitors had utilized six out of the eight; others were not marked at all, and most of the instructions as to the meaning of the various markings were given verbally, and during the exhibition. It was suggested that all slides should be delivered, as previously suggested, some time prior to the exhibition, placed in grooved boxes, numbered, and arranged consecutively, and each one distinctly marked in accordance with the rule laid down by the Photo Club, *i.e.*, that each slide shall bear on its face two white patches, one on each upper corner. By the face of the slide is meant that side which, when held next to the eye, shows the picture or any reading the right way; and above all, that all slides not sent in accordance with the regulations laid down by the committee should be excluded. Two oxyhydrogen lanterns fitted with twin conductors and objectives having been placed in a suitable position for throwing two 5-feet discs side by side on a screen, in each series of slides the negative was first exhibited, and its general character commented on, and then slides made from the gelatino-bromide process, gelatino chloride, direct printing, collodion, washed emulsion, and collodion emulsion with beer preservative, were submitted for the judgment of the members. The majority appeared rather to disregard the question of colour, and attach more importance to other qualities. The slides on gelatino-bromide plates were considered the best; but in several instances these were closely run by chloride plates and washed emulsion. The colour of the latter elicited much admiration from some of the members.

The **Chairman** said he should hardly like to say there was any best process of preparation, so much depending on the skill and experience of the operator. Some people could succeed in obtaining good results by any process, others fail more or less. Even professional experts by any one selected process seldom attain to uniformity of result or equality of merit. For reduction or copying in the camera the collodion process has many advantages; but only to those who have long worked the process, and have the requisite appliances. The prevalence of metallic toning is to be deprecated as tending to opacity and hardness. Of the extraordinary facilities now offered in the matter of gelatine dry plates, he had freely availed himself for contact printing. For maps, plans, and all line-work, slow and sure plates, such as those called 5-10 times, gave with ordinary fer. ox. development excellent results. Such plates similarly developed would also render the half tones of pictorial subjects satisfactorily, and only from the nature of the subject require more care that the development be arrested at the proper time, and more careful timing of the exposure. Further experiment on development of the same plates by the various alkaline, pyro, or hydrokinone methods gave a pleasing variety of good results.

A communication from the W. B. Woodbury Fund Committee having been read, the meeting shortly afterwards adjourned.

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Talk in the Studio.

Photographers' Benevolent Association.—The following circular has been issued by the Board of Management:—"181, Aldersgate Street, March 4th, 1885. At a meeting of the Board of Management, held place and date as above, it was decided to issue this circular-letter to the photographic fraternity. In the opinion of the Board, the period has arrived for a decision as to the continuance or dissolution of the Association. As is well known, it has been in existence for a period of ten years. It has relieved necessitous cases by direct money grants, and been useful in putting assistants out of work in correspondence with employers. It has accumulated a fund of £180. But the general interest and sympathy of the photographic body has been very imperfectly elicited in its favour. The Board, therefore, make this public and direct appeal to employers and employed to consider if such an Association is a desirable thing in itself, and if they are willing to support it. The Association is distinctly a benevolent society, and indirectly only a benefit society. Its primary object is not to inculcate provident self-regarding thrift, but to organise effective distribution of the charity of an important profession. It is not intended to supersede life insurance, subscription to benefit societies, &c., but to provide means of investigating the disasters of fortune which strike members of a community, despite prudential arrangements. The Board will think its task a thankless one, unless appreciated and supported by masters and men more widely than at present. At least 500 additional annual subscribers of 10s. are wanted. Donations, doubtless, would follow in proportion to numbers and need. The next general meeting of the members in May will be summoned to decide on the future of the Association. Promises of support, only, are wanted in the *interim.* The Board is unwilling to abandon its work, and will wait the issue of this appeal. Masters, it is hoped, will confer with their employées. Communications, favourable or unfavourable, to the Association, are invited by the Board, and may be addressed to the Chairman, W. S. Bird, 74, New Oxford Street, W.C.; or to the Treasurer, J. Stuart, 112, New Bond Ssreet, W."

Amateur Photographic Societies in Manchester.—We receive notification of two schemes for fostering the practice of amateur photography in Manchester. The Manchester Amateur Photographic Club proposes as its programme, the social discussion of photographic matter, holding of out-door meetings, exchange of prints, and organising prize competitions amongst its members. At present the Club is to be limited to thirty members; the subscription being one guinea per annum. Mr. Edward Openshaw, of 24, Wards Buildings, Deansgate, Manchester, has consented to act as hon. secretary and treasurer. On the other hand, it is suggested to form an Amateur Society on a wider base, and with a subscription of five shillings. It is expected that this will tend to make the Society a popular and vigorous one. Gentlemen desirous of joining should send their names to Mr. Robert Graham, 18, Eldon Street, Chorlton-upon-Medlock, Manchester, when they will be informed of the time fixed for a meeting.

At last a photographic branch has been formed in connection with the London Tricyle Club, and Mr. G. H. R. Salmon, of Oak Hurst, East Croydon, will be happy to hear from members of the club willing to co-operate either as actual workers or not, and, of course, also from non-members who may be willing, for the sake of the photographic branch, to join the L.T.C.—*The Cyclist.*

Avoiding Halation.—Mr. T. Stokoe is good enough to send us some interesting examples which show that any tendency to halation may be overcome by using ground glass instead of plain glass for coating with emulsion; the rough side of the glass being coated with the sensitive material. About double the ordinary exposure is required.

Photographic Club.—The subject for discussion at the next meeting, on March 18th, will be on "Platinotye."

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To Correspondents.

*** We cannot undertake to return rejected communications.

J. D. W.—1. As regards the red rays, it should be more sensitive. 2. With the electric light, the probability of success will become very much greater. Thank you for your promise to communicate particulars.

S. A. S.—1. Obtain a simple drop-shutter; you can get it from the maker of the lens. 2. We have not tried it, but imagine that for every-day work it would prove rather too complex. 3. Use the lens you mention, but well stopped down; take care not to over-expose, use a moderate amount of restrainer in the developer, and intensify by the method described on page 83.

E. A. M.—As far as our knowledge goes, there is not one near London, and we are inclined to think that on the whole you would do better to adopt a design more like that of Mr. Tuohy's studio. Mr. Blanchard promises to give our readers some further particulars as to working in the south light studio.

A. G. B.—Such an opinion is quite an exceptional one, but it is rather difficult to obtain a final and conclusive answer to the question; as when shall we find a worker equally expert in the use of each, and, moreover, unprejudiced?

Norman.—It can be done by the method described on page 338 of our volume for 1883.

E. J. L.—Iron is best. If all are alike, the expansion will be equal throughout, and no mischief will result.

Teinbridge.—No; but you can get it made to order from the published descriptions.

H. J. Thorne.—Next week.

E. H.—1. Soak it in the mixture specified on the last page of our number for March 6th, in answer to "Artist." 2. It would not do, as in either case the developed image consists of metallic silver.

A. H. S.—1. It would take too much space, but we will prepare an article on the subject. 2. See the paper by Mr. H. Chapman Jones, on page 83 of our present volume. 3. In Abney's "Instruction," published by Piper and Carter.

John Talboys.—We do not wish to purchase, but perhaps by advertising you may find a customer.

M. Cappelli.—It is probable that the markings are due to the presence of a trace of greasy matter in the gelatine or on the plates. Try another sample of gelatine.

J. S. C.—As far as we know, there is not any firm that makes a special feature of such work.

F. H. S.—Use ordinary plates, but back with an asphaltum varnish—the so-called "liquid jet," or even ordinary "Brunswick black."

W. S. F.—1. It is made and used in Vienna, but has not yet reached this country, as far as our information goes. 2. Thanks; it is obviously a misprint.

H. S.—The conclusion was evidently a hasty one, and in our next you will see some remarks thereon by Professor Léon Vidal.

W. H. Walmsley.—1. Such exceptionally fine productions as those you send make us wish for an article descriptive of your mode of working. Thank you very much for the specimens. 2. Both names are ambiguous, and, as far as we can see, neither can ever be used definitely and finally; still, opinions may differ as to which is the more appropriate of the two. It seems a matter of no great importance, but a person who has adopted one may perhaps do well to keep to it.

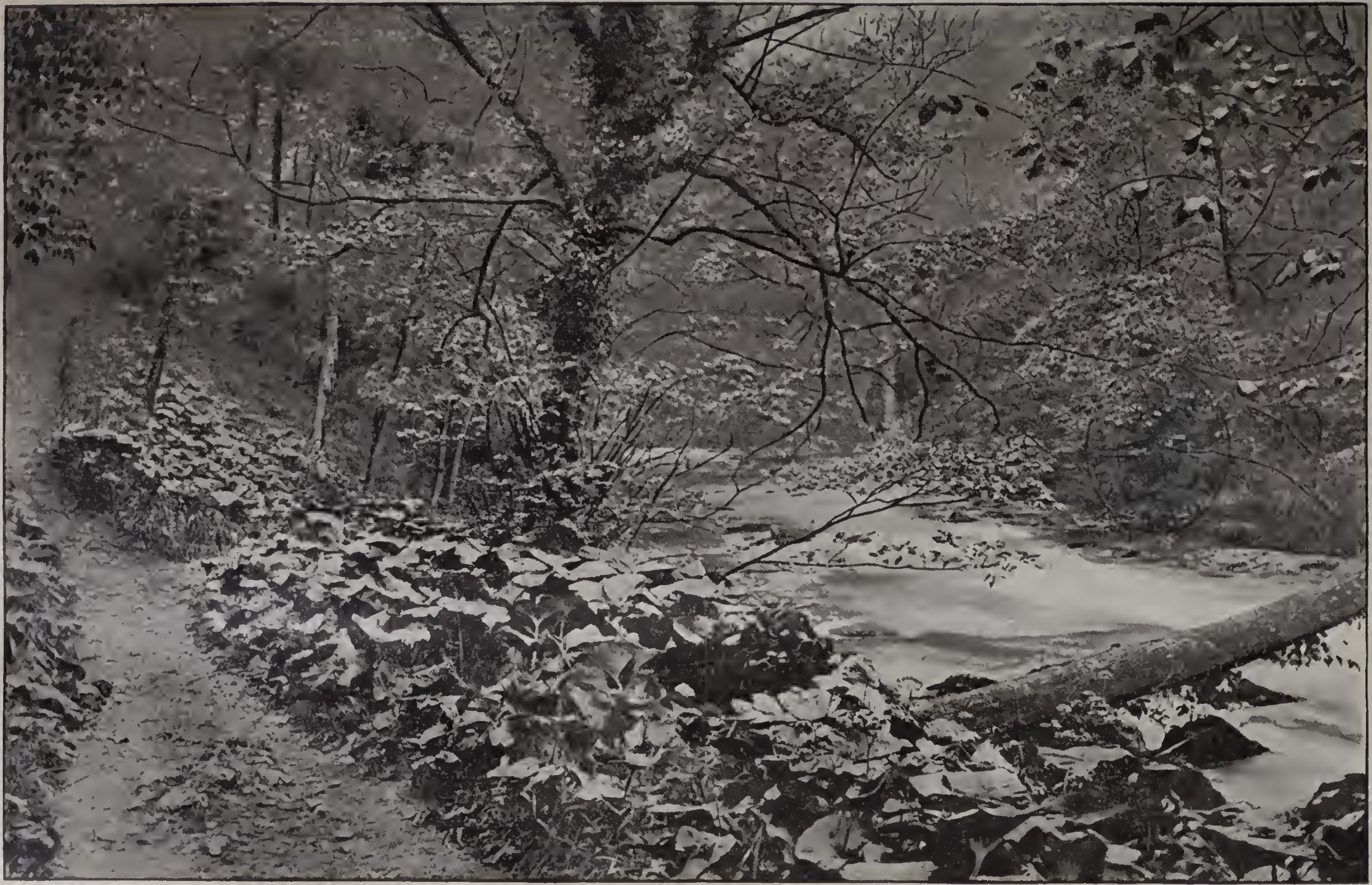
Chas. D——.—1. The particulars will be found on the last page. 2. Consult the index for the past year.

Correspondent.—1. Use water-colours mixed with ox-gall. 2. Luckhardt's encaustic paste—white wax, 1 ounce; turpentine, 5 ounces.

F. H. B.—One we tried was very good indeed, but our experience has been limited to the trial of this.

John Lane.—It is difficult to estimate their value, as all depends on how urgently they are required.

SUPPLEMENT TO "THE PHOTOGRAPHIC NEWS," 13TH MARCH 1885.



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THE PHOTOGRAPHIC NEWS.

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LECTURE ON ‘ RECENT IMPROVEMENTS IN PHOTOGRAPHIC DEVELOPMENT.”

On the 12th March Mr. W. K. Burton read before the Society of Arts a paper bearing the above title. The chair was occupied by Captain Abney, and although the lecture was nominally on " recent improvements," a better title would probably have been recent modifications, inasmuch as the lecturer stated his opinion that, since 1861, when the possibility of the true development of the haloids was discovered, there had been no improvements. He qualified his statement, however, by adding that he referred only to the every-day work of developing negatives, not to special work for which other developers than the alkaline pyro were preferable to it.

To those who have but recently joined the photographic ranks, and who have not studied the history of their art, it may not be known that up till the year 1861 the possibility of acting directly on the haloids of silver by a developer was not established. In the wet process, which may be taken as typical of many, the film consisted of silver haloid suspended in collodion, and the light impression was received by this film; but the visible image was not developed in it, or from the silver in it. The silver which went to build up the image was reduced from free silver nitrate, which existed as excess *on* the wet plate.

The dry plates of these days consisted of films—mostly of collodion—precisely similar to wet plates, except inasmuch as the free silver nitrate was carefully washed out of them, after which they were treated with a preservative, and were then dried. Before development, however, the free silver nitrate was always replaced.

In 1861, however, Mr. Wharton Simpson read a paper before the North London Photographic Association,* in which he described a set of experiments made on dry plates which had been completely deprived of all free silver nitrate, and subsequent treatment with iodide of ammonium, followed by a second washing. These were developed with a neutral solution of pyro, a thin image resulting, which was intensified with alkaline pyro and silver nitrate. Mr. Simpson attributed the discovery of this direct development of the haloid to Mr. Mudd, who, in his turn, gave the entire credit of the suggestion to his assistant, Mr. Wardley.

In the discussion which followed Mr. Burton's lecture, Captain Abney stated it as his experience that a truly neutral solution of pyrogallol would not develop an image on a haloid of silver film. Recent experiments which we have made tend to confirm that at least in the case of gelatino-bromide plates, as with these we have given very protracted exposures behind negatives—up to a hundred times normal—and have been unable to get a trace of an image after a very prolonged development with a perfectly neutral solution of pyrogallol. The addition of a trace of alkali resulted in the case of the very long exposures in thin, but quite complete negatives.

It must be borne in mind, in connection with the experiments of 1861, that the point towards which all attention was directed was the complete illumination of free silver nitrate, and that, although it was stated that the solutions were made with pyro without the addition of an acid restrainer, no particular effort appears to have been made to secure absolute neutrality. The novel feature was development without silver nitrate, not development without alkali. It is therefore quite possible that slightly alkaline solutions were used.

However this may be, the experiments referred to were the immediate forerunners of the discovery of development with alkaline pyrogallol. All will agree with the lecturer that this discovery was the greatest advance made in the matter of the development of the photographic image since the introduction of acid pyrogallic developer. Without it the dry plate process of the present day could not have been the thing it is—the negative photographic process.

From the time of the discovery of the " alkaline pyro " developer, the lecturer passed on to the announcement by Mr. Carey Lea, in 1877, that although protosulphate of iron would not develop an image in films of the silver haloids, various organic salts of iron would, and that of these one of the most useful is ferrous oxalate. In this connection it was mentioned by the chairman that the protosulphate of iron would develop a latent image on the haloids of silver if it were present at the time of exposure.

Mr. Burton stated his preference for the " alkaline pyro developer," " his own favourite," to any of the organic iron developers. We do not wish to enter into the question of the excellencies of pyro development " as set against those of iron development," but would point out that, whatever advantages the former may have over the latter for negative work in gelatino-bromide, the introduction of the organic iron developer has opened the way to the working of certain modern processes almost as certainly as alkaline pyro opened the way to the working of modern dry plates. We need merely mention gelatino-bromide paper as used for enlargements, gelatino-chloride plates, and the new rapid printing paper.

At the lecture referred to, a series of transparencies was shown. These were all taken from one negative with the same exposure. They were developed with various developers, amongst these being ferrous-oxalate, hydrokinone, and pyrogallol in conjunction with various alkalies.

We were glad to observe, in connection with the last-mentioned developers, that the lecturer entered a mild protest against those who talk about a particular alkali as giving, in conjunction with pyrogallol, a result totally different from that to be obtained by other alkalies. As a matter of fact, there was little difference to be seen between one and another of the six plates developed by the aid of the following six alkalies—caustic ammonia, potash and soda, carbonates of ammonium, potassium and sodium. That there was some difference is undeniable. We have noted such difference in our own experimental work, and have noticed a still greater difference in *time taken for development*, than in the final result.

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* Photographic News, 1861, p. 518.

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ON BROMINE-ABSORBING POWER OF VARIOUS BODIES.

A paper of considerable direct interest to the photographer was read before the Glasgow Section of the Society of Chemical Industry some few weeks ago by Dr. E. T. Mills and Mr. T. Muter; these gentlemen having examined a very considerable number of organic bodies (mostly resins) with the view of determining their capability of taking up free bromine. It is needless to remark on the probability that some of those substances which have been found by experiment to possess great bromine-absorbing powers may be found useful as "chemical sensitizers" for bromide of silver.

The details as to the methods of working adopted by Messrs. Mills and Muter would not very greatly interest our readers; but we may mention that weighed quantities of the material experimented upon and of bromine—this latter diluted by a suitable solvent—were left for a sufficient time in contact, the unabsorbed bromine being then determined.

Subjoined are some of the results which we take from the memoir of Messrs. Mills and Muter:—

Substance.	Absorption.
Shellac bleached	4·61
Shellac	5·21
Gum Benzoin	38·90
Amber	53·53
Animé	60·22
Gamboge	71·56
Copal, reduced to ¾ by boiling	84·52
Copal	89·93
Sandarac	96·42
Kauri	108·22
Gum Thus	108·54
Dammar	117·94
Elemi	122 23
Mastic	124·33
Sunflower oil	51·45
Haddock liver oil...	109·84
Anthracene at 11° C.	89 89
,, ,, at 17°	175·33
Para-toluidine	74·47
Ortho-toluidine	151·34

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FRENCH CORRESPONDENCE.

Dark-Room Lighting—Sulphocyanide of Ammonium for Developing — Carbonate of Potash and Sulphite of Soda Developer—Incandescent Dark-Room Lamp—Effect of a Yellow Phosphorescent Surface upon Sensitized Plates—Poitevin Subscriptions—Photo-Typographic Blocks.

M. Scola's Remarks on Dark-Room Lighting.—At the meeting on February 6th of the Photographic Society of France, M. Scola announced a method of dark-room illumination with white light. The possibility of such a thing seemed very attractive, but, unfortunately, all promises are not realised. M. Scola seems to have taken the shadow for the substance, and exposed himself to a smart reply from M. Adolphe Martin, who has put things clearly in their true light. M. Scola, relying on the one hand upon Mr. Stokes' curious statements, and M. de Chardonnet's on the other, has concluded that as silvered plates allow violet rays capable of being photographed to traverse them, the actinic rays of white light were absorbed, and the rays from the reflected surface did not influence sensitive films. In replying, M. Martin said that Foucault's mirrors had often served to obtain astronomical reproductions, and it had been shown the mirrors yielded a maximum of reflected light amounting to 90 per cent. of the incident light. In short, M. Scola ought to have further assured himself by accurate experiments, and have withdrawn his communication. This explains why the affair was not mentioned in the *Bulletin* of the Society, although it gave rise to an animated discussion. It was also the cause of the decision passed by the administrative council of the Society not to admit manuscripts to come on during the meeting until they had been given in a certain time beforehand, that their contents might be looked through to see if they were suitable.

Sulphocyanide of Ammonium Developer.—M. Le Cornet is in favour of a solution of sulphocyanide of ammonium instead of simple hot water for developing carbon prints. He has been experimenting with a twelve per cent. solution. If the process be found to show marked improvement in carbon printing, it seems to me that the same solution might be used with advantage upon photo-reliefs for Woodburytypes. The development of a gelatine relief is so long, why not accelerate it by the dissolving properties of sulphocyanide of ammonium, provided it does not dissolve the hardened gelatine? I particularly call the attention of those engaged in photo-relief work to this point.

Carbonate of Potash and Sulphite of Soda Developer.—M. Roger, director of the photographic department of the Artillery Museum, has given an account of the advantages presented by the carbonates of soda and potash developer spoken well of by Mr. Newton, President of the Photographic Institute, New York. He regrets that it is but little used in England, and not at all in France. Below are the formulæ. In separate bottles are prepared the following solutions:—

Sulphite of soda			to saturation
Carbonate of soda, 25 of the salt to		100	parts water
Carbonate of potash 25	,, ...	100	,,
Bromide of potassium 10	,, ...	100	,,

To develop a negative of 7¼ by 9¾ of correct exposure and under favourable circumstances, Mr. Roger takes the following solution:—

Water	200	cubic centimeters	
Solution of sulphite of soda ...	from 5 to 6	,,	,,
Solution of carbonate of soda ...	from 10 to 12	,,	,,
Solution of carbonate of potash ...	from 10 to 12	,,	,,
Pyrogallic acid	0·8 to 1	gramme	

The quantities are given approximately, so as to allow the operator a certain margin, whether he wishes to accelerate or retard the development.

Incandescent Dark-Room Lamp.—An amateur has applied to dark-room illumination a small incandescent electric lamp enveloped in a red glass bulb. It may be worn as a scarf pin by the operator, and a small commutator suffices to bring it into action.

Effect of Yellow Phosphorescent Surface upon a Sensitized Plate.—It is known that a sensitized plate, slightly exposed over its entire surface before putting in the camera and submitting to the action of reflected rays, gives a more rapid and intense impression, due to this first rupture of equilibrium. Partly based on this fact, and also on the acceleration produced from a first impression with yellow rays, I think it would be possible to apply it to all gelatino-bromide plates, to render them more sensitive.

To avoid fogging the plates, it would be sufficient to submit to the action of a phosphorescent plate covered with yellow glass for about three or four seconds. This light will have the effect of disturbing the equilibrium, and pre-disposes the plate to submit more quickly to the action of reflected rays. With a view to this object, I have the idea of a special dark slide allowing this feeble exposure before the actual one. The inner surface of the moving slide is coated with sulphide of calcium, over which is a sheet of yellow gelatine. A thin movable slide covers over this surface, which is opened and shut to expose the plate to the phosphorescent surface, and both slides open together for the exposure to the object. By this means the sensitiveness is increased by one-fourth. There are some curious experiments to try on this track.

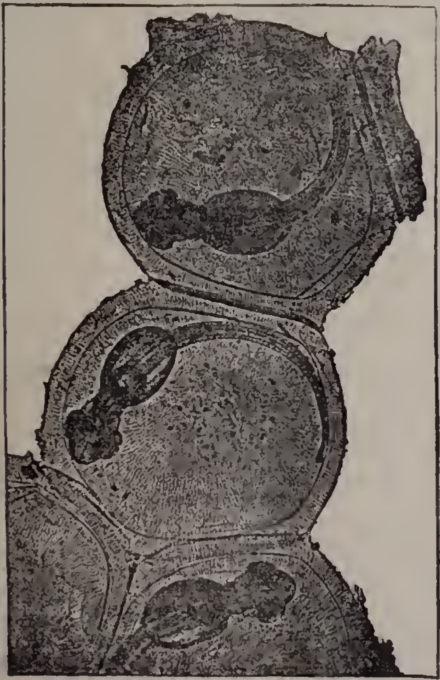
Poitevin Subscriptions.—The amount subscribed to the Poitevin monument is highly satisfactory, and exceeds the expectations of the promoters, amounting altogether to 10,500 francs. The Photographic Society of Vienna has just contributed 483 francs.

Photo-Typographic Blocks. — MM. Deroulède and Terpereau showed before the Photographic Society of France photo-typographic blocks obtained by a counter-mould from gelatine with a metallic composition, having the property of taking up the fatty ink in certain parts, and leaving it in others without previous wetting. The results shown leave much still to be desired, but they are the preliminary trials capable of opening up the way to something more complete. The mould is formed by an amalgam which hardens as soon as it has taken the impression from the gelatine, and its molecular nature is such, that with the help of mercury, which destroys the homogenous property of the metal (zinc probably) with which it is amalgamated, some of its particles retain the ink, and others leave it. LEON VIDAL.

THE RETINA OF SCIENCE.

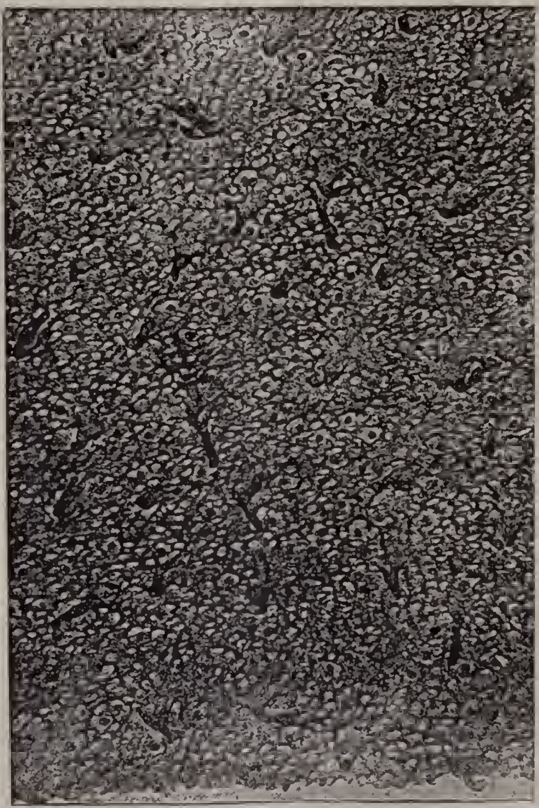
BY DR. T. CHARTERS WHITE.

THE photographic camera has been compared to the eye, and in the essential elements of its construction it bears a somewhat close analogy to the the organ of vision. Thus in the eye we have the iris acting as a stop in front of the crystalline lens, which in its turn throws the image on the retina as on a focussing screen, or a sensitive plate in the camera. A French savant once not inaptly styled the sensitive photographic plate the "retina of science," but a reference to the accompanying Dallastint will show that the sensitive film possesses some power of discriminating greater than that possessed by the human retina, as structure quite invisible under the microscope has become distinctly so in the photographic negative. It was with no little astonishment now two years ago that I saw this result after taking a photo-micrograph of some young tench in their eggs. I well remember the clear structureless character of these jelly-like envelopes enclosing their restless inmates, and also the undesirable movements by which they manifested their objection to the "fierce light" of my lamp beating on their dwellings. I quieted these movements by the addition of a weak solution of iodine green to the water in the trough which held my prisoners, and ultimately succeeded in taking their portraits as above. When I developed the negatives—for I took more than one—I was much astonished to find that what was clear and gelatinoid under the microscope, was now pierced by innumerable tubes which passed through the egg cases in parallel lines, and proving that the *retina of science* possesses a power which the human retina does not, a phenomenon which has yet to be explained by future investigation.



YOUNG TENCH IN THE EGGS.

The second Dallastint accompanying this short article serves to show the capabilities of that process in the delineation of photo-micrographic subjects. We have here the internal surface of the cuticle of an infant, in which the delicate reticulated structure of the *stratum mucosum* is well displayed; while scattered about may be seen the pouch-like terminations of the hair follicles, and the openings of the sudoriparous glands.



INTERNAL SURFACE OF INFANT'S CUTICLE.

It is not the province of an article like this to enter upon a long disquisition on the histological structures forming the skin proper, but it may render this Dallastint more readily understood if, in explanation, I say that this cuticle is peeled off from the surface of the subject, and mounted for the microscope with its under surface upwards towards the eye of the observer. The pits seen covering the sketch are occupied in their normal state in capping an immense number of the sensitive *papillæ* of the true skin, and acting as a protection to it. The hairs covering the skin are formed by buds springing from the bottoms of pouches which are formed from an inversion of the surface, and are seen as projections in the sketch, while scattered about may be noticed numberless black spots having a light ring surrounding them; these are the pores of the skin, and are the openings through which the perspiration exudes.

I think these few remarks will enable some of the anatomical details present in this sketch to be readily made out, and thus I leave it to the indulgence of my readers.

PRODUCING FLORAL BORDERS TO VIGNETTE PORTRAITS.

BY R. STANLEY FREEMAN.[*]

In the Photographic News of the 5th December last, a paragraph appeared in the notes to the effect that "it is curious, considering the thousand-and-one purposes to which photography has been turned, that no one has ever thought of adapting it, as regards portraiture, to Christmas cards. Photographs on Christmas cards are, of course, no novelties; but to send one's portrait surrounded by a tasteful border, and accompanied by an appropriate sentiment, has not been done. This statement is only true to an extent, and the idea may have been conceived and carried out by more than myself, but not, perhaps, in the manner I am about to explain.

Some years ago there was issued a series of mounts for C.D.V. portraits, the borders of which consisted of embossed flowers in colours, after the manner of valentines. In the centre of each mount was an oval opening to show the head and bust portion of a photographic portrait. They were certainly very pretty and effective—so effective, in fact, from the extreme brilliancy of the colours, that the photograph was completely killed, even a well-coloured portrait being put in the shade. Since then there have been numerous other examples of floral mounts, but the same objection has applied to them—too great a brilliancy of colour. With this drawback in mind, I cast about for a means of producing a more subdued kind of border, which, while faithfully representing the natural flower and foliage, would at the same time, harmonise with the tone of the portrait. After many failures, which I need not enumerate, I succeeded in accomplishing my desires. My first attempt was with the natural leaves of ferns; but I found that by the time I had adjusted them to my satisfaction and was ready to photograph them, they became too limp for the purpose. I therefore fell back upon artificial fronds. Having found the ferns a great success, I essayed other foliage and flowers, and found them equally successful. Most people, especially ladies, have their favourite flowers, and as there is no limit to the number or variety of the designs, a little trouble and no great expense puts one in a position to gratify most tastes. As with my first attempt with the ferns, I found natural flowers flag before I could manipulate them. I consulted an artificial florist, who, entering into the spirit of my requirements, made me up such wreaths as I desired, according to instructions and designs furnished. Artificial flowers, too, are more capable of arrangement, and maintain their form for any length of time, and when done with photographically, convey joy to the heart of your wife as trimmings for her own and daugher's bonnets and hats. I can remember my forget-me-not wreath adorning tho broad-brimmed Leghorn hat of my little daughter, and a more pretty and chaste trimming I never saw.

Now for my *modus operandi*. Having obtained a wreath to my satisfaction, I mount and arrange it on a large sheet of white cardboard. This I set up on an easel (I prefer an easel as being handy to move about for the purpose of dodging the light). The focussing and exposure I need not enter upon, the only difficulty, after the proper lighting, being in the development. In the resulting negative the wreath itself is not required to be intense, but the centre and outside edges must necessarily be so, to avoid degrading the whites of the portraits in the subsequent printing in; and here I am in doubt as to the adaptability of gelatine plates to the purpose, not having tried them. The difficulty I allude to can only be got over by local intensification after development. All who have worked the collodion process know that by pouring the pyro and citric acid intensifier on and off a certain spot, that spot or portion can be intensified to any extent without materially adding to the density of the other portions of the negative; hence I found that by a little practice and sleight-of-hand work, I could accomplish, with just a failure now and then, the object required, without any after dodging of the negative.

Having obtained your negative of the wreath, you place it in the printing-frame, and, holding it up to the light, superimpose the vignetted portrait upon it, and proceed to print in the usual manner.

Copying painted designs and drawings I have not found satisfactory, as there is a flatness and want of solidity about the result; the portrait appearing far in advance of the border, and not behind or in the same plane, as the case is when a natural or artificial wreath is used.

As I before suggested, when once you have the idea, there is practically no limit to your designs. Another very pretty effect is obtained by making a rough wooden frame, shaped like an Oxford frame, and covering the face or front with virgin cork. To the cork you attach your wreath, either trailing around it, or in such other manner as may suit your fancy. Place this frame against a white background, and make your negative. Having printed your portrait, proceed as with the wreaths, and the result is a portrait mounted in a pretty and rustic frame. You may obtain a similar result by placing your sitter behind the frame, but the effect is not so good, and you cannot obtain so clean a vignette in the centre. I can show you an example of the frame and portrait done at one operation, and against a dark background, but tho effect is nothing like as good and chaste as when printed in with a vignette portrait in the centre.

AIDS TO CORRECT EXPOSURE.

BY W. GOODWIN.[*]

With good plates and intelligent development, a practised photographer may, within certain limits, correct the effects of over- or under-exposure, but there is a correct exposure, and you cannot trespass very far on either side of it without sacrificing something in the resulting negative.

The factors which govern exposure are: the subject of the picture, the lens and and its aperture, the rapidity of the plate, and last, but not by any means least, the quality of the light by which the work is to be done.

Let us consider each of these separately, and see if we cannot reduce any of them to rule. In this respect, the subject will be intractable. Scarcely two subjects will be found to send exactly the same amount of light through the lens. However, a broad classification may be made, and this has been done by Mr. Burton in his table of comparative exposures. A glance at this table will show how greatly the character of the view may influence the time of exposure. The first aid I have to suggest is the use of such a table as Mr. Burton's, and the first step is to rule a page of your note-book into ten columns, and head each as Mr. Burton heads his.

Before we do anything more in this direction, we must consider the influence of the lens and its diaphragms. In theory, the single landscape lens is more rapid than the doublet of equal aperture; but the difference is so little that it may be disregarded in practice, and my remarks will apply to both.

The rapidity of a lens depends mainly on its aperture and its focal length. Thus a lens of 2 inches focus will require four times the exposure of a 6-inch, with an equal sized diaphragm, and a quarter-inch diaphragm will require four times the exposure of a half-inch when used in the same lens. The Photographic Society of Great Britain have recommended that the diaphragms of all lenses should bear such relation to the focal length that each should require exactly double the exposure of the next smaller.

Now, if we turn again to Mr. Burton's table, we shall find that it is constructed on this principle, and that each stop is numbered, so as to show its exposure. Obviously, the most sensible thing would be to get a set of stops made to correspond with this arrangement, but we will see how we can construct a table for stops of any size. First, if possible, find the equivalent focus of your lens. If it is made by a known maker, you will find it in his price list, and if not you may calculate it for yourself by the rules given in the various text books, provided you have a camera of pretty long focus. However, it will be near enough for our purpose if you get a sharp image of the sun on a piece of paper, and while you hold lens and paper, get some one to measure the distance from the paper to the diaphragm aperture, or, in the case of a single lens, to the centre of the lens. Note down this focal length, and proceed to measure your diaphragms in sixteenths of an inch.

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[*] Abstract of a communication to the Newcastle-on-Tyne and Northern Counties Photographic Association.

[*] Abstract of a paper communicated to the Glasgow and West of Scotland Amateur Photographic Association.

Then, with pen and paper, proceed to divide the diameter of each stop into the focus, and state the result as a fraction of the focus, thus $\frac{f}{8}$. For example, a Ross half-plate rapid symmetrical has a focal length of 7½ inches; for convenience reduce this to 16ths = 120. A diaphragm measuring $\frac{f}{16}$ will give the fraction $\frac{f}{7.5}$.

Having picked out the stops that correspond, and filled in the exposure for them, we have now to deal with the odd sizes. Here is one $\frac{f}{27}$, which is just half way between No. 16 and No. 32; but a moment's thought will show that as the exposure increases as the square of the diameter, it won't do to take the exposure half-way between the two.

We have another factor to consider now; that is, the rapidity of the plate. If you use plates by a maker who has a name to sustain, you may be pretty confident that they are of fairly uniform rapidity; so, after you have got into the way of working any particular brand, the best thing you can do is to stick to it. The exposures in our table are for plates of medium rapidity in good spring light. In my own experience I find that they just suit "30-times" plates, or 15 on the sensitometer; but then I like a full exposure with slow development, and I know that others find these exposures just right for "20-times" plates developed in the usual way. The most rapid plates in the market will not be overdone with half the given exposures.

It must always be borne in mind that an error of a fraction of a second in either direction may be corrected in development, and it is impossible to make a very serious error if you refer to the table.

We come now to the light. If you depend on the eye entirely in judging the quality of the light, it will sometimes play you tricks. The rays which are most active on the plates are those which have the least effect on the eye. We can, however, by chemical means, arrive at an exact estimate of the actinic power, and for this purpose an actinometer in used. This is simply an arrangement whereby a piece of sensitized paper is exposed and allowed to darken to a standard tint, and by the time it takes to reach that tint, the value of the light is judged. Capt. Abney has, however, pointed out that ordinary sensitized paper is not suitable for bromide plates, since there are conditions of light in which the plates will be fairly rapid, while the paper will be very slow. He gives a formula for a bromide paper which is treated with tannin in order to absorb the bromine set free during exposure, otherwise the darkening would be very slight. I used this paper for awhile, but found it rather slow. The tannin also turned brown on keeping for a week or so. I then made some more, substituting for tannin potassium nitrite, not nitrate, which is colourless. This was an improvement, but still it was just slow enough.

Bearing in mind that your table of exposures is calculated for the best spring light, go to the country some bright day next month with note-book, actinometer, and the necessary appliances for exposing a few plates. Select (say) an open landscape, and use your smallest stop. When all ready to expose, get out your actinometer and expose it to the reflected light of the sky for ten seconds (if the sun is shining, turn your back to it, and keep the actinometer in your own shadow), then put it in your pocket, expose a plate according to your table, and in case the light or plate should not be just in accordance with the conditions under which the table was prepared, expose other two plates, one a little less, and one a little more than that first exposed. Then note down everything you have done—kind of view, stop, speed of plate, exposure of each plate, and length of exposure of actinometer.

When you get home, the first thing to do is to get hold of a paint box and paint the under side of the glass of your actinometer to match the darkened paper. Do this by gaslight, then scrape away a little of the paint so as to let a strip of the paper be seen below it. After this, develop your three plates with developer of normal strength, and see which is best. If you have chosen a really bright spring day, and are using plates of medium rapidity, you will most likely find that exposed according to the table just about right.

Now let us see how we can use these aids in our field work. We have ascertained the correct exposure with a given stop on one class of view, with light of a given quality; but now suppose all these conditions altered, let the view have heavy foliage coming close up to the camera, the stop be a size largar than that used in our first experiment, and the day rather dull. The table tells us what the exposure would be with this stop on this view, on a bright day, and if the actinometer take 20 seconds to reach the painted tint, then we must double the exposure given in the table.

You may sometimes find that the actinometer indicates a very different exposure from what the eye would lead you to expect. For instance, one day last September I went to Bothwell Castle to get a picture I know of in the grounds. It was one of those strange yellow days we had then, and the sun, though shining with all his might, was apparently shining through orange glass. The actinometer indicated an exposure of 30 seconds, where in good light 5 would be right. I was rather incredulous; 30 seconds in broad sunshine! However, I gave this exposure, but for my own satisfaction, I gave another plate 15 seconds only. On developing, the latter was hopelessly under-exposed, while that having 30 seconds gave a negative which furnished one of my exhibition pictures.

I have shown you how to reduce the quality of the light to a certainty, also how to reduce to rule the exposure with different lenses and stops on certain classes of subjects, and it remains with you only to guess correctly to what class the view you wish to take belongs. I can assure you from my own experience that there is enough uncertainty about that point to prevent good negatives ever becoming monotonous. The only aid I can suggest in this case is the continual use of a note-book. Note every plate you expose, and when you have a failure, be careful to record the fact, and you will gradually find these accumulated notes becoming a great help in cases of doubt. One hint I can give to beginners is, that a great number of the pictures to be met with in this part of the country are intermediate between open landscape, and landscape with heavy foliage in the foreground; and it is scarcely needful to say that if you are in doubt, let the exposure be too much rather than too little. You *may* make a negative of an over-exposed plate, but never of an under-exposed one.

THE FACULTY OF OBSERVATION, OR COMMONPLACE KNOWLEDGE IN PICTURE-MAKING.

BY A. B. STEWART.*

My text will be found on page 802 of the last volume of the Photographic News, under date 19th December last, where appear the following remarks by Mr. Hadley relative to an exhibit of his at the late Pall Mall Exhibition, which formed the supplement to that number of the News. [Mr. Stewart quoted the passage].

As to the necessity of cultivating this faculty of observation, I think no one will dream of contradicting Mr. Hadley. It is the one thing which marks the difference between a mere photographer and an artist. It is the faculty which enables the artist to judge from what particular spot and at what particular time to take his picture, so as to get the best possible results out of it. But it appears to me that our artist has limited the application of the faculty. He confines it to the ability to see a picture in commonplace subjects. In this line certainly his picture "At the Wheel" is a good example, but I do not agree with him in thinking, as his remarks indicate he does, that the cultivation of the faculty of observation in this direction is so very rare. Witness the number of beautiful pictures which we have recently had before us, many of which were made up of the most commonplace materials: two girls reading a printed bill pasted on a smithy door; two women picking their way across a dried-up burn; haymaking; and many others from the same artist, all most effective subjects. Witness our last presentation print—an old crone just in from the harvest field, her "heuck" thrown carelessly over the arm of her old arm-chair, trimming her cheap common lamp in the semi-obscurity of her poor cottage; these are what go to make "The Gloamin'"—one of the finest, most picturesque, and effective studies that can well be imagined out of what to the ordinary mind would seem to be the most unpromising materials possible.

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* Read before the Edinburgh Photographic Society.

And this brings me to the part of the subject where the artist has stopped short, far short, of the limits of his subject. The cultivation of this faculty of observation enables the artist not only to find an "effective" subject, but also to know something about the subject he is depicting. And the picture before us is an admirable illustration, from its very failure in this very point, of such necessity. The artist says, "The man evidently knew his work." Pity he did not leave the man alone, as he evidently did not. I do not speak of his knowledge of artistic composition, or of his photographic skill. What I mean is, that this picture shows his ignorance of that commonplace knowledge, the possession of which might have saved an eminent painter from the critique of a farmer in a farmyard scene: "Ay, they be mortal like pigs, but who ever saw five pigs feedin' without one on 'em havin' his foot in the trough."

And it is this commonplace knowledge, the want of which is so evident in the picture before us. The use of the "man at the wheel" is to steer the vessel while she is under way. And this lighter is evidently not under way. The mainsheet is hanging loose, a loop on a rope's end is slipped over one of the wheel spokes on the man's left hand, while another rope is double hitched round one of the spokes on the opposite side. Had she been under way the mainsheet would have been taut, and no ropes or anything else would have been allowed around to interfere with the free working of the wheel. And if she were not under way, what was the use of "the man at the wheel?" But again, it is evident, *ex facie* of the picture, that the man is not steering. From the strain on his right arm—his "starboard flipper"—it would appear that he was obeying the order "port your helm," *i.e.*, pulling the wheel over towards his own left hand: now in that case it would have been the right, and not the left foot, which would have been advanced to get the necessary purchase on the wheel. Then, again, a steersman always faces straight in front. His eye must be ever watching the compass the sails, the pilot, if there be one on board, and straight ahead of the vessel; but always straight in front of him. What have we here? The man upon whose vigilance and care the safety of ship, crew, cargo, and everything else depend, is carelessly holding fast a wheel tied down with ropes, enjoying a quiet pipe (a thing I never saw a man at the wheel doing in all my experience, except on the canal, where there are no wheels), and looking not where the ship is going, but over the side, as if, to quote an American poet, "the subsequent proceedings interested him no more."

And this brings me to the point I wish specially to impress upon you; and the depicting of common-place subjects such as the one before you requires in a far higher degree the exercise of the faculty of observation than almost any other branch of our art. It requires common-place knowledge, which can only be acquired by the cultivation of this faculty of observation, and its application to everything that falls within the range of the observer's vision, and reasoning powers, no matter how small or how trivial it may be. And again, quoting Mr. Hadley: "I should like to point out to my brother-photographers the absolute necessity for cultivating the faculty of observation, without which success need not be looked for." As I have said, I give these words a far wider application than the author appears to do. There is no knowledge, however common-place, however mean, however trifling apparently, which by the observant and intelligent artist may not be made use of effectively in some way, and at some time or other; and he who carefully cultivates the faculty of observation, and stores away in the recesses of his memory the common-place knowledge so obtained, is indeed a long way ahead of those who stand like the two photographers at Whitby, unable to "see anything worth taking."

LESSONS DERIVED FROM PIN-HOLE PHOTOGRAPHS.

BY BARNARD S. PROCTOR.*

Photography depends upon our ability to throw upon a sensitive plate the rays of light coming from a body or group of bodies in such a way that every point in view affects a corresponding point on the sensitive plate, and that no point in the plate shall be affected by rays coming from any other point in the field of view than that to which it corresponds.

If we place a sensitive plate at the back of an opaque box, and a pin-hole in the centre of the front, we approximately comply with these conditions, and the picture obtained would correspond with the view the eye would receive if placed in the pin-hole limited by an opening the size of the plate and placed in front of the eye at a distance equal to the distance between the pin-hole and the plate.

I say under these circumstances our conditions are approximately complied with, and I say approximately, because for an exact compliance, we should require that the access of light should be limited to a mathematical point—an infinitely small opening.

In reducing the size of the opening with the view of approaching more closely to the theoretical requirements, we are limited by the quantity of light required to do the work in a practical period. An infinitely small hole would require an infinite exposure.

Another obstacle which would probably be met with in the reduction of the perforation would be the inflection which rays of light undergo when passing near to solid bodies. The smaller the hole, the larger the proportion of the rays would pass within such a distance of the edges of the perforation that inflection would take place.

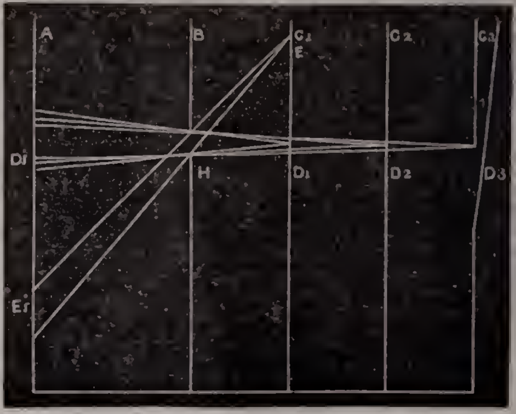
I have not as yet observed any indications of the phenomena of the diffraction, or interference of the luminous rays.

At the meeting in December, when I was asked to explain the mode in which I had obtained the pin-hole picture exhibited in November, I was asked about the focus or distance to be observed between the diaphragm and the plate; and some doubt was expressed as to the correctness of my statement that there was no such thing as focus in the case, and that the greater the distance between the pin-hole and the plate, the greater the clearness of the picture in relation to its size. Since then I have made further examination of the picture on the focussing glass to make sure of my correctness on this point.

The theory of the case was so clearly in favour of my statement that I looked, with little expectation of finding the indications of a clearer picture at one particular distance, and came to the conclusion that any apparent clearness at one particular distance, which one of my hearers thought he could detect, might arise from the visible clearness being dependant upon two circumstances. When the focussing-glass is near the pin-hole, the picture is luminous, but the rays from the different objects overlap on the screen, and very palpably interfere with the picture. As the distance increases, this overlapping diminishes, and continues to diminish at every increase of distance. But at the same time, the picture becomes less luminous, and consequently visually less clear, but photographically more clear, only requiring an extended exposure to compensate for the diminished light.

I will endeavour to make clear to you, first, how the overlapping of the separate points of the object increases and diminishes according to the distance of the screen from the pin-hole, and then how the light on the screen diminishes as the distance increases.

We will take a diagram drawn in a plane parallel to the direction of sight, and cutting the sensitive plate at right angles. A represents the plate; B the diaphragm, with its perforation; and C the view. D_1, D_2, and D_3, are three points in the same



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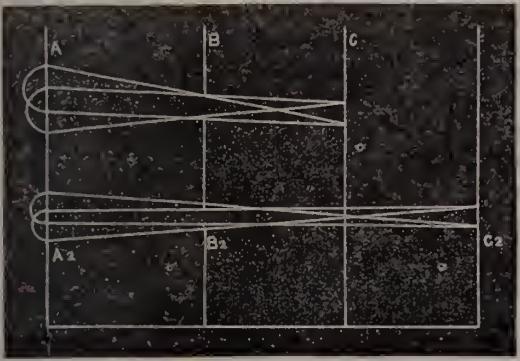
* Read before the Newcastle-on-Tyne and Northern Counties Photographic Association.

line of view, but at different distances ; D*i* is the image of these points on the plate ; E is another point in a different part of the view ; and E*i* is its image on the plate.

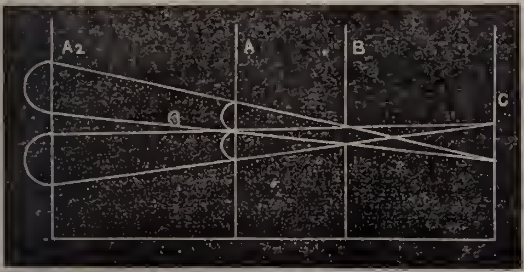
First, in reference to the points D, I wish you to observe that the further they are from the pin-hole, the smaller is their image upon the plate ; secondly, that the further the plate is from the pin-hole, the larger will be the image of any point in the view ; but the image of D_1 will increase in more rapid ratio than the image of D_2 or D_3.

Secondly, I wish to draw your attention to the fact that other points on the plane C_1 will have images of about the same proportionate size as D_1. For example, the point E is a greater distance from the pin-hole H than is the point D_1. It has consequently a more acutely diverging cone of rays passing through H. In a corresponding degree its image, E*i*, is also further from H, and the longer continuance of the divergence compensates for the smaller degree. In like manner the cone of rays meets the pin-hole obliquely, and, as a consequence, the perforation only permits the passage of a band of light narrower than its diameter ; but this narrow band meets the sensitive plate obliquely also—thus it is spread out over the same area as the band from D, which meets both B and A at right angles.*

In the next diagram I endeavour to show that two points C in the view, having a distance from one another equal to the diameter of pinhole B, will give over-lapping images on the plate A ; and that these images overlap more as the distance of the points from the pinhole increases as drawn at A_2 B_2 and C_2 ; consequently a sign board would give you a more legible image with your pinhole camera 20 yards distance, than if the camera were moved to 50 or a 100 yards from the same board.



The following diagram shows that the two points in the view C, the images of which overlap when the plate is placed at A, give images which do not overlap when the distance of the plate from the pin-hole is increased so much as to A_2, and the luminosity of any point on the focusing screen or sensitive plate is diminished by the decreased number of points in the view which throw light upon it.



In this diagram I have placed the points in the view at a distance from one another greater than the diameter of the pin-hole. Had I not done so, no increased distance of the plate from the pin-hole could have freed them from this overlapping.

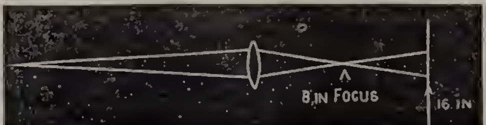
The blurring of the picture—the "focal aberration," if I may use such a term where there is no such thing as focus in the question—will always be proportionate to the size of the pin-hole, divided by the distance of the pin-hole from the plate.

At the December meeting I was asked if perfect roundness and smoothness of the pin-hole were not essential to the production of a picture. My reply that "the shape and smoothness of the aperture were, theoretically, of no importance," is confirmed by a picture which I now exhibit, of the same view taken with an oblong perforation in a thin sheet of copper, placed vertically. The perforation is about seven times as long as it is wide, and the effect—as might be anticipated—is to make the letters in the name of the street rather taller than they should be, to dull the horizontal lines in the roof, &c., and rather to sharpen the vertical lines.

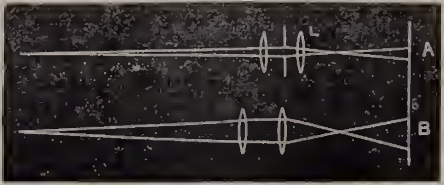
I was also asked if the pin-hole views were free from the perspective distortions common to views taken with lenses. As I cannot pretend to have an eye for perspective so keen as to detect errors in any ordinary photographic views, I have simply endeavoured to give a practical reply to this question by taking the same view with an ordinary rapid rectilinear lens, and will leave it to those who see, or think they see, faults in photos of this description, to compare the pin-hole with lens picture. I should expect them to be identical, and their correctness far beyond the criticism of an eye under any ordinary training.

This subject was commenced with no thought of anything beyond a passing curiosity to see what sort of picture I could obtain without a lens ; but I think we may reasonably look for some educational advantages from such experiments, and the present instance has considerable bearing upon the art of focussing, and the value of small stops.

With the view of illustrating this, I have taken another negative of the same street corner with the pin-hole diaphragm in conjunction with the lens, but the lens which has an eight-inch focus was sixteen inches distance from the plate, so that until the diaphragm was inserted, each point in the view occupied a disc on the plate about equal in size to the area of the lens, with the well-known result that no picture was visible beyond the simple fact that you could discriminate between earth and sky ; but after the insertion of the pin-hole diaphragm each point in the view occupied a disc on the plate equal in size to the area of the pin-hole, and the landscape at once showed its broad details, and had about the same degree of clearness as obtained when the pin-hole was used without the lens.



It is worth while to note, in passing—though it is precisely what we might predict—that it was found impossible to focus the view with the pin-hole diaphragm and lens in their places. In the diagram you have represented roughly the contrast between the two cases. In A the pin-hole stop is in, the plate A being double the focal distance. It would be difficult to see where the lines of light cross ; the difference midway between the lens L and the plate A differs so in sharpness from points an inch or so on either side of correct focal distance, that the eye fails to appreciate it ; but with the full aperture of the lens as drawn at B, the point at which the rays cross is most clearly marked ; the slightest movement of the plate backwards or forwards gives a most palpable blurring of the image, hence the common rule to focus with the largest aperture, and expose with the smallest which your light and other circumstances will permit.



(*To be continued.*)

Notes.

The annular eclipse of the 16th inst. was, it appears, well observed at some of the transatlantic stations.

Was it not Rejlander who said that the portrait photographer always gets the full value for his money when he travels in one of the large open third-class carriages which run on many of our railways?

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* The narrower band of light, however, having to cover an equal area on he plate necessarily illumines it to a lower degree.

To sit at one end and note the shading of the faces from right to left and from left to right is always instructive, to say nothing of the increasing obliquity of the lighting as one looks on those persons facing oneself at diminishing distances from the end of the carriage; but the most interesting effects are noticeable as the carriage swings round curves, or is partly shaded in passing line-side objects.

There is a rage just now for the exhibiting of paintings somewhat *risqué* in treatment. The pictures of "Nana" and "The White Slave" are examples of what we mean. They are cleverly painted, and their effect is enhanced by the tricky method of illumination, the room being darkened and the picture lighted from the sides. Whether there is, as *Truth* suggests, another reason for the darkness, namely that it is useful in hiding the blushes of the spectators, we will not determine. It is, however, rather an anomaly that while such pictures, with all kinds of accessories to make them life-like, are allowed to be shown, anyone selling photographs of them would stand a good chance of being prosecuted.

A circular issued by the Autotype Company informs us that a new issue of Turner's *Liber Studiorum* is in hand, and an examination of the very comprehensive catalogue of art reproductions which accompanies the circular makes us ask: Why is our own National Gallery so very poorly represented in the series of works published by the Autotype Company?

Considering that the Autotype Company can show a collection of reproductions from all the best galleries in Europe, and that the mere catalogue of these makes a closely-printed volume of over 150 octavo pages, they certainly ought to claim and enjoy as great facilities for working at the National Gallery, as those recently granted to Messrs. Braun and Co.

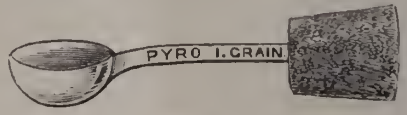
Mr. Shaw Lefevre was "tackled" last week on the subject of the contract entered into between the Trustees of the National Gallery and Messrs. Braun with reference to photographing the pictures. Mr. Shaw Lefevre could give no information on the subject, since, as he remarked, the matter was one out of the jurisdiction of the office of works, and concerned only the trustees.

Mr. Hastings' artistic Copyright Bill, introduced last year, will shortly come on for discussion in the House of Commons. The provisions of the bill have already appeared in the Photographic News. Briefly, so far as photography is concerned, they may thus be recapitulated: The copyright of a photograph to be vested in the person who takes the negative; photographic portraits not to be exhibited or sold without the consent of the sitter (a rather important clause in view of the recent sudden rush after military celebrities), and the seller of forged photographs is liable to be punished. An amendment to the bill, it is stated, is to be moved by Sir H. D. Wolfe.

The Royal Society has determined to follow the lead of the Photographic Society, in organising informal assemblies or social gatherings between the regular meetings, and, according to the arrangements, the first should have taken place on the 19th (last night). Anyone desirous of showing experiments, or exhibiting objects of interest, at these informal meetings, should communicate with the Secretary at Burlington House.

After making numerous experiments, and constructing costly machinery, a great and original American genius has succeeded in compressing pyrogallic acid into pills or tablets weighing approximately two grains each, and a bottle containing one hundred of these pellets can be bought for something less than the cost of an ounce of the usual article.

When one merely wants to measure out pyrogallic acid in fairly accurate doses, it seems to us that a simple and convenient method is to attach a bone salt spoon to the inside of the cork, as shown below. Of course, the spoon must be cut or filed down to the required size, and the shank should be bevelled at the top, so that none of the material will lodge thereon.



When used for a loosely coherent material like powdered bromide of potassium, a spoon measure of this kind is surprisingly accurate.

The *World* is good enough to say that the Chancellor of the Exchequer, to make up the deficiencies caused by the Soudan campaign, "will probably direct his attention to beer, wine, cigars, and *photographs*." This is not the first time a tax on photographs has been suggested, but we do not hesitate to say, apart from the injustice of taxing a profession which competition and the badness of the times have already made a very precarious one, that the idea is thoroughly impracticable. On what principle could a tax be levied? Are professionals only to be taxed, and amateurs allowed to go scot-free? Would the unmounted photograph be stamped, or would stamps be placed on cards? Would there be any distinction drawn between direct prints and mechanical prints? And if somebody discovered a process which was neither the first nor the second, would that also be taxed, or would the Act of Parliament have to be altered in consequence? In fact, directly one goes into the matter, a thousand and one objections spring up. Photography has conferred so much benefit upon the world, and has given so much pleasure to mankind, that the proposition to fetter it by a tax is a most ungracious one.

Walzl's Monthly addresses the portrait photographer in search of ideas, and tells him to go to the theatre, and there study the best female actress.

From M. L. Wulff, the director of the *Progres Photographique*, we receive an excellent specimen of Woodbury's Photofiligrane, the work of M. Braun of Augoulême. Portraits of the three founders of photography—Nièpce, Daguerre, and Talbot—are embodied in the design.

Civilisation is not quite so injurious to the eye-sight as Mr. Brudenell Carter contends, if we are to accept the argument of Lord Rayleigh. This latter physicist regards the superiority of the savage as a matter of attention and practice as to the interpretation of minute indications. Something quite analogous to the well-known acuteness of the blind in drawing conclusions from slender acoustical premises.

Practical emulsion making will be treated of in a series of articles which Mr. W. E. Debenham has been good enough to prepare for us; the first will appear next week.

There is a story of photographic ingenuity about; but this, we admit, has an American origin, and must be received with several grains, if not indeed a whole cellar-full, of salt. The tale in question is of a professional photographer, who, being anxious to obtain portraits of the leading English politicians, and finding he could not get them in the normal way, bethought himself of becoming for the time a Hanson cabman, and taking up his stand in Palace Yard, having prepared for his new duties by fixing up on the roof of his Hanson a camera which he could bring to bear through the trapdoor. Well, according to the story, in less than a week he had driven Gladstone, Bright, Forster, and about a dozen other notable M.P.'s, and had, moreover, obtained most characteristic negatives of them as they sat in his Hanson. But clearly this is impracticable unless it is cartes of the crowns of their hats, or their middle partings, he has obtained. The public will, we venture to say, have to wait a long time for this new series of the portraits of "cabbing-it" ministers.

Yet another story of Yankee origin! To diners at restaurants the state of the various hot joints at the time they wish for a cut off one is of importance, and we know how anxious are the enquiries addressed to the waiter as to the condition of this one or that. Well, a down town restaurateur in New York has his joints photographed at fixed intervals, and their exact condition of "on" or "off-ness" may be seen by the diners by a glance at the "bill of fare." This particular restaurant-keeper, perhaps, has heard of the careful *paterfamilias* who, when in seaside lodgings, used to photograph the joints before they left his table.

There is a feature in the action brought by Mr. Gibson, an artist, against Mr. A. Bassano, the well-known photographer, which is worth noting, as illustrating the relation between fashion and art. Mr. Gibson was to paint for Mr. Bassano a large picture representing a meet of the Coaching Club in 1882, but after making the sketch and getting the consent of the members and their friends (who, we presume, were to be photographed), Mr. Bassano would not allow the painting to be carried to completion. On the merits of the case we do not wish to enter, and would only refer to one point in the defence, namely, that the ladies' dresses as sketched were not in the fashion of the period. It is not stated whether the fashion was to be that of 1882, or that of 1884, or 1885—in other words, of the period when the picture would be finished and ready for exhibition. Much depends upon this as regards the criticism of the ladies themselves. The tide of fashion soon turns, and what is thought charming and becoming in 1882, is voted hideously vulgar in 1883. Hence pictures of this kind, unless executed at lightning speed, are somewhat risky. Frith's pictures of Ramsgate Sands, and the Derby Day, represented society as it appeared a quarter of a century ago; but how singular the dresses appear now. And as for John Leech's sketches, one can hardly believe that ladies could so have disfigured themselves as in the days of the crinoline mania.

The itinerant vendors of photographs are not slow to note what people buy. Cabinet photographs of Lord Wolseley, General Stewart, and Colonel Burnaby are now being offered in the street at fourpence each, evidently copies of those which are sold in the shops at five or six times the price. It would be interesting to know whether the owners of the original negatives have given permission for the copies to be made. If not, the vendors do not concern themselves about the penalties of an infringement of copyright, for not only are the photographs openly exposed for sale, but attention is drawn to them by means of a placard.

The usual complaints of the scarcity of sitters at this time of the year have been heard on all sides. Save in military districts, where the exodus of troops has given a slight spurt, photographers have, during the last three months, been doing badly. But we do not know that the times are worse now than they have usually been in the dull season, and no doubt the average of twelve months will bring about a balance; still it is difficult to believe in averages when you are doing no business at all; and no wonder photographers take a gloomy view of the situation.

Patent Intelligence.

Applications for Letters Patent.

3134. Henry Harris Lake, 45, Southampton Buildings, London, for "An improved heliotypic or photo-lithographic process and apparatus to be used therein."—(*C. Angerer* and ——*Göschl*, Austria.)—[*Complete Specification.*]—10th March, 1885.

3150. James Cheney, 17, Oakley Street, Waterloo Road, London, Surrey, for "Improvements in tripod stands and tops for the same for photographic cameras, telescopes, heliographs, lanterns, and other like purposes."—10th March, 1885.

3185. Alfred Julius Boult, 323, High Holborn, Middlesex, for "Improvements in apparatus for applying photographic emulsion to photographic plates."—(*Eli John Palmer*, Canada.) —*Complete Specification.*—11th March, 1885.

3204. JoshuaBillcliff, 27, Richmond Street, Boundary Lane, Chorlton-on-Medlock, Manchester, Lancashire, for "Improvements in photographic cameras."—11th March, 1885.

Patent Sealed.

14,335. William Griffith Honey, 3, High Street, Devizes, Wiltshire, for "An Improved holder and dark slides to be used therewith for sensitive plates."—Dated 30th October, 1884.

Patents which have become Void through Non-payment of the Seventh Year's Renewal Fee.

4632. John Henry Johnson, of 47, Lincoln's Inn Fields, in the County of Middlesex, Gentleman, for "Improvements in the reproduction of drawings, patterns, devices, or designs."—A communication from abroad by La Société Henri Pellet et Campagnie, of Paris, in the Republic of France.—Dated 27th May, 1878.

The well-known Pellet process of printing in blue lines on a white ground.

Specification Published during the Week.

6743. Norman Macbeth, of the Victoria Foundry, Bolton, in the County of Lancaster, Engineer, for "Improvements in the production of printing surfaces by the aid of photo-reliefs." Dated 22nd January, 1885.—*Complete Specification.**

At this stage in the process I usually remove the filling substance, but if preferred for any reason, it may be removed after the grinding or reducing operation next to be described. The so far prepared surface of the block or plate is now to be ground, scraped, planed, or reduced until the higher prominences are reduced in height or are reduced to one level plane, whereby the ridges, grains, or projections are made wider, and the intervening grooves or spaces narrower, to a greater or less extent, according to the degree of depression caused by the varying relief of the photo film. This reducing of the surface may be conveniently effected by grinding with emery or other abrading powder upon a flat metal surface, or by grinding upon a plane surface, or by means of a revolving grinder traversed in a straight line, or a planing machine, or tool, or a straight scraper, or any other suitable means may be employed. The filling substance is now removed, if this has not been done previously, and the block or plate may be used in the obtainment of printed impressions. If preferred the block or plate may receive a thin protective coating of a harder metal, such as nickel, cobalt, or copper. In place of grinding, scraping, or planing the block or plate, I may subject it to pressure to obtain a corresponding effect, the filling substance being removed previously to such pressing operation, or I may obtain the desired effect by the employment of both methods. The block or plate may be pressed in contact with a smooth, hard, plane surface, the pressure being so regulated as to crush or flatten down the higher prominences to the extent required to obtain the desired effect. I do not, however, consider this method so suitable as the grinding or scraping, as the effect of the operation cannot be so well controlled.

If it be desired to obtain a printing-block or plate, having deeper depressions in the high lights than would be produced by the direct pressure of the relief film, in the manner hereinbefore set forth, I ink the block or plate, which has been impressed by a negative photo relief film, using an acid or solvent-resisting ink, and I transfer an impression in such ink from the said block or plate to a plate of zinc, copper, or suitable metal, which may afterwards be suitably etched or treated with acid or solvent, so as to produce a printing surface. In place of obtaining the impression directly from the prepared block or plate, I may take an impression upon transfer or medium, and transfer the ink therefrom to the metal-plate, which is to be etched. I may obtain this impression in the flattening operation, in which case I may press the zinc, copper, or other metal plate, or a sheet of transfer paper or medium, upon the inked block or plate, so as to flatten the prominences in the manner hereinbefore mentioned, the plate so used in the flattening process retaining an impression in ink of the subject, and after being "bitten" in or treated with acid, may be used in printing operations, or in case transfer paper or medium has been used, the received impression in ink may be transferred to a metal plate, which may have the picture "bitten in." The blocks or plates produced by the foregoing processes may be printed from direct, or electro-type copies may be obtained and be used for printing purposes, especially in cases wherein a large number of printing impressions is required. I may vary the process by obtaining a cast or mould of the film in a suitably hard material, and using this instead of the film to impress the prepared surface of the softer block or plate, which is in all other respects treated in the manner hereinbefore set forth, or the relief film may be applied with pressure directly to the said prepared surface in the manner hereinbefore set forth, whereby the block or plate receives an impression, but in place of reducing, grinding, or flattening the surface of the said block or plate, a cast or impression is obtained from it by electro deposit, or by pressure or other suitable means, and this may then be ground or reduced in the manner hereinbefore set forth, to render it suitable for printing from. By these means several impressions of one subject may be obtained from the one block or plate containing the original impression. I do not confine myself to the plane formation of printing surfaces, as in some cases such surfaces may be of cylindrical formation, as, for example, when required for application to the cylinder of a printing machine, or to be used in the printing of woven fabrics, nor do I confine myself to the use of the filling material in all cases. In some cases, as, for example, when electro-type shells or thin plates, backed up with a softer metal, are used, as hereinbefore mentioned, the metal, say for example copper composing such shells, may have sufficient stiffness to of itself maintain the sectional forms of the ridges or projections to a suitable degree, without the support of a filling powder or substance.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—

1. Scoring, lining, graining, stippling, or preparing in the indicated manner a block or plate of suitable impressible material, pressing thereupon a photo relief film, and subsequently grinding, scraping, reducing or flattening the prepared and impressed surface substantially as and for the purpose set forth.

2. In the process comprised in the first claim, filling the lines or depressions in the prepared block with a powder or substance, for the purpose herein set forth.

3. Obtaining an electro-type shell or film from a surface which is scored, lined, grained, stippled, or otherwise suitably adapted for my purpose, backing up such shell with a softer impressible metal, alloy, or substance, and using the block so produced in the process included in the first claim herein.

4. Pressing a photo-relief film upon a block or plate, having a suitably lined, grained, stippled, or prepared surface, as aforesaid, obtaining an electro-type or other impression from the said surface so impressed, and treating the surface of the said impression by grinding, scraping, planing, or other reducing or flattening operation, substantially as and for the purpose set forth.

5. Preparing a block or plate, by pressing a photo-relief film upon a surface of a nature hereinbefore indicated, and by subsequently grinding, reducing, or flattening the prominences; inking the printing surface so obtained with an acid resisting ink, obtaining an impression of or transfer from the inked surface upon a zinc, copper, or metal plate, and subsequently etching or "biting in" the last named plate substantially as and for the purpose set forth.

6. Preparing a lined, grained, or roughened block or plate, and filling the depressions in the surface thereof, as hereinbefore set forth; pressing a photo-relief film upon the surface so prepared, removing the filling, inking the impressed surface, pressing a copper, zinc, or metal plate upon the inked surface, so as to flatten the prominences, and subsequently etching or "biting in" the metal plate, which has received an impression in ink from the said block or plate, substantially as and for the purpose set forth.

7. As a variation of the process indicated in the sixth claim hereof, pressing transfer paper or medium upon the inked block or plate, so as to flatten the prominences, transferring the inked impressions so obtained to a metal plate; and etching or biting in the said plate, in order to obtain a printing surface or plate.

6898. Henry Joseph Redding, 48, Myddelton Square, London, E.C., Optician and Photographer, for "An improved pocket ruby lantern for photographic purposes."—Dated 27th Jan., 1885. (*Complete Specification*).

A folding triangular lamp, of which the body is hinged on one of the sides, so that it can be without a break or separation at any one of the angles. The specific claim is as follows:—

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* Continued from page 171.

That the body of the lantern folds without being disconnected at any of the angles, as the ruby cloth, or other medium, entirely surrounds it, and forms the hinges.

A FEW STRAY "SHOTS" IN IRELAND.

BY ADOLPH W. BEER.*

Leaving Liverpool one evening last September, Holyhead is reached about an hour after midnight, and we at once secure our berths on board the express steamer *Banshee*, now blowing off steam alongside the railway platform. This done, we go on the saloon deck and admire the weird and ghastly effect produced by the illumination of Holyhead harbour by electric lights, raised to great elevations, and having anything but a pleasing appearance.

Presently, in the twilight of daybreak, we steam through the double harbour, and soon the red and white lights are left far behind, and we are fairly on our way. After an unrefreshing sleep one is aroused by a lovely perfume pervading the saloon that can only be manufactured at Cologne or Dublin, and on looking out, see a narrow ditch, crowded with tumble-down buildings and rotting wharves—in a word, the Liffey at low water—stinking and filthy.

Fortunately we are soon at North Wall, and after passing through a miniature "Mersey tunnel," we and all our traps emerge on to the quay, and essay our first ride in an Irish low-backed car.

Away we tear, in early autumn evening, passing the Custom House—a fair specimen of the public buildings of Dublin—through the only just awakening streets of the city, and on to the station for Bray. Having no intention to lose any time, we defer looking round Dublin until our return.

We reach Bray in time for breakfast, for which we are about ready, previously engaging, and coming to a satisfactory understanding with, a carman for the day's drive. Enough has been said for and against the Irish jaunting car, and we are bound in fairness to admit that we found them not only delightfully easy riding, but also, upon the whole, reasonably cheap travelling.

After the "feed," we find our "boys" waiting for us, and drive off to the Dargle and Carvers Court. It was one of our pieces of good fortune that our photographic chum was an old Dublin resident, and who knew the ground; consequently we were able to get to work without any loss of time.

A drive of about two miles brings us to the Powerscourt entrance to the Dargle Glen (the stream dividing the demesnes of Lords Monck and Powerscourt), and at once stride down to the bed of the river.

Working up the glen, countless pictures are to be obtained, limited only to the plate-power of the photographer. Many of these views are made popular by the camera of Payne Jennings, who, it is said, owes much of his repute to his success here.

The day is perfect for this class of work. Not a breath of air stirring, not a ripple through the trees, not a quiver of a leaf, although the sun is at times rather too bright. Are we ever quite content?

Half way through the valley we come to a most lovely pool, shut in by precipitous rocks, with a gorge-like opening framed in shining foliage, reflected in the still, deep, cool water at the foot, with just a suspicion of current on the surface. Of course we do our best to make a picture of it, but, unfortunately, no photograph—or, for the matter of that, painting either—could faithfully render all the beauties of that "gem of the Dargle." We tread reluctantly away, and mount the steep banks, to the picturesque cottage.

A walk across the fields brings us to where our car is waiting for us, to continue our drive. A little further on we again find the stream just past the house and grounds presented by a grateful nation to Henry Grattan. Here, at what is called the "Golden Bridge," we find more camera work.

A long and rather wearisome drive through a fir plantation and between hills shutting out all prospect, and making the valley look dull and dismal, brings us to the famous Powerscourt Waterfall, where the Dargle is thrown over a hill or mountain 300 feet high, and if there is any body of water at all, it must be a most magnificent sight; but at the time of our visit the quantity was very limited and the stream thin; nevertheless, its situation, where the green, rocky mass seems to close up the valley as by a gigantic wall, dwarfing the magnificent trees, and frowning grimly in the fading afternoon light, surpasses our expectations, and is well worth the "fag" of the otherwise purposeless drive.

We find the day rapidly closing in and the light fading, but by means of full aperture and long exposure, a fair rendering is secured.

We drive back to Bray through the Monck demesnes, over a grandly picturesque road, cut high up on the hill side, commanding broad and swelling vistas of wood, and road, and hill in ever-changing variety, and in the far distance, through the openings in the hills, can be seen, under the line of the horizon, the gleam of the open sea.

The low wall that guards the precipitous edge of the road looks very insecure—being but a foot or two high; and we are entertained by an account describing how, some years ago, a drunken coachman drove a carriage and pair, together with Lady Monck, who was inside, right over the wall and down the precipice, her life only being saved by the dense foliage breaking the fall. Arriving back on the high road, we essay to photograph the famous Dargle Bridge—the subject of many tender attentions by many ambitious artists. The stream here is very diversified and broken up, and many changing views both up and down stream are available. The bridge here makes good pictures from the bed of the river, and we now admire it from half way up the little footpath taken with a long focus lens, the distant water being softly and delicately rendered. We leave the pretty suburban, sea-washed town of Bray by rail, and wind round and through the great mass of rock known as Bray Head, a magnificent headland, not unlike St. Bee's Head, in Cumberland.

In the gloaming we hurry round the rugged Wicklow coast, the dull boom of the breaking waves harmonizing with the rattle of the train; through the county town of Wicklow, with its ruined castle overlooked by the bay; past the genuine and unadulterated Irish town of Rathnew, and into Rathdrum—our quarters for the night—long after dark.

We select Rathdrum on account of its central position, and the large number of excursions that can be made from it; we will only describe one of them, viz., Glendalough.

Our car being now ready, we lash bags, baggage, and plates, and start for the three miles drive to Glendalough. Only that our supply of plates was of a limited character, we could have found numerous subjects *en route*, but we only pause for a few moments at the Vale of Clare, and with a "shot" at the pretty cottage, and a last look at the bridge, we push along. Although the old proverb "a bird in the hand, &c.," is well to be remembered and acted upon when out upon photographic excursions, as often when most is expected least is found.

However, we are now close to Glendalough, and a turn of the road brings us in full view of the magnificent valley stretching away at our feet; with all the little piles of stones (like small outhouses with the roofs off) scattered, as it were, broadcast over the land; while from the centre rises one of those mysterious wonder-provoking erections. The great Glendalough Road towers white far beyond; the two lakes—which give the name to the valley—lay darkening under the shade of the eternal hills.

As we take this revelation of beauty in, we become unpleasantly aware of being confronted with another curiosity of Ireland. The beautifully bright, warm, clear morning has given place to a bleak, raw, wet noon, with strong gusts of wind and heavy showers of cold rain. We are in despair, so arriving at the hotel we do the next best thing, viz., order dinner. Promised at 2.30, we don't get it until 4 p.m., but this is, we presume, not unusual in these latitudes. Meanwhile, we skirmish around, discouraged, but not hopeless.

The gateway to the enclosure containing the principal ruins is somewhat remarkable, being castellated with a tunnel-like continuation, reminding one of Walmgate Bar, York, in miniature. Through the long, wet grass bank, we force our way, crowded with memorial stones of all ages, sizes, and shapes, and in every possible variety of position, with fragments of ancient crosses of unknown antiquity; the whole falling into a strange state of utter neglect.

Here is the Cathedral—we should imagine the smallest building in the world ever dignified by this title, being only about 50 feet long, and supposed to have been built about A.D. 600, but the extreme antiquity of these structures is at once seen by the shape of the doorways—viz., with sloping sides and solid blocks of stone for the lintels, reminding you of nothing else but the pictured entrances to the pyramids.

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* Abstract of a communication to the Photographic Society of Ireland.

Higher and higher rose the wind, beside mountains of clouds piled themselves up on the top of the hills, rain in heavy showers fell at rapidly recurring intervals; and indeed it must have been on a similar day to this when the poet Moore wrote those famous lines, commencing—

By that lake, whose gloomy shore
 Skylark never warbles o'er;
Where the cliff hangs high and steep,
 Young St. Kevin stole to sleep.

But we do not permit ourselves to quite lose hope. So between the gusts of wind and showers of rain we "fire off" at one or two points of interest. The view from the opposite hill side is quaint, while a drearier picture of the cell (with its high-pitched stone roof and cathedral) just showing doorway, are the last secured; while the exposures given were so long, that when coming to develop the exposed plates, on our return, we were almost afraid to commence. So that, under these circumstances, you may, perhaps, make some allowances for any want of "sparkle" in the Glendalough pictures.

Rathdrum Station at last, and once more *en route* for Dublin.

Early next morning we are again ready, like restless hawks, for another flight. This time into the heart of Ireland—viz., Kildare and Cashel.

Leaving Kingsbridge Station, we reach Kildare at about 10 a.m., and see the town on a small hill (memorable in the days of '98) but a short distance from the station. Here we find but little photographic work. The castle is only a hall. The cathedral is being rebuilt in the old monastic style. The round tower is non-get-at-able, and characteristic studies *non est.* However, we take a general view "shot," such as it is.

While waiting at the station for our "southward" train, a talkative native gave us the tale of the "Devil's Bite," we shall see further on, to something like the following effect:—His Satannic Majesty, being in not the sweetest of tempers, one day took a bite out of the mountain, but not finding the mouthful to his taste, spit it out again, when it fell some fifteen miles off, forming the "Rock of Cashel;" and, continued our informant, accurate measurement had been taken, with the result of proving that to an hairbreadth the Rock of Cashel would exactly fit into the gap of the mountain.

Fortunately, by this time, the train has taken us up, or to what length the old gentleman's imagination might have led him we cannot tell.

Templemore passed, we get a glimpse of the magnificent ruins, Tudor Mansion, of Southmore, standing lonely and desolate by the river side—the heavy stone mullions of its many windows, and the tall flanking towers, looking gaunt and strong yet, after the lapse of so many decades.

(To be Continued.)

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Correspondence.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

Sir,—In reference to the Photographers' Benevolent Association, it has been stated that photographers are all so well off that an association of the kind is not required, and that the fact of photographers, as a body, not having come forward to support the Association, proves this to be a fact. I do not think that it does prove it, as there are many benevolent associations that are almost entirely supported by donations; and, as far as my experience goes, photographers are not all of them rich men. An association of the kind seems to me to be much needed. Much good has been done by the Association in question, and, if it were more generally supported, it would be able to do much more good. There is one thing in connection with the Association that has been, to a great extent, overlooked: it is that it forms a really valuable means of communication between the employers and the employed, and in this way—viz., obtaining situations for members—it has done quite as good service as by making grants of money. The Association has been gradually brought to its present state, which, though leaving much to be wished for, is more satisfactory than it has been before; and I am sure all those connected with it—especially those old members who have steadily worked for its advancement for so many years—would be very sorry to see the Association come to an end now, simply because the photographic world does not take sufficient interest in the movement.

Kentish Town, March 14. H. T. Thorne.

DRYING PLATES.

Sir,—I am afraid that I must have been very badly heard at the meeting of the Photographic Society of Great Britain, as your report makes me state in one particular exactly the converse of what I wished to convey. With reference to the statements that have been made to the effect that plates frill, or are unsatisfactory if the emulsion be dried in less or more than certain limits of time—six hours as minimum, and twenty-four as maximum I believe have been mentioned—I said that although the observations to that effect would be true generally speaking, it was not necessarily on account of the time occupied, but of some other condition commonly accompanying the limits of time mentioned. Thus, if plates are dried in less than six hours, it is generally because an amount of heat has been employed which causes the frilling complained of; but if the rapidity of drying be due to other causes, such as a strong draught, this effect will not ensue. On the other hand, if plates are very slow in drying, decomposition is apt to set in; but in the case I adduced of plates which took four days to dry without any injurious result, the emulsion contained an antiseptic—thymol—and the drying was conducted in a closed box with a chloride of calcium tray.—I am, yours faithfully, W. E. Debenham.

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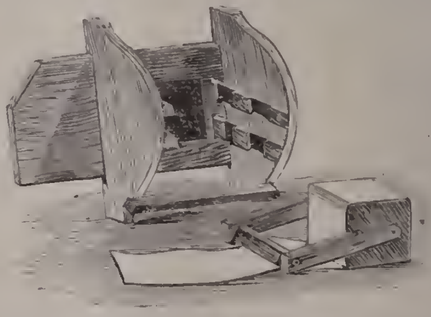
Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 12th inst., Mr. A. Mackie in the chair.

The Hon. Secretary passed round prints sent by Messrs. Morgan and Kidd, which were printed from each side of the paper negatives made at the previous meeting.

Mr Herbert S. Starnes exhibited a continuous exposing frame, designed for use in printing gelatine chloride or bromide positive and negative papers. It consisted of a four-sided block, 4 by $2\frac{3}{8}$ inches, suited for C.D.V.'s, made to revolve between two brackets by means of central pins, and checked by the four stops shown in the diagram. The brackets are intended for attachment to the window of the dark room, and exposure is controlled by a suitable shutter. Mr. Starnes said he could obtain a fresh surface every two seconds. His method of making contact with the negative was by pressing up the sliding block on which was rolled two strips of paper, one sensitive and the other non-actinic. After exposure the slider would be drawn back about one and a half inches, and in so doing revolved a quarter turn at the same time, and in revolving, the pin passes down the slot, thus preventing the edge of the block from touching the negative. The slider is then pushed home, and a second exposure made, the operation being repeated as often as may be required. The negative is fixed by springs.



Mr. A. Cowan called attention to the advantage presented in a commercial article composed of gelatine and glycerine as a backing for plates giving halation with subjects of a black-and-white character. The article, which is made in sheets of varying thickness, is easily squeezed on the back of a glass plate, and as easily removed. He (Mr. Cowan) found it better than carbon tissue and other backings, and illustrated his remarks with a series of negatives.

Mr. W. H. **Prestwich** thought the test was a severe one, and although halation was not entirely prevented in the examples shown, it was considerably mitigated.

The **Chairman** suggested Fol's method of soaking carbon tissue in glycerine to obtain a similar flexibility and adhesiveness.

Mr. J. B. B. **Wellington** then gave a practical illustration of the capabilities of his new dissolving carrier, a description of which was given in our last report of this Society. He passed about 160 choice transparencies through the lantern. The whole of these pictures were shown on the screen without any hitch whatever, dissolver acting perfectly.

Mr. W. J. Simpson was elected a member of the Association, after which it was announced that a number of forms of tender for the right of taking photographs at the International Inventions Exhibition had been sent for distribution among the members.

Birkenhead Photographic Association.

The ordinary monthly meeting of the above Society was held on Thursday, the 12th inst., Mr. J. A. **Forrest** in the chair. Messrs. C Jones, William A. Webb, and H. H. Williams were elected members of the Association.

Mr. **Croker** exhibited a half-plate camera, of ordinary make, to which he had adapted a swing-back in a very simple and inexpensive manner.

Mr. A. W. **Beer** (assisted by Mr. A. W. **Cornish**, who manipulated one of Hughes' new Pamphengos lanterns) then read a paper entitled, "A Few Stray Shots in Ireland" (see page 187).

In the course of the paper, a large number of excellent transparencies, reduced from negatives taken by the above-named gentlemen, were thrown upon the screen, and frequently elicited deserved admiration and applause.

Cambridge University Photographic Society.

A highly successful exhibition was held under the auspices of the above Society on Thursday, March 12th, in the rooms of Mr. W. N. Shaw, Emanuel College. Over 100 negatives, prints, and transparencies were exhibited by members, many of them being of great merit, both artistic and technical. Before the exhibition, a general meeting of the Society was held, Mr. **Shaw**, President, in the chair; and it was decided that similar exhibitions should be held every October and Lent Terms, and also a larger and more public one in the May Term.

Glasgow Photographic Association.

The usual monthly meeting was held on Tuesday, the 10th inst., Mr. **Hugh Reid** in the chair.

After the approval of the minutes, the following new members were admitted:—Mrs. Ramsay, Miss Mary Thom, Messrs. Robt. Goodier, Hugh Reid, G. Y. Armour, Robt. Cairns, W. B. T. Halley, Hugh H. Smiley, Jas. Brown, and Peter Beattie.

Mr. Wm. **Goodwin** read a short paper on "Aids to Correct Exposure" (see page 180), and explained Burton's table. Mr. Goodwin showed a small box made like Woodbury's photometer, and filled with Morgan's paper, and demonstrated the change of colour by exposure to magnesium ribbon.

A number of members then showed interesting and novel apparatus, including many improvements made by themselves, and this brought the meeting to a close.

Edinburgh Photographic Society.

The fifth meeting of the session was held on Wednesday evening, 4th March, Mr. **Norman Macbeth** in the chair.

The minutes of last meeting having been read and approved, the following gentlemen were admitted as ordinary members of the Society:—Messrs. D. Guthrie, T. G. Whaite, John Drummond, Walter J. H. Cumming, D. Taylor, D. Cuthbert, J. Falconer King, F.C S., and John Scott.

Mr. A. B. **Stewart** read a paper on "The Faculty of Observation, or Commonplace Knowledge in Picture-Making" (see page 181).

Mr. **Tamkin** said that many a good picture had been spoiled for want of a little of that common-place knowledge about which Mr. Stewart had spoken, and it would be well if photographers would exercise a little more of that faculty of observation so necessary in making really good work.

Mr. **Balmain** stated that he would be almost frightened to submit any pictures of his for Mr. Stewart to pull to pieces; nevertheless, what Mr. Stewart had insisted on was perfectly correct.

Mr. **Howie** thought that it was of great importance that photographers should be careful in making their observations before firing off their plates; indeed, they could not be too careful. It was a great mistake, although a very common practice, for photographers to go out and fire away at the first thing that came before them. If they would only exercise the faculty of observation, and carefully note the lighting and composition of their subject, and ascertain the best point from whence to take it, this would tend to make them much more successful as far as the pictures were concerned.

The **President** said that he should not be satisfied with what merely strikes him at the first glance, but should work round it and see it under every possible condition of light. There was a very simple plan that would greatly aid photographers in examining pictures, namely, to have a little opening cut in a piece of blackened card, and find the picture by this, turning it in every direction until the best point of view was found. This was a method that never failed to produce the finest effects.

Mr. **Brebner** then gave a practical demonstration of his new method of developing by means of a copper plate immersed in contact with the exposed negative in various chemical media. In answer to a question by Dr. Thompson, Mr. Brebner stated that he could not quite explain the chemical effect of the various compounds he had used; that he got very similar results with ammonia mixed with honey, glucose, dextrose, and various other organifiers.

Mr. **Henderson** thought there seemed to be something in this process capable of development, that the action seemed to him to be electric, and he suggested that experiments might be made in the way of coating the copper plates directly with the sensitive film, and exposing and developing the image there, and the image might possibly be etched on the copper afterwards by means of sulphuric acid or perchloride of iron.

Mr. **Halliday** exhibited a machine which he had used for many years for sizing paper, and which he thought might be used for coating paper with emulsions. The apparatus consisted of a wooden trough having a groove at each end. In this trough was placed a wooden roller, the axis of which worked in the grooves. The paper to be coated was rolled up on a rod exactly the same length as the trough, and which also fitted into the grooves. The weight of the roll of paper kept it in close contact with the under roller. A quantity of emulsion was then poured into the trough sufficient to nearly cover the wooden roller, and on the paper being drawn off it actuated the wooden roller, which lifted a layer of emulsion and brought it in contact with the paper, which came off perfectly and evenly coated with emulsion.

Mr. **Turnbull** reported that, as commissioned by the Council, he had attended a meeting of the London and Provincial Photographic Association on Thursday night last, and in the name of the Society had presented to that Association copies of the three last presentation prints, and he had been requested to convey to the Society the hearty thanks of the Association for these prints, which had been much admired.

It was stated that Mr. Turnbull while in London had selected a series of slides entitled "Devonshire Illustrated," to be used at the next popular meeting.

Newcastle-on-Tyne and Northern Counties Photographic Association.

The ordinary meeting was held on Wednesday evening, the 11th inst., the **President** (Prof. Herschel, M.A, F.R.A.S., &c.) in the chair.

Lt.-Col. Osbaldiston Mitford and Mr. Meldrun Dawson were elected members.

Mr. B. S. **Proctor** read a paper entitled "Lessons Derived from Pinhole Photography" (see page 182).

Remarks were offered by the Chairman, Mr. Pac, Mr. Dodds, Mr. Gibson, and Mr. J. W. Robinson.

Mr. R. **Stanley Freeman** followed with a paper on "A New

Method of Printing Floral Borders to Vignette Portraits" (see page 180). Mr. Freeman exhibited several very fine specimens in illustration of his method.

A question was asked as to whether orthochromatic plates had been tried for photographing flowers and coloured objects; but, apparently, no one present had had experience of them.

Gloucester School of Science Philosophical Society.

Photographic Section.

The ordinary monthly meeting was held on the 10th inst., Mr. J. Crofts in the chair.

Routine preliminaries having been disposed of,

Mr. G. Embrey, F.G.S., exhibited a small installation of electric lighting apparatus, and suitable for use in the dark-room. An ingenious but very simple contrivance answers the purpose of throwing the light on to the work in hand, while entirely shielding the eyes, and the addition thereto of a small cap, the end of which is covered with orange paper or golden fabric, effectually renders the light non actinic. The lamp used was an incandescent one of 2½-candle power. The advantages of such a light for the dark-room were pointed out and generally recognized by the members present, amongst them being the facility with which the light can be increased or reduced at will, by the mere turning of a small handle, so that a light as feeble as desired may be used for the commencement of the development of a very rapid plate, and gradually increased as the plate becomes less sensitive. On completion of the fixing, it is only to take the little cap off the lamp, just as you would remove a lens cap, and you have white light again. The four batteries are contained in a box about twelve inches square, and will furnish power enough to light two or three lamps at a time if desired. It was estimated that one lamp would burn six hours continually without it becoming necessary to re-charge the batteries, and that the cost of the materials for re-charging would be about 6½d.

One of the members stated that he had been at a considerably greater expense in fitting up a lamp in his dark-room with a chimney to carry off the impure air, and that he found the heat given off by it so great as to preclude its possible use during the coming summer, and he also attributed the discolouration of a quantity of sensitized paper to the action of the gas fumes. The electric lamp would, he said, remedy all these evils, and occupy less of the working space of his small room, as the box containing the batteries could be placed either overhead on a shelf, or on the ground, and the lamp suspended where required.

Notts Photographic Society.

The usual fortnightly meeting was held at the rooms, Shakespeare Street, on Monday evening last, Mr. G. Shepperley, President, in the chair, when, after the minutes had been passed and a new member admitted, a more than usually interesting paper was read by Mr. Pendry upon the carbon process, illustrating his subject afterwards by producing some very fine transparencies (for window decoration) upon glass, and demonstrating at the same time the single transfer process upon paper and opal.

Much satisfaction was expressed by the members present at the simplicity and practicability of explanation afforded them by the demonstrator.

Afterwards, some collodio-albumen prints were shown by the Chairman to those assembled, which had been presented to the former Nottingham Photographic Society in the year 1856, and which were consequently regarded with peculiar interest.

Manchester Photographic Society.

The usual monthly meeting of this Society was held on the 12th inst., Mr. J. S. Pollitt in the chair.

The minutes of the previous meeting were read and confirmed.

Mr. A. Brothers, F.R.A.S., desired to correct a possible misunderstanding which the report of the previous meeting might have conveyed to persons not present at the meeting, when he (Mr. Brothers) showed the photograph of a group of children taken at the Mayor of Salford's fancy dress ball; and he wished it to be understood that the photograph in question had been taken by Mr. J. White, and not by himself.

Mr. T. R. Colley was elected a member of the Society.

The Hon. Secretary gave a demonstration of the collodio-bromide process for transparencies. After describing the method of making the emulsion, and exhibiting several small pieces of apparatus which he had found useful in working the process, several plates were prepared, exposed, and developed, and handed round to the members for inspection. The developer he used was similar to the one published by Mr. William Brooks, and the details of the process as given by the Hon. Secretary are as follows:—

Collodion.

Alcohol	1¼ ounces
Ether	2 ,,
Pyroxylin	37½ grains

Dissolve 100 grains zinc bromide in a small quantity of alcohol, and add two or three drops of nitric acid, and add to half the above collodion. Dissolve 165 grains of silver nitrate in boiling alcohol, and add to the other half the collodion. Sensitise by mixing the two collodions, drop by drop, shaking well all the time. Spread a small quantity of the emulsion on a glass plate, and examine by transmitted light. The flame of a candle should appear orange or ruby. Add a drop of potassium chromate to test a portion of the emulsion, or to a film spread on glass. A bright red coloration shows the presence of silver in excess. Make up to seven and a half ounces with ether and alcohol in equal parts, and let stand to ripen for twenty-four hours. If to be washed, do not add the last solvents, but pour the whole into a dish for the solvents to evaporate. Break up with a slip of glass or bone paper knife, and wash in several changes of water till all trace of silver is removed. Drain on blotting-paper, and when as much water as possible has been removed by this means, add a small quantity of alcohol, which will absorb the remainder of the water, and when this has evaporated, dissolve in ether and alcohol, as above, to seven and a half ounces.

Developer.—Solution P.

Pyrogallol	3 grains
Water	1 ounce

Solution A.

Potass. carb.	75 grains
,, bicarb.	37 ,,
,, bromide	15 ,,
Sodium acetate	30 ,,
Water	3 ,,

To develop, flood the plate with alcohol and water for about one minute. Immerse in a dish of water till all greasiness is gone. While plate is washing, mix one drachm of A with one ounce of P. Cover plate with this till details are all out, and complete the development by adding additional portions of A and P as required. If intensification is found necessary, it can be done after fixing with the ordinary pyro and silver intensifier, viz.:—

Pyro	2 grains
Acid citrate	2 ,,
Water	1 ounce

To which is added at the time of using five to ten drops of a ten-grain solution of silver nitrate. Fix with hypo or potassium cyanide. Care is necessary, after washing well, to remove all trace of the fixing solution, with—

Platinum bichloride...	1 grain
Acid nitric	1 drop
Water...	3 ounces

Derby Photographic Society.

The usual monthly meeting was held on Wednesday, March 4th. Mr. J. C. Merry occupied the chair, and congratulated the Society on the large number of new members which had come forward since the *conversazione*.

Mr. Arthur J. Cox then read a paper on "The Artistic Application of Photography," which he illustrated with numerous photographs, and which contained much sound advice as to the best subjects to choose when on a tour with the camera, also pointing out errors when trying to make an artistic picture.

The Society now numbers sixty-eight members.

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Talk in the Studio.

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will take place on Tuesday next, March 24th, at eight o'clock, at the Gallery, 5a, Pall Mall East.

Photographers' Benevolent Association.—Such photographic assistants as are located in the Leeds or Bradford districts, and who are willing to co-operate in the formation of a branch, are requested by Mr. W. T. Wilkinson, North Parade, Otley, to communicate with him.

Manchester Lanternists' Association.—We are desired to call attention to the above Association, and to correct a misapprehension that it is in some way connected with an "amateur photographic (social) club." It is, we are informed, a purely independent Association, and not intended to clash in the slightest degree with the Manchester Photographic Society. The objects of the Lanternists' Association are to have lantern meetings monthly; to give and receive instructions in lantern manipulation, preparation, and production of photographic lantern slides, colouring, scientific projection, &c.

International Inventions Exhibition.—The opening ceremony is to take place on Monday, the 4th of May, and it appears that no less than a quarter of a million copies of a special "International Inventions Exhibition Railway Guide" are to be circulated by post. Should the Council adhere to their ill-advised determination of opening a portrait studio in the building, and carrying on a general photographic business in competition with outsiders, it is quite possible that photographers may neither look upon this wide publicity with satisfaction, nor may feel inclined to assist in any future enterprise at South Kensington.

A Scramble for Negatives.—Fleet Street one day last week was plunged into a state of confusion and turmoil, and all on account of photography! An old-established firm of photographers were clearing out their stock of waste negatives, the accumulation of years; and while the porter was absent getting more negatives, some fifteen or twenty boys clustered round the truck like bees round a sugar-cask, and helped themselves and their friends from the store. The porter brought down a couple more hampers, and did not notice the peculation going on; but on arriving with the last instalment, which he carried in a zinc pail, the crowd had so increased in numbers and daring that he couldn't very well help noticing its proceedings. One unlucky lad he immediately pounced upon, and forced him to disgorge, and, to prevent further requisitions, began smashing up the negatives with his pail until the truck was full of fragments of glass. Having sufficiently pulverised the contents, he was about to wheel away the truck, when someome, disappointed of his share of the spoil, threw some dirt in his face. Instantly the truck was put down, and the tormented porter was in full cry after his assailant, followed by one half of the crowd, while the other half remained to rummage the truck, and rescue the undamaged negatives. Pursuer and pursued came to close quarters in Bouverie Street, where the bystanders were disappointed of witnessing a scrimmage by the prompt appearance of a policeman. A separation was effected, and the porter walked back to his truck, which he got away without further molestation. But in the meantime all the vendors of newspapers, the loafers, the errand boys, and the "printers' devils" of Fleet Street were possessed of photographic art treasures, and the criticisms passed upon them were certainly more forcible than polite. We have not heard of a rush to the nearest photographic dealer for albumenized paper and printing-frames.

Fire in New York.—The laboratories and shops of the Electric-light Engraving and Printing Co., 22, College Place, New York, Wm. Kurtz and A. Ringler, proprietors, were destroyed by fire on the morning of the 8th inst. Business has been resumed in other quarters.—*Photographic Times.*

A Photographer's Cat.—The intelligent posing cat Sneezer is a half-tiger cat, reared beneath the shadow of classic Yale, and the property of the photographer George C. Phelps, of New Haven, Conn. Mr. Phelps whistles. Sneezer comes from any part of the building, springs up on the chair, puts his fore paws on the back, and fastens his large eyes on those of the child, as much as to say, "Now, look at me for a second." Usually the babe becomes quite interested, and remains quiet long enough to obtain an instantaneous negative. In case of success, Sneezer jumps down and awaits the next customer; otherwise he performs tricks, which no child can resist. Even adults are inveigled into a proper pose by this clever animal, who can soon banish a look of care or austerity. "Shake hands, Sneezer," Mr. Phelps will say. Up comes the white paw. "Speak!" Sneezer says "Meow." "Louder, old boy!" Out comes a screech that would make the managers of a cat concert turn green with envy. Sneezer has a broad intelligent face, but he is vain, and delights in looking into the mirror. He knows Mr. Phelps' footsteps—and his greeting, when his master returns after an absence, is human. During nine years he has not travelled beyond the confines of his habitation, but here he has, in the language of cats, conversed with many of the illustrious men who linger in the shadows of old Yale.—*Harper's Bazaar.*

How he would make a Pistolagraph.—An interviewer of the *New York Tribune* writes thus:—"'Now,' continued Mr. Rookwood, 'I'll tell you how to make a pistolagraph. Take the stock of an ordinary pistol; in place of a barrel, put on a little half-inch objective or portrait combination lens, with a focus of say an inch. In place of the hammer, trigger, and spring, we fit on a little dark chamber, in which could be arranged an adjustable or fixed focus, the little sensitive plate. A spring worked with a trigger could instantaneously open or shut the lens, while small plate-holders could be carried in the pocket, to be inserted as those in the dark chamber were used up. The whole contrivance would occupy less space and be lighter to carry than an ordinary bull-dog pistol. Its uses are apparent. Armed with it, a policeman could photograph any number of suspicious characters on his beat whom he did not feel justified in arresting. In fact, he could 'take' them without 'running them in.'" Our readers had better not attempt to use a "pistolagraph" in London.

"The Illuminating Power of Ethane and Propane.—By Dr. Percy F. Frankland.—In continuing his researches on illuminating gas, the author has determined the illuminating power of ethane and propane. The gases were prepared by the action of the zinc-copper couple on ethyl and isopropyl iodides respectively, and then subjected to purification by passing them through bromine. The illuminating power of ethane, when consumed from a "Referee's burner," at the rate of 5 cubic feet per hour, was found to be 34·8 candles, and that of propane 53·3 candles. The illuminating power of ethane is thus almost exactly half that of ethylene (68·5 candles), whilst that of propane is 1·5 times as great as that of ethane. From these results it appears that in the paraffin series of hydrocarbons, excluding the first member, methane, the illuminating power is directly proportional to the number of carbon atoms in the molecule.—*Proceedings of the Chemical Society.*

How to get Potable Water when on an Exploring Expedition.—Major Fielding, in a communication to the *Society of Arts*, says:—"In most countries subject to drought, the water requires special treatment; mechanical filtration is seldom practicable, or even safe. I have come across it as thick as pea soup, and sometimes covered with a growth of green or red weeds. In such cases, the first operation is that of skimming with a skimmer made out of a forked stick, with a pocket handkerchief or other piece of linen stretched tightly between the forks. This done, scatter a pinch of powdered alum into the vessel in which you have collected the skimmed water; this will cause a great deal of the matter in suspension to precipitate. Then pour the water slowly into a filter filled with the charcoal of your last night's camp fire, mixed with any sand or fine gravel which may be obtainable, and which you have previously washed. It must then be boiled, and skimmed whilst simmering, and only when no more scum arises on the water is it really fit or safe to use."

Separation and Determination of Methylic Alcohol in Presence of Ethylic Alcohol, by C. De Poncy.—The process is based on the fact that methyl oxalate dissolves readily in water, whilst ethyl oxalate is sparingly soluble, and both oxalates form with ammonia amides perfectly insoluble in water. In 10 c.c. of the alcohol in question there are dissolved 10·8 grms. oxalic acid, and the solution is saturated with hydrochloric acid gas. After standing for twenty-four hours in a well-stoppered bottle, 2 c.c. of the solution are mixed with 10 c.c. of water, shaken up and filtered. As methyl oxalate is completely soluble in water, there is obtained, on adding ammonia, more amide than if any equal quantity of pure ethylic alcohol had been employed. By a number of experiments we may ascertain the quantity of oxamide formed in the washing waters of the ethylic oxalates. For absolute alcohol the mean is 6·6. For methyl oxalate the mean is from 14·65, and 15 per cent. on the quantity of the methylic alcohol. If a mixture of methylic and ethylic alcohols is etherified, shaken up with water, and the filtrate mixed with ammonia to precipitate the amides, the proportion of methylic alcohol may be calculated from the quantity of oxamide obtained. For every one per cent. of methylic alcohol we obtain from 0·14 to 0·15 more than 6·6 per cent.—*Chemical News.*

Air-tight Packages.—According to the *American Druggist*, a German firm supplies chloride of lime packed in the following manner:—Quantities of quarter, half, and one kilo. are wrapped first in strong paper and sealed. The packet is then dipped for a moment in melted resin, which is as nearly cool as it can be to be fluid. This forms a perfectly air-tight varnish, and the parcel is lastly wrapped in a good paper and labelled. The idea is a good one, and may be adopted with advantage in packing photographic chemicals.

Decomposition of Organic Acids by Sunlight.—According to H. de Vries, solutions of oxalic, citric, tartaric, and malic acids are all decomposed by light in the presence of oxygen. The three last-named are first converted into oxalic acid, and finally the latter is oxidized to carbonic anhydride and water. The blue rays cause this oxidation, and the process goes on most rapidly in thin layers of dilute solutions, through which a stream of air is passed. Ferric salts in the acid solution act in the same way as oxygen, and thus the author suggests that this property of iron, of oxidizing organic compounds in the presence of light, may perhaps play an important part in the organisms of animals and plants.—*Journal of the Berlin Chemical Society.*

Photographers "Playing Low" in Derby.—"The latest improvement in photography. By this new and beautiful process, portraits can be taken at your own homes in a style which was not possible before, at prices which place them within the reach of all. You can have a group comprising all the members of your family for one shilling. These portraits, being taken in the open air, are taken with a rapidity that is truly astonishing, and being taken on the new American medium, can be finished and delivered in a few minutes. Gentlemen's houses, dogs, horses, &c., photographed on the shortest notice. As our stay is limited, you are requested to give your order at once. Please do not destroy this circular, as it will be called for." The above is the reprint of a bill which has been circulated in Derby by a troop of travelling photographers. It will be noticed that the bill is without a name, neither is there any address.

Pushing Business.—Not a bad story this. A Birmingham solicitor, whose father is far advanced in the sere and yellow leaf, persuaded the old gentleman to accompany him one day this week to a photographic establishment and have his portrait taken. The venerable parent consented, and was forthwith photographed. Judge of the dutiful son's feelings when on the following day, a canvasser from the photographer's called upon him with a suggestion that he should have an "enlarged copy of the old gentleman taken in water-colours *before anything happened to him.*" This is one way of pushing a trade, and no mistake.—*Birmingham Daily Mail.*

Photographic Club.—The subject for discussion at the next meeting, March 25th, will be "On the Preparation of Lantern Slides." This is a lantern night. Visitors are invited.

◆

To Correspondents.

*** We cannot undertake to return rejected communications.

W. V. Morris.—1. The lens you have ordered will cover the plate somewhat better, as it will have a longer focus. As regard general qualities, the lenses are practically equal. 2. You can either get an outer box made to take the usual quarter-plate folding camera, or you can obtain a rigid box-camera. 3. It is a compromise with truth.

J. H. (Glasgow).—There is no doubt as to the law on the point. If they are unfit for the purpose for which they are sold, the manufacturer is responsible for the loss; but, even assuming your case is good, to prove the facts to the satisfaction of a court might cost you several hundred times the value.

R. S. P. E.—1. A rapid symmetrical or rectilinear by one of the high class makers is best, as it is almost impracticable to use a portrait lens for so large a plate. If, however, you consider it essential to use a more rapid instrument, employ the small lens which you mention last, and enlarge the picture.

Photo.—As you have only one print, you had better make the negative by copying it with the camera.

W. B. (Cheadle).—The photograph you send is a very pleasing picture, and shows that you have made excellent progress in the time. We would suggest another view from the same standpoint when the light is brighter.

N. Gallard.—You probably refer to Mr. Pickwell's photographic compass for registering a ship's course. See Photographic News, vol. xxvii., page 33.

L. Haakman.—Use the following toning bath, and fume your paper with ammonia.

Chloride of gold	1 grain
Whiting or chalk	30 grains
Warm water	8 ounces
Saturated solution of chloride of lime ...	2 drops

It is somtimes well to dilute this with its own bulk of water.

T. E. Sansom.—To bleach the engraving, first soak it in warm water for a few minutes, and then immerse it in a solution made by dissolving one ounce of commercial chloride of lime (bleaching powder) in four pints of cold water. When this solution has thoroughly penetrated the paper, add hydrochloric acid, a few drops at a time, until the print is sufficiently bleached. After each addition of hydrochloric acid the bath must be well agitated, and when the bleaching is over the print should be well washed, after which it ought to remain for about ten minutes in a solution containing one ounce of soda hyposulphite in four pints of water.

F. L.—Lacquer prepared according to the following recipe will probably answer your purpose:—

Shellac	70 parts
Sandarac	10 ,,
Mastic	5 ,,

These are dissolved in 500 parts of methylated spirit.

X. Y.—Dr. Stolze does not say what you suppose, but recommends first sensitizing the albumenized paper with a ten per cent. silver solution for four minutes. Draw over a rod, allow to drain, and then float the back of the paper for the same period upon the following:—

Citrate of potash	1 part
Water	30 parts

T. Edge.—We should prefer to have one of about 12 inches focus, and in this case your arc may advantageously be 24 inches from the centre of the condenser, and your objective at the same distance on the other side Take care that the image of the arc falls exactly on the plane of the diaphragm of the objective. Focus by shifting the negative.

A. M. S.—1. They are excellent, especially the cloud views. 2. It is, we think, in the exposure and development. The former should have been longer, and the latter more restrained. 3. Not having seen it, we cannot tell, but suppose it was done with a wide-angle lens.

Chiaroscuro.—Give a very much longer exposure—four- or six-fold.

John Oxley.—The ugly view at the side is quite sufficient reason for using ribbed glass in this place, but as regards the smaller top light, you might do well to reconsider your determination. Ribbed glass never gives so much light as clear glass, and is not very easy to clean. When the light requires softening, it is very easy to use a muslin screen or curtain. An angle of 45 degrees will be more suitable in your case.

W. B. Bloxam.—1. Your letter does not make it quite clear whether you have used it hot or cold. It should not be heated to a temperature over 120° F., and ought to be slightly alkaline. 2. You had better scrape it until an entirely fresh surface is exposed. 3. It contains about half its weight of silver.

G. C. F.—Immerse plain Saxe paper for five minutes in the following solution:—

Chloride of ammonium	100 grains
Chloride of barium	100 ,,
Citrate of soda	20 ,,
Water	20 ounces

When dry, sensitize on a bath made up of—

Nitrate of silver	1 dram
Water	1 ounce

The Photographic News.

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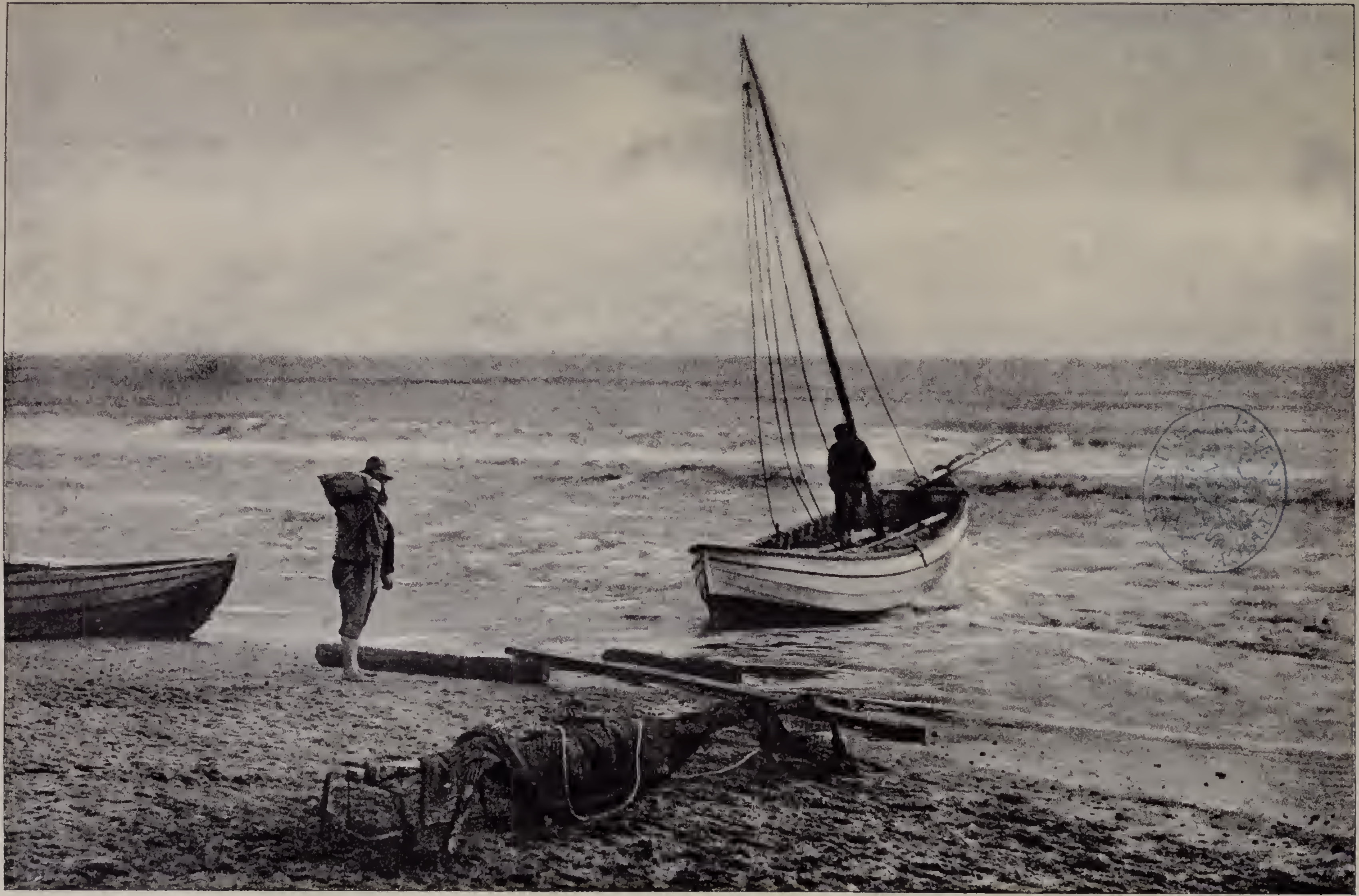
SUPPLEMENT TO "THE PHOTOGRAPHIC NEWS" 1ST MAY, 1885



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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1386.—*March* 27, 1885.

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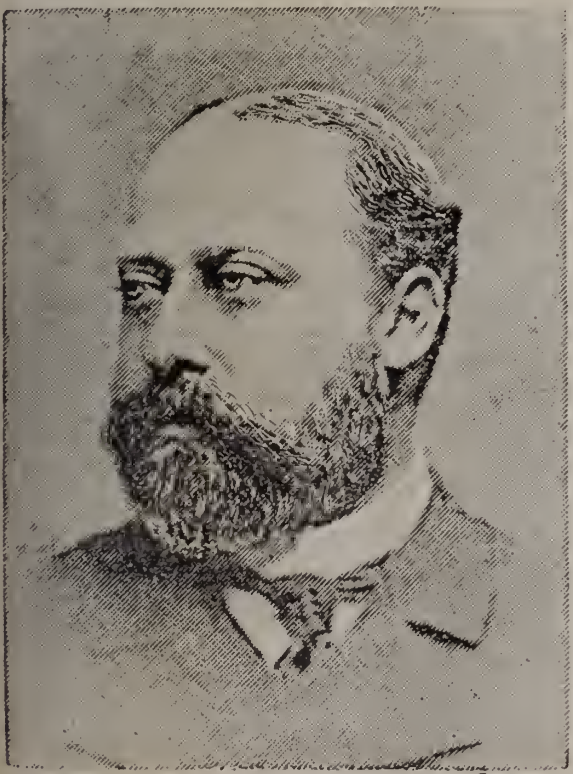
ANOTHER BLOCK PROCESS.

We have received a sample block made by the process of Mr. George Sutherland, of Adelaide, South Australia, and here is a print from it.



The process of Mr. Sutherland is, like many of the processes introduced of late, based on the general principles of the Ives method—that is to say, pressure between a photo-relief and a mechanically-grained surface — and some details gathered from the specification (No. 9026, A.D. 1884—Gardner; a communication from G. Sutherland, Adelaide) will interest our readers.

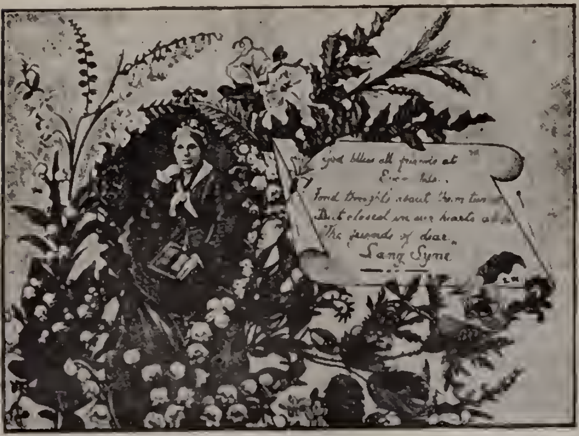
A plaster cast from an ordinary swelled gelatine relief is taken (for one of the most convenient methods of doing this see "Photographic Bas-Reliefs," present volume, page 166), and the further details of Mr. Sutherland's mode of working will be best elucidated by quoting the actual words of the specification :—

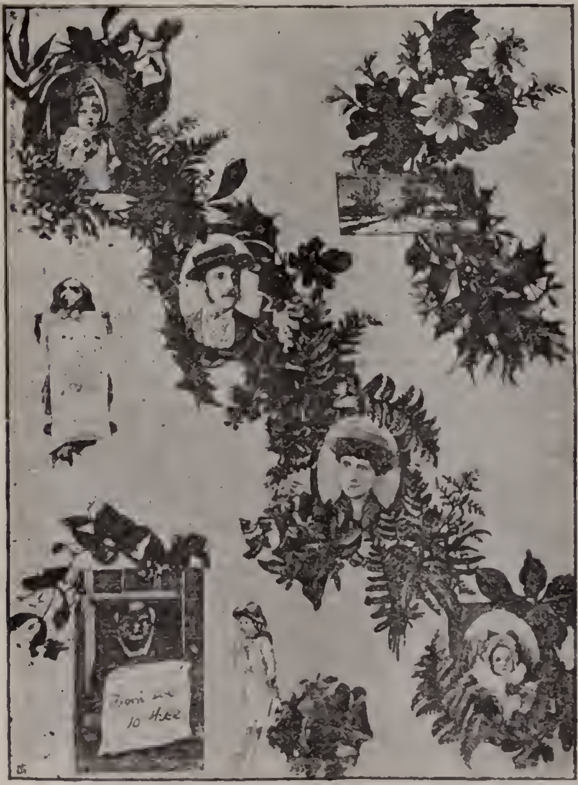
"I rub the surface of the cast first with a small quantity of common gum solution, and then with gold size, made of linseed oil, boiled to a sticky consistency. The relief is then ready to receive the film, impressed with the form of an engraved surface. This film is prepared as follows :—I take a sheet of tinfoil, or any other material which will readily take the form of any surface on which it is pressed, and place it on the surface of an engraved block of wood, metal, or any other suitable material. The engraved block has raised lines, dots, or other marks arranged regularly, so as produce, when printed from, in an ordinary typographic surface printing press, the effect of an even shade or tent. The tinfoil or other material having been placed on the surface of the block, is covered with a piece of woollen cloth, and submitted to pressure until an exact impression of the engraved surface has been communicated to it. I then remove it from the block and place it on the prepared surface of the plaster cast, the dots, lines, or other marks being uppermost. A piece of soft woollen or flannel cloth having been again placed above the tinfoil or other material, I submit the whole to a gentle pressure until it has taken the form of the surface of the plaster cast, yet without having the dots, lines, or other marks obliterated. The surface then presents the appearance of a series of raised eminences, of which the highest are situated on the raised portions of the plaster cast, that is to say, on the portions of the picture which are darkest, the middle tints being partially raised, and the lightest points lying in the depressions. I then gently rub the surface with any instrument having a smooth even surface, such as the handle of an ordinary lead pencil laid flat, and passed backwards and forwards, or a slab of glass, metal, or other material pressed gently on the raised dots, or lines, or other marks. The effect is, that those portions of the surface of the tinfoil or other material which have the highest eminences receive the greatest pressure, and consequently those raised marks on those portions are most flattened out, the intermediate elevations having the raised marks flattened in proportion to their height. The pressure and rubbing are continued until on those portions of the surface which are intended to be capable, in the finished block or plate, of printing pure black or the darkest shade, the dots become merged into one another. The surface thus produced is capable of being printed from, but is not strong enough to yield many impressions. I therefore take from it a cast, either in plaster of Paris, or in other suitable material, and make either a stereotype or an electrotype in the ordinary manner.

"If the type metal or copper or other surface so produced does not print a sufficiently dark picture, either in whole or in part, I rub the surface with a flat piece of wood to which a piece of emery cloth has been attached, or with any other flat or straight instrument suitable for grinding, filing, or pressing metals."

FLORAL BORDERS FOR PHOTOGRAPHS.

The paper on producing floral borders for vignette photographs, recently read by Mr. R. E. Freeman before the Newcastle-on-Tyne Photographic Association, brings to mind some very elegant examples of work in this direction which we have received from Mr. Walter D. Welford, of Hagley Road, Edgbaston. These were sent to us towards the close of the year 1884, and without further preface we reproduce two out of some dozen sent to us by this gentleman.





In a communication accompanying the photographs, Mr. Welford says:—

"On page 776 you mention that photographic Christmas cards—a portrait in fancy border—might well be introduced. There is nothing new under the camera, you know, and herewith I enclose you samples of some novelties exactly in that line. Two years ago (as an amateur) I produced the same thing. This year, owing to pressure of work, I have not pushed them at all, either by advertisement or showcase. All I have done has been to show them to some of my sitters, and orders have flocked in freely, though it was the latter end of November before I got even a specimen out. They have, in several instances, produced other orders. In this way, the customer has taken a fancy to somebody's Christmas card, drops in for a portrait for a Christmas card for herself, and then says, while she is about it, that she will have some cartes or cabinets from the negative. The samples will give you an idea as to the endless variety possible. There are three other advantages I might mention—First, the customer may make his own design and motto—you will see my generosity in this, as it saves me the labour; second, by writing the motto they can send out a *facsimile* of their handwriting or signature; third, if they choose appropriate words, the card can also be utilized as a birthday card."

From Mr. Stokoe, of Clare, Suffolk, we have just received some tastefully designed Easter cards with floral and emblematic borders.

◆

A NEW DEVELOPER CONTAINING SULPHITE OF AMMONIA, WITH A NOTE ON THE LIME DEVELOPER.

BY DR. JOSEPH MARIA EDER.

I have fully recognized the value of the potash developer for rapid plates and short exposures; but notwithstanding this, I now advocate a fresh developer containing ammonia and sulphite of ammonium, this developer having proved excellent with almost all kinds of commercial plates.

A.—Dissolve 10 parts of pyrogallol, and 25 to 30 parts of sulphite of ammonium, in 100 parts of water.

B.—Dissolve 5 parts of bromide of ammonium in 150 parts of water, and add 50 parts of liquid ammonia.

The working developer is made by mixing 100 cubic centimetres of water, 4 c. cm. of the pyrogallic solution A, and 4 c. cm. of the alkaline solution B. Development takes place very quickly, and if it is desired to make the reaction slower, more water (50 c. cm. extra) is added. This leads to the production of softer pictures.

If, on the other hand, more vigorous images are required, a few drops of a ten per cent. solution of ammonium bromide must be added.

The ammonium sulphite developer gives very well-modelled, brilliant negatives, in which the high-lights are well rendered, and the deep shadows are full of modelling, while the negatives have an agreeable dark-brownish tint.

The ammonium sulphite makes the aqueous solution of pyrogallol more permanent than when the sodium sulphite is used, and there is but little liability to fog with it.

A Developer with Lime Water.—Pyrogallic acid and lime water were first recommended by Davanne for collodio-bromide emulsion, and this developer can also be used with gelatine emulsion plates.

As lime is but slightly soluble in water, it is convenient to make a ten per cent. solution of sugar in water, and to saturate this with slaked lime.

The pyro-lime developer becomes violet and brown in use, also becomes turbid; while the developed images produced are so thin that I do not think very much of this developer.

◆

THE CRUISE OF THE *CEYLON*, 1885.

A Voyage to the Spanish Main with a Camera.

BY NORMAN MAY.

Our good ship *Ceylon*, Capt. Sunham, 2,200 tons, weighed anchor at Gravesend at four in the afternoon of Saturday, January 24th.

In the night we drop anchor near the Nore, as owing to the crowded state of the river, and the darkness of the night, our pilot thinks it dangerous to proceed. The water is now smooth, but there is a slight roll, which, combined with the smell of the engines and closeness of the cabins, makes some of us rather uncomfortable. In the early morning the anchor is again weighed, and we proceed on our journey, passing the Dungeness Lighthouse, Dover Castle, and town of Dover veiled in mist; and later, we get nearly our last glimpse of old England in the bold cliff of Beachy Head, standing so prominently in the sunlight. Hastings, Eastbourne, and Brighton are left behind, and by tea time on Sunday we are well out of sight of land. Our pilot leaves us very early on Monday morning off Ventnor, and we are now fairly on our way.

Situated in the North Atlantic Ocean, some twelve hundred miles south of England, Madeira is a place of somewhat popular resort, both on account of the variety and beauty of its scenery, and the salubrity of its climate. Mild in winter, and on the hills cool in summer, it presents, both to the invalid and overtasked business man, a quickly-changing panorama of loveliness; giving also a delicious sense of dreamy restfulness. The summers are, as a rule, very dry, and the autumnal rains are very welcome. Under the shade of a Spanish chestnut tree one can live out of doors nearly the whole of a summer's day, the evening being the most suitable for riding or driving.

On the hills the yellow gorse grows in profusion, and in the clefts of the rocks are found many varieties of beautiful ferns and mosses, some of the ferns reaching twelve feet in height. Flowers of both the tropical and temperate zones are successfully cultivated here. In the open air in summer are bignonias, stephanotis, and other plants that reach perfection only under a tropical sun. In the autumn, camelias, and brilliant tropical plants and creepers, make all nature radiant, and winter brings in great abundance sweet-scented violets, arum lilies, and daffodils.

The day before landing I had overhauled my photographic kit, and filled my slides with plates. My apparatus consists of a 12 by 10 tourist's camera, with three double backs, and a half-plate ditto, also with three double backs, and partitioned cases for cameras and slides. One strong folding tripod I found sufficient, and my lenses are a Dallmeyer's 12 by 10 rapid rectilinear, an 8½ by 6½ and 5 by 4 ditto, and an 8 by 5 wide angle rectilinear. I started with about 150 plates of various sizes, with all trays and requisites for developing, varnishing, and printing, even to a tank with tap, rubber tube, and rose, and a wooden sink about 16 by 14, with rubber waste pipe attached, in the expectation that I could have the use of a cabin on board; but the ship was full, some intending passengers, indeed, being unable to be taken. My own cabin was so small and filled with my belongings that I could not utilize that, even if I wished to do so. I did fix two or three negatives in my cabin, but the vessel rolled so much, even in the calm sea, that, though I balanced the dish in my hand, spilling some of the soda solution was unavoidable. I filled the slides under the bed-clothes of my berth. I cannot recommend that plan, at least not on board a rolling ship in the tropics; as, though the plates were quite free from fog, dust was peppered down on to them, and, owing to the narrowness of the bunk, it was impossible to work with any degree of comfort.

At eight on the morning of February 3rd, Funchal looked lovely in the bright sunshine, the peaks of the hills in the background capped with light fleecy clouds, and broad masses of colour enlivening the foreground; the sea calm, and lively with shore boats. I tried two 12 by 10 plates from the bridge of the vessel, one with the 8½ by 6½ rectilinear, the other with the 12 by 10, both with drop-shutters, but in neither are the houses quite sharp, owing to the roll of the vessel. The 8½ by 6½ lens covers a 12 by 10 up to the edge, and is a capital lens to embrace a wide angle.

After a somewhat hurried breakfast we went ashore in the native surf boats, the ship's boats being unsuitable for landing on the open pebbly beach. As the surf boat nears the shore it is turned stem on, and taking advantage of an incoming wave, is hauled swiftly and bodily up the beach by some half dozen men. At stem and stern are high curved posts, of great assistance in landing.

The descent into the Little Curral is picturesque in the extreme; but the path is narrow and precipitous, and the foothold for horses very loose. On one side the forest-clad hill towered above us, on the other an almost perpendicular precipice yawned beneath. Some of our party preferred to walk down the dangerous-looking paths, but the little horses are extremely sure-footed, and we met with not a single mishap. We were astonished to find that none of the horses we examined had broken knees, so steep and slippery seemed the roads. At the bottom of the Little Curral is a bridge which I wished to photograph, but our party wishing to get back to the hotel by luncheon time, and not caring to be left behind alone, I was obliged to give up the attempt. By the way, if you wish to secure any good photographs, don't go with a party; their notions of the fitness of things are not the same as yours, and they either begrudge the necessary time, or wish to place themselves in the foreground of the pictures. Go alone, and you can take what you like when you like.

From the Little Curral we ascended to the Mount Church, the interior of which we inspected. This Church is nearly 2,000 feet above the sea. The original church was built in 1470, and dedicated to the Assumption. The only things worth seeing were the silver hanging lamps; the altars were simply masses of tinsel and coloured paper. The wooden ceiling is painted in a curious manner. The view from the Church steps is open and extensive.

The subject of my next exposure was a somewhat handsome fountain in a square, after which I did successively a surf boat with its curious heavy oars, and a bullock car, used for carrying freight only.

There is a plethora of subjects for the camera in Madeira, but they need as much time to do them justice as in less favoured lands. No one can expect to churn out a series of pictures in Madeira, any more than anywhere else, and I soon found that plentiful as subjects were, some time and a considerable amount of judgment were necessary in choosing them; and to secure a fairly representative series, two months would be required, instead of our short two days.

I sent my camera to the hotel at about four o'clock, and mounting my horse, soon left the town behind, and enjoyed a good canter of some miles on the shady, soft New Road. How enjoyable that canter was—such a change from the stuffiness and circumscribed exercise of the ship! On one side the descending cliffs and surf-beaten strand; on the other, the cool green hills and waterfalls; and above, the clear blue sky. Such a sense of careless freedom and increased breathing power, added materially to one's stock of health.

After the confinement of the vessel, the hotel seemed so neat and airy, and clear, with, as it seemed to us, a strange absence of heavy curtains and stores. Here, five short days' sail only from England, we, lightly clad, were enjoying outdoors in the beginning of February, the coolness of the evening, while those at home were piling on the coal to raise the temperature to anything like a habitable degree.

It was late when we went to bed, and we appreciated those beds at their full value; I, for one, revelled in the ample width and absolute stillness; no danger of rolling or being pitched out in one's sleep, or of harming some article of wearing apparel, pitched, by an extra lurch, unexpectedly in one's face. I was up betimes in the morning, but many others were before me, for we were to make an excursion to Ribeiro Frio, and as it was a three hours' ride an early start was a necessity.

It was half-past eight ere we started, and commenced our ascent. Favoured with true Madeira weather, as we rose above Funchal the ride was picturesque in the extreme. At every step we passed something worthy of being perpetuated by the camera: now a woman, clad in bright colours, washing her linen at one of the roadside streams abounding in Madeira; now a clump of sugar canes and thickly-clustering oranges, or hanging bananas; now white houses, with their miniature balconies covered with trailing vines, and square mud chimnies; and anon, as we rose higher, quaint little thatched cottages, perched under the sheltering billside, inhabited by peasants, whose faces called Murillo to mind.

Still ascending, after a ride of about two hours, we reached the Peak, variously estimated at from 4,000 to 4,500 feet above sea level. We halted at the little roadside inn here, which contains a spacious fire-place; for at this altitude it is often very cold and foggy, and visitors are glad to be able to make a cup of tea and dry themselves. We were able here to get some wine, and water, the latter of which we preferred.

Unfortunately, the weather now changed, and we saw, with consternation, clouds of mist drifting over the hills around us, and at times totally obscuring the view. However, after a short halt, we pressed forward, and cantering over a tolerably level moorland, commenced descending the mountain side by the steep zigzag paved road. The mist somewhat limited our view, but between the clouds we had peeps of the beautiful wooded ravines, the mountain peaks, and serrated ridges, rendered ever and anon brilliantly golden by the gleams of the fitful sun, the shadows a soft ethereal blue. Dashing from rock to rock were miniature cascades, leaping o'er moss-grown boulders. Soon we reached a level mountain path bordered by ferns of various classes; wild geraniums, hoary lichens, and clusters of yellow gorse brightening the mass of green.

My 12 by 10 camera accompanied me on this excursion, and a great nuisance I found it. Up the hills I was obliged to carry it in front of me on the saddle, and on the level it was impossible to trot in comfort. Being able to secure some permanent momento of one's travels affords great pleasure in after years, but the necessary *impedimenta* is apt at the time to detract from one's freedom of movement.

With many regrets at the shortness of our stay at lovely Madeira, we went on board the yacht at seven o'clock, and at eight were steaming out of the Bay of Funchal, our band playing, and the passengers watching, somewhat sadly, the fast disappearing lights of the little town. We all thoroughly enjoyed our two days' stay, all too short, at Madeira.

There are two photographers in Madeira, at Funchal, both of whom display very good landscape work; but the portraiture is decidedly inferior. A good English portraitist would probably do a very fair business, if he were also a competent landscape man. Small as the island is, it abounds in beautiful views, and an immense collection of profitable negatives might be secured. The resident English population and visitors rather decrease, owing to the dictum of the medical world, and rival claims of new and more fashionable watering-places; still a pushing man could, at any rate, make a comfortable living in this very enjoyable place. The Cape mail, and other large steamers, which call at Madeira, create a demand for views.

At nine o'clock in the evening of February 5th, Funchal was out of sight, and we were bound for Barbadoes and the Islands of the Caribbean Sea.

BLISTERS ON SILVER PRINTS.

BY W. M. ASHMAN.

What causes blisters in albumenized silver prints is a question of frequent occurrence.

Societies' question-boxes, too, occasionally contain similar queries for information, and after much discussion, in which ancient ideas are generally revived, and modern ones aired, the subject invariably drops pretty much in the same position as where it was picked up. An object has been achieved, however, for knowledge acquired by the querist is put in practice for awhile with beneficial results; though upon the cessation of the evil complained of, it receives, as a rule, very little further consideration, until questions upon the subject are again circulating.

It is curious to note how regularly these complaints are made; and to my way of thinking this periodical outcry proves in a large measure that the phenomenon is influenced by excessive changes of temperature. At the present season, it is by no means unusual for the thermometer to register during the night freezing point, or thereabouts; and this cannot fail to do other than exert some influence on the image film, such as the thin and insoluble albumen coating in the printed state represents. If it were only practicable, or only possible to obtain the same degree of purity in the whites and resisting power between the two surfaces by supplementing an albumen substratum for the present starch or gelatine method now employed, we might be sure that blisters would once for all depart, since a layer of albumen will not, under ordinary circumstances, adhere with equal tenacity to a surface which, by the very nature of its preparation, cannot be considered even, as it would to a surface having a nearer approach to perfection, such as a substratum of a similar substance would present.

Doubtless, if it were only possible to test the power of adhesiveness and expansion existing between any one portion of the prepared paper and the coating thereof, we should be in a better position to define the incipient cause of blisters; since such a method is not practicable, it becomes desirable to search in another direction for the probable germs of the evil.

As a general rule, the dealer becomes the greatest sufferer; he is the recipient of all the wrath that can be instilled into a letter, the length of which alone would show that the writer possessed no sympathy for the reader. The dealer in turn improves the occasion by retaliating upon the albumenizer or sensitizer, as the case may be, who, with hackneyed excuses, allows the matter to rest, until he shall have communicated with the mill—result, no answer. Much of the annoyance is caused by insufficient knowledge on the part of the user, while his lack of experience might easily be supplemented, if producers would each agree to give explicit instruction for the treatment of their papers, in so far as past experience has enabled them to do.

Problems will doubtless continue to present themselves for solution, such for instance, as one or more portions of the same ream, printed and otherwise manipulated in different localities, giving trouble when the remaining portions, in the hands of other manipulaters, show complete immunity from the defect complained of. Why this is thus, forms the debatable ground for argument, which up to the present has never been wholly cleared of doubts. We might elucidate a clearer conception of the cause by staining a sheet of albumenized (Rive) paper with a dilute solution of iodine, and examine the same under a microscope before and after removal of the albumen. Those portions not exhibiting the well-known iodide of starch colour would have failed to have established perfect adhesion between the two layers.

Saxe paper, not being sized with starch like the foregoing, would require a slightly different treatment, such, for instance, as a wash of potassium bichromate over the albumen surface, and after exposure to light, a removal of the albumen film, followed by a subsequent microscopical examination.

The effect of extreme heat upon a print is not so marked as might be expected, for the image once obtained on albumen, is not easily removed in boiling water; notwithstanding that the sizing of the paper is abstracted, the albumen remains undisturbed. If we go to the other extreme, and allow the temperature of the washing waters to fall below 35° F., it is only with the greatest care such prints can be afterwards handled. Now it is customary with some printers to give a final wash in hot water, and there is no objection to this proceeding, provided that the solutions have been kept at a high temperature all through the manipulation; but alternately boiling and freezing is productive of much annoyance and many blisters.

That small blisters do little or no harm under ordinary circumstances is generally conceded; also that such are usually due to a highly surfaced paper and unequally heated solutions; but let such prints be exposed in a damp state to very cold air, 32° F., for instance, and it is surprising how easily the portions of the albumen can be removed; moreover, upon again soaking prints so exposed in hot water, blisters of large size are readily formed. An experience of this kind is not often met with, still it has been recorded upon one or two occasions, and is worthy of remembrance, since it is one of the failures attributable to the user, and not the manufacturer of albumenized or ready-sensitized paper.

Everyone knows that a strong silver bath has a tendency to detach the albumen in very thin skins, more especially during high temperatures; doubtless those who use preserved paper do not meet with this difficulty, and a precaution of this kind would only apply to those who sensitize their own paper. With highly-surfaced papers, the writer has often found it necessary to reduce the strength of the sensitizing bath to less than thirty grains of silver nitrate per fluid ounce.

Certain remedies might here be mentioned, which, although known to many manipulators, may not be familiar to beginners. To classify the remedies, it may be said that equality of temperature throughout is of primary importance, and beyond which it is seldom really necessary to seek relief. Next in order may be mentioned the degree of concentration of the sensitizing bath; the stronger the silver bath, the greater the tendency to blister. This was, in a measure, overcome some years ago by a photographer in the United States—Professor Towler, I believe—who replaced an eighth part of the water used in making up the bath with that quantity of alcohol. The only objection to that method was that the paper would not keep in summer time so well as when the alcohol was absent. Anthony's plan of placing a small lump of gum-camphor and a crystal of alum in the filter tended very much to keep the paper, and prevent blisters. These methods, of course, refer to freshly-sensitized papers.

Preserved sensitive paper occasionally exhibits a very troublesome form of blister, inasmuch as fully one-half of the image is often so detached. The makers generally recommend the final washing before toning to consist of an alkaline bath; if the alkaline solution used be dilute, there is not the least doubt but its effect will prove beneficial, so far as it assists rapid toning; but assuming there be acid used in the preservation of the paper, and the alkaline carbonate bath be too strong for the purpose, it is easy to imagine what would happen. If a violent disengagement of carbonic acid gas took place within the texture of the paper, such a force evolved would be sufficient to separate the two surfaces, and the inevitable result would be blisters, while other portions of the same ream, differently treated, would show no trace of the defect, because the alkaline bath was made with greater care, and the prints were equally acted upon. It is a matter of considerable importance that this alkaline solution should only be employed in very dilute proportions, since the entire removal of the albumen image is a comparatively easy matter, under alkaline conditions; therefore, where acid is known to be absent, salt may be substituted for the alkali with considerable advantage.

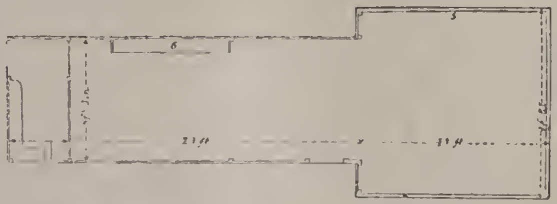
Other means for accomplishing the end in view might be reiterated, such as soaking the prints after toning in a bath containing four ounces of common salt per gallon of water, and a faintly alkaline fixing bath, with which some printers find it advantageous to put a small quantity of alcohol. When an equal temperature of the washing water cannot be relied upon, it is sometimes advisable to dilute the fixing bath gradually with water, and thus rid the prints of the fixing agent in that manner. The treatment of prints in saline baths, made with three per cent. of common salt or ordinary commercial alum, tends greatly to check the after formation of blisters, while they also play the rôle of eliminators. Other methods have from time to time been published in these pages, and I feel it to be incumbent that some excuse should be offered for quoting experiences of others. My excuse is this. Two serious cases—one occurring in the North and the other in the South—were recently brought under my notice. In both cases portions of the same batch were used, being distributed in the ordinary course, and these were the only cases where blisters were observed. Upon enquiry, it was conclusively proved that the temperature was low upon both the occasions complained of, and an increased temperature resulted in an absence of blisters.

* * *

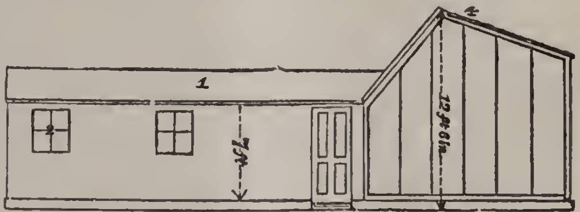
THE GLASS HOUSE—HOW TO DESIGN, CONSTRUCT, AND FURNISH IT.

Chapter I.—Glass Houses, Old and New—*Continued.*

Colonel Stuart Wortley's Studio.—We subjoin the ground plan and elevation, together with a few details of the construction:—



From the ground plan it may be seen that the total length of the room is thirty-six feet, the portion really constituting the studio, the only part lighted, is twelve feet wide by thirteen feet long. The unlighted portion, in which the camera stands, is twenty-three feet long by eight feet wide, and the extreme end is divided off to form the dark-room. The part marked 6 has a tier of shelves for various purposes:—

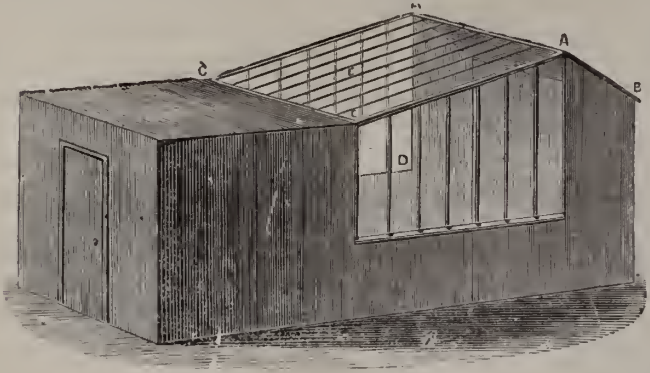


On reference to the sketch of the elevation it will be seen that the studio portion is 12 feet high at the ridge. One side of the studio is all glass, consisting of corrugated glass from the ground to 7 feet high, and from thence to the roof clear white glass. The sloping front light (7) is clear white glass. The opposite side of the studio is opaque, reflected light only being obtained on that side. The roof (4) is also opaque. The only portions having glass are one side of the square or studio portion, and the front sloping portion of the roof (7). With the exception of the glazed parts we have named, the room is chiefly constructed of inch boarding, covered at the roof with asphalte felt. The unilluminated portion is 7 feet high to the eaves, and from thence to the ridge about two feet more. The window marked 2 is of orange glass for the dark-room. The other small window is to admit a little light when necessary to the unilluminated portion of the room. Each pane in the studio has a distinct set of two blinds, one white and the other black, and the blinds of each pane may each be worked quite independent of the other, so as to secure entire control of the light.

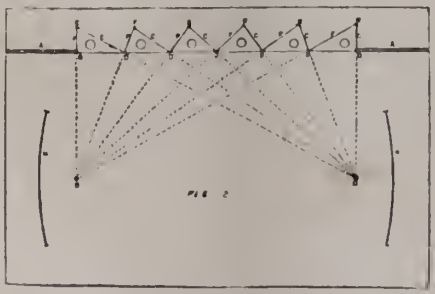
The room is well built throughout, and carefully finished in every part, making an excellent smoking room when not used as an amateur studio. The total cost of the erection was something over £100.

Another glass room of very similar design is that of Mr. Matheson.

It is thus described :—The tallest end for the background, B, is square—a great advantage in taking groups—while all the rest of the room not actually wanted for light may be built of any opaque material, to keep out the heat. The quantity of glass surface need bear very little proportion to the size of the room, as ten feet of glass from the sitter (or from A to C) is sufficient, no matter how long the room may be. About three or four feet from the background of the under surface of glass, from A to B, may be blackened or built of an opaque material, as shown in the drawing. Supposing the room to be twelve feet wide, the highest part of the roof, A, should be about ten, sloping down for about eight or ten feet from the sitter, or A, to the lowest part, C, which may be a flat roof, leaded or tiled, or other opaque material, and which need be no higher than convenient to walk under. The sloping part just over the head of the sitter, A, B, may be hinged as a flap, to be lifted up when the weather will admit, as the warm air ascends to this, the highest part. This makes an admirable ventilator in summer. The back, B, should be placed against a tall house if possible, while the rest should be placed so as to have no obstructions.



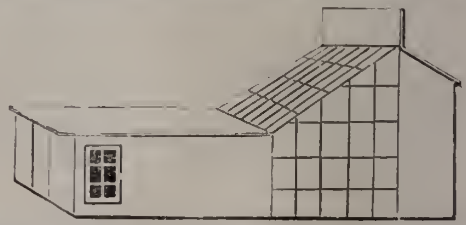
Vanderweyde's Studio Window.—The figure is a horizontal section of a photographic studio. A A is the side wall of the studio, and B C are two points near each end of the studio at any convenient point in its width, at either which the sitter may be placed. In constructing the window, are placed at equal distances apart a number of vertical sashes, D. The distance between these sashes will depend upon the width of the panes of glass to be used. It is convenient to place them about two feet apart. The glass is fixed between the inner row of sash-bars, D, and an outer row of bars, E, the position of the glass being shown by the lines E G. A convenient way of finding the position for the outer row of sash-bars, E. is by drawing radial lines from the points B C respectively through and beyond the points occupied by the sash-bars D, and at the points E, where the lines first intersect each other beyond the row of sashes (D), is placed the outer row of sash-bars, E.



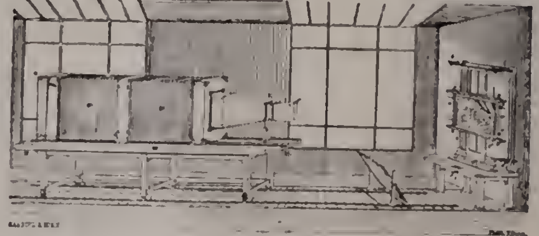
The panes of glass are thus divided into two sets facing in opposite directions, all the panes of the one set (F) facing as nearly as possible the point B, at the same time that they are edgewise, or radial to the point C ; while, on the other hand, all the panes of the other set (G) face as nearly as possible to the point C, and are edgewise or radial to the point B. Thus arranged, the double row of sash-bars does not obscure any more light than a single row, and it will be seen that if the sitter be placed at B, the glass G can be darkened by blinds or shutters, the light only being admitted through glass F, so that without obscuring any of the light passing in the direction of the sitter, the light is cut off from the remainder of the studio, which is not required to be illuminated.

Monckhoven' Tunnel Studio for Copying.—Major Waterhouse writes : "Monckhoven recommends for reproductions a studio of what is called the "tunnel" form, having the glass roof to the north ; and I think there is no doubt that on the whole a steady, bright diffused light from the north coming through clear glass is to be preferred to sunshine filtered, as it must be, through ground glass, which cuts off an enormous proportion of the light.

"In my own case, having a certain amount of open ground towards the south of the office building, and none to the north, I built the glass house for the photographic branch of the Surveyor-General's Office in Calcutta, on the ground level in something of the same kind of tunnel shape as Monckhoven's, but facing the south. The sloping glass roof and the side sashes under it are glazed with ground glass, so that a strong diffused light is thrown upon the plan-boards. In order to lessen vibration as much as possible, the plan-boards are fixed on a separate wall, quite isolated from the walls of the buildings ; and each camera stands by itself on a block of masonry resting on a bed of sand, and is thus isolated from adjoining blocks, and from the walls and floor of the rest of the building. The house is roofed in over the cameras, and the dark-rooms are conveniently placed just behind the cameras, the dark-slides being passed in and out of the dark-room through wooden boxes let into the wall.



"This arrangement is found to answer very well for copying of maps, though sometimes, when the sun is high, the grain of the paper is apt to show too much, and it is possible that a similar arrangement facing the north might have been better."



Volkmer's Interior Arrangements for Copying.—No further description of the engraving than the following reference notes is required :—K K K, an ordinary camera, with body having two bellows, *m m*. M M, table stand for the camera, running on rails, so placed as to ensure absolute and constant parallelism of the sensitive plate with the design to be copied. R R′, frame on which the original is stretched equally in all directions by means of the screws, *s s′*; *a b d*, handles for controlling the forward, upward, and lateral motions respectively.

Patent Intelligence.

Applications for Letters Patent.

3581. Alfred Peter Sharp, 17, Great Brunswick Street, Dublin, for "Photographic dark slide for negatives on paper."—20th March, 1885.

3598. Matthew Whiting, 1, Lavender Hill, Wandsworth, London, for "Facilitating the exhibition of slides in the magic lantern."—20th March, 1885.

3641. Joshua Bilcliff and Josiah Thomas Chapman, 27, Richmond Street, Boundary Lane, Chorlton-on-Medlock, Manchester, for "Improvements in photographic cameras."—21st March, 1885.

3662. John Rigby, 46, Lincoln's Inn Fields, London, W.C., for "Improvements in the construction of photographic cameras."—21st March, 1885.

Patent on which the Seventh Year's Renewal Fee of £10 has been Paid.

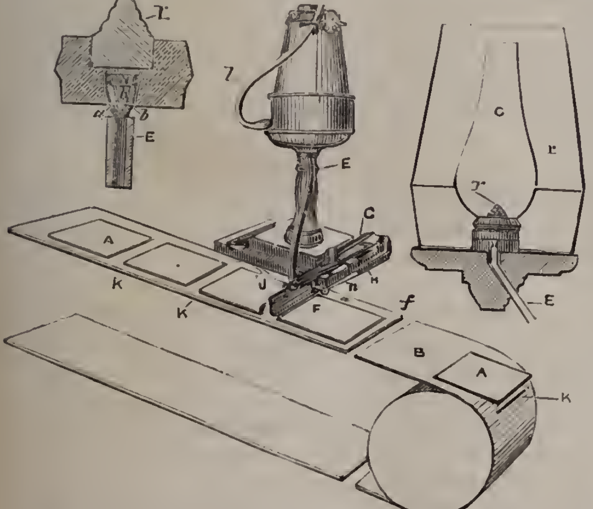
1448. Rouch, S. W., "Photographic camera."—a. d. 1878.

Patent Sealed.

3510. Henry Bratt Sharp, of 5, South John Street, Liverpool, in the county of Lancaster, Optician, for "Improvements in portable legs, supports, or standards for the stands of cameras, stereoscopes, telescopes, theodolites, music easels, surveyors' staffs, and other like purposes."—Dated 18th of February, 1884.

Patent Granted in America.

313,761, Eli J. Palmer, Toronto, Ontario, Canada, assignor of one-third to Theodore Snell, same place. "Machine for applying photographic emulsion to photographic plates." Filed July 7, 1884. (No model.)



Claim.—1. In a device for applying emulsion, a narrow vessel made substantially of a length to correspond with the width of the plate on which the emulsion is to be applied, and provided with a porous apron, or its equivalent designed to receive the emulsion and distribute it on the plate, substantially as and for the purpose specified.

2. In a device for applying emulsion, a narrow vessel made substantially of a length to correspond with the width of the plate on which the emulsion is to be applied, and having a longitudinal slot made at or near its bottom to permit the escape of the emulsion on to a porous apron through which the emulsion is applied to the plate.

3. A distributing-vessel, F, journaled on the rod *g*, and having an arm *h*, attached to it, in combination with the bridge *i*, attached to the travelling belt B, substantially as and for the purpose specified.

4. The distributing-vessel F, journaled or pivoted on the rod *g*, and provided with an arm, *h*, the spring pinchers G, arranged to grip the end of the flexible tube E, and the lever H, for operating the said pinchers, in combination with the bridges *i* and *j*, connected to the travelling belt B, substantially as and for the purpose specified.

5. The spring-pinchers G, arranged to grip and close the flexible tube E, and connected, as described, to the pivoted lever H, in combination with the bridge *j*, connected to the travelling belt B, substantially as and for the purpose specified.

6. The distributing-vessel F, journaled, as described, and supplied with emulsion from a flexible tube, E, closed by the pinchers G, in combination with a travelling belt, B, having plates A held on its surface, as described, and bridges *i* and *j*, arranged to operate the vessel F and pinchers G, substantially as and for the purpose specified.

7. An emulsion reservoir, C, placed within a hot-water urn, D, and having a flexible tube, E, connected with the bottom thereof, and arranged to convey emulsion to the distributing-vessel F, in combination with the sponge *r*, inserted in a recess in said reservoir C, over the mouth of said tube, substantially as and for the purpose specified.

8. A soft-rubber plug arranged to close holes in the bottoms of the reservoir C and urn D, a hard-rubber tapered ferrule, *a*, inserted in a correspondingly-formed hole in the said plug, in combination with a flexible tube, E, having a hard-rubber tapered ferrule *b*, inserted into its mouth, and forced into the ferrule *a*, substantially as and for the purpose specified.

9. In combination with a device for distributing photographic emulsion on plates, an endless travelling belt, B, having projecting lips *k*, and bridges *i i*, placed on the surface, substantially as and for the purpose specified.

10. A horizontal endless travelling belt, B, having projecting lips, *k*, placed on its surface for holding the plates A, in combination with a travelling shelf placed at the turning-point of the endless apron, and arranged substantially on a level with the top of the belt to receive the plates A, substantially as and for the purpose specified.

11. An endless apron, B, having projecting lips, *k*, to retain in position the plates A, in combination with a rack, K, arranged to hold a series of shelves, and automatically operated so as to bring an empty shelf before each plate, substantially as and for the purpose specified.

12. In a machine for applying photographic emulsions, the combination of a distributing-vessel, as F, refrigerator, as A′, rack K, and a travelling belt, B, arranged to convey the photographic plates under the distributing-vessel, and from thence through said refrigerator, and deliver them to said rack, substantially as and for the purpose specified.

13. The combination of an endless travelling belt, movable plate-rack, and a reciprocating conveyer-table situated intermediate of said belt and rack, substantially as described.

313,677. August Loeffler, Tompkinsville, N. Y. "Instantaneous shutter for photographic lenses." Filed Dec. 2, 1884 (No model.)

An aperture in a spring roller-blind passes across the lens tube.

Notes.

Those who get stained or spotty negatives should turn to page 208, and notice the treatment recommended by Belitski. If the negative is a valuable one, it is always as well to make a transparency before commencing.

One is almost tempted to be a little incredulous as to the absolute accuracy of photographs of the nebulæ, when we find the President of the Liverpool Astronomical Society, in his reference at the last meeting to the photograph of the great nebula in Andromeda, saying, "The difficulty of determining which were stars, and which were specks on the plate, was very considerable, and it is quite possible that some of the stars entered in the drawing may turn out not to be stars at all." This nebula, it seems, is much more deficient in photographic light than the nebula in Orion.

Sheets of compact or smooth cardboard, faced with gelatino-bromide emulsion, were shown by M. Thiébaut at a recent meeting of the Paris Photographic Society, these cardboard plates being used in the ordinary dark slides. After development and fixation the cardboard is stripped from the gelatine, and one has a pellicular negative, which can be printed from either side.

Mr. F. Galton's system of composite portraiture has made its appearance in America, pictures of groups of the members of the American Academy of Sciences forming the experiments. The features of thirty-one were first combined, the result, according to an American correspondent of a contemporary, being a fair "type-picture of the average scientist, or the ideal intellectual man of the Caucasian type." Three faces, however, differing greatly from the average, were separated, and the rest was divided into two groups of sixteen naturalists, and twelve mathematicians. The effect of these combinations showed that the mathematicians had a broader, and the naturalists a slightly narrower, forehead than the average of mankind. We are not told, however, what the average width of the forehead is. It would be interesting to know this.

For the first time since it has been the fashion to photograph the University Crews, the Oxford and Cambridge have been taken together. They were invited to dine by a resident of one of the mansions on the banks of the Upper Thames, and advantage was taken of the opportunity to secure a picture. One boating man is very like another, and in this case Pompey greatly resembles Cæsar. Truth to tell, take away three or four faces, and one man might have sat for the rest.

The Photographic Society of Great Britain has no properly-fitted dark-room, but a conveniently-arranged lavatory where it would be quite easy to develop plates. The younger societies in London are better off in this respect, as the Photographic Club has an excellent and convenient dark-room of its own; and the same may now be said of the London and Provincial Association. Although the South London Society is not sole proprietor of a developing room, it is better off than the other societies, as Mr. Trueman Wood is good enough to allow this Society to use the laboratory belonging to the Society of Arts.

Experimenters with green glass for dark-room windows had better beware of what is called "signal green" glass, if they wish to succeed at all. This "signal green" glass (which derives its name from being used for railway signal lamps) is remarkably opaque to red and yellow rays.

The "Maker's Amateur" of the 'cycling world, to whom we alluded recently, is generally a practitioner who cannot succeed as an ordinary professional, so he takes secret service with a manufacturer of bi- and tri-cycles, and while loudly proclaiming his amateurism, he serves his master by displaying the merits of his goods; by organizing sham exhibitions, where, may be, medals are offered for the best records on the master's machines; and may be, by bringing out a trade circular in something as near to the style of an independent journal as he knows how.

Although the nondescript individual referred to only just exists in photographic circles—in fact, a magnifying glass is required to see him clearly—it is as well to bear in mind the possibility of his future development.

Referring to the bone spoon which we mentioned last week as forming a convenient measure for pyro, we have had two communications which merit special notice.

The first is from Mr. W. B. Allison, the Honorary Secretary of the North Staffordshire Amateur Photographic Society. He says:—"I venture to enclose description of a measure which has been used by me for some time. A drachm pill box cut down to the requisite size for holding the required quantity of pyro is fastened by sealing-wax to a small strip of wood, which is in turn fastened in cork of bottle, precisely as described by you."

The second comes from a Bradford correspondent, who signs himself "Exactitude." This gentleman says that it is quite impossible to measure dry pyrogallic acid with any reasonable approach to accuracy, and he writes a very long letter by way of enforcing this view. He carefully adjusted a spoon, and found that half a dozen trials of the doses lifted by it gave the following results:—1·2 gr., 1·1 gr., 1·3 gr., 1·1 gr., 1·1 gr., 1·0 gr.

Our correspondent's spoon evidently needs cutting down a little more, and his figures serve to illustrate the practical utility of a measure for the pyrogallic acid.

Photo-tricyclists in Russia meet with difficulties just now, two of the chief ones bring the fact that a highly organized camera is not unfrequently taken for a land-torpedoe, and the circumstance that just now a committee is sitting to determine whether tricycling is good for the children of the Czar. The '*Cyclist* says that, "Recently a tricyclist in St. Petersburg was ordered by the police to quit the road and take to the path, a course of advice which he promptly followed, only, however, to be ordered back into the road again by the next guardian of the peace whom he met."

Our readers will remember Mr. Beard's camera clip, described by us early in the year. It has been improved upon by the inventor, and some of the improvements have been patented, but the exact points claimed will not be known until the Specification is published. The subjoined sketch of two forms of the clip requires no explanation.

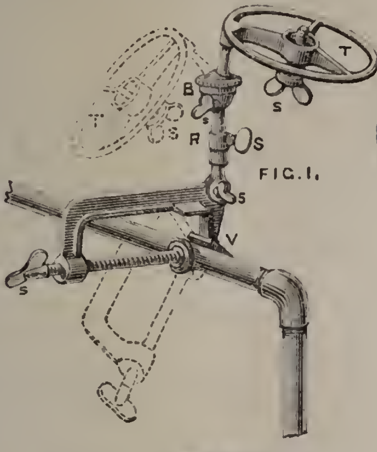
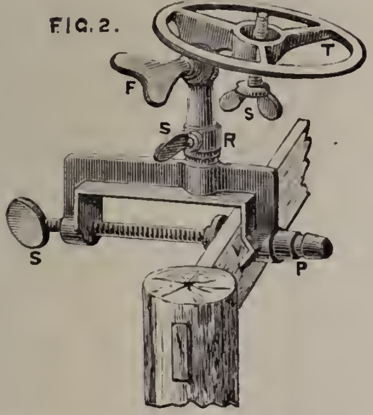


FIG. 1.

FIG. 2.



What becomes of all the spoiled gelatine plates? There must be thousands accumulating—reproachful monuments representing so much wasted money and labour. Everything has its use—even old Champagne bottles, until recently the most worthless article in the market of unconsidered trifles—but has no one thought it worth while to collect waste gelatine plates, clean them, and offer them to the manufacturers to be coated afresh?

The children of one of the Metropolitan Board Schools were recently photographed. While the operation was proceeding, one of the officials of the Board chanced to visit the school, and was thereupon moved to express his displeasure at the "waste of time." He futhermore said that the Board disapproved of the photographing of Board School children in school hours, for the reason he had alleged, namely, waste of time. Can this be really true? There is not a Board School in the metropolis which has not been photographed. The children are taken in classes with their teachers, and the time for each group does not exceed ten minutes. The pleasure and *espirt du corps* which the photographs give certainly more than outweigh the ten minutes' waste of time. It is to be hoped that the official spoke without authority, and that his objections arose from an undue sense of his own importance.

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GELATINE EMULSIONS, AND HOW TO MAKE THEM.

BY W. E. DEBENHAM.

No. I.

A DESCRIPTION of the photographic processes in which gelatine is employed as the vehicle of sensitive compounds of silver, covers a much wider field than that occupied by collodion but a few years since. Not only have gelatino-bromide plates almost entirely superseded collodion for the production of negatives, but the variety and beauty of colour obtainable with chloride and bromide of silver suspended in gelatine have given an impetus to the production of transparencies for the lantern, and for window decoration; whilst the recent achievements in the way of producing prints upon gelatine paper, both by direct printing, and by development after a rapid exposure, prove that even if these processes are not destined to supplant the old familiar one of printing upon albumenised paper, they at least contain what Dr. Johnson would have called the "potentialities" of doing so. Another, and now very considerable development of the gelatino-bromide process, is that of the production of enlargements upon paper, and yet another is the production of enlarged negatives upon paper somewhat similarly prepared.

The writer proposes in the following pages to give a description of each of the typical processes, together with a formula, which, generally speaking, if not quite in every case, he has tried himself, and sufficient details to enable those quite new to emulsion making to enter upon what is found by many to be a most delightful hobby.

Without further reference to those early processes, or suggestions for processes, in which gelatine was proposed to take the place of collodion as a vehicle for iodide of silver in connection with an excess of silver nitrate, we come in 1871 to the publication by Dr. Maddox of a method which has been considered the parent of the modern gelatino-bromide process. In this process nitrate of silver and an alkaline bromide are added to a solution of gelatine, and silver bromide is thus formed in that state of suspension known as an emulsion, and this is poured upon a glass plate and dried. The drawback to the employment of this simple method is that the nitrate of the alkali is liable to crystallize upon the surface of the film, and so cause an irregularity which may show in the negative, besides inducing a tendency in the gelatine film to frill, or separate itself, during development or the after processes, from the glass plate upon which it has been spread.

This tendency to crystallization and frilling will be much less with certain nitrates than with others; much less with potassium nitrate than with that of ammonium; therefore, in this process, bromide of potassium should be employed in preference to bromide of ammonium. It is also obvious that the smaller the quantity of nitrate in a given quantity of gelatine, the more readily that gelatine will hold the nitrate without its crystallizing, or causing any other injurious influence.

Bromide of silver in gelatine is capable of existing in a great variety of conditions, some of which will give, with a certain amount of silver in a given quantity of gelatine, a far richer and more opaque-looking film than others. For the particular process now under consideration it is especially desirable that a condition of silver bromide should be formed giving richness and body, so that a small quantity of it (*i.e.*, the silver bromide), in proportion to the gelatine used, will suffice. Of course, with the smaller quantity of silver bromide, there will be a smaller quantity of nitrate of potash for the gelatine to retain.

In the following formula, although there is eight times as much gelatine as nitrate of silver used, the film will be found to have plenty of body, and the image to be rich and brilliant. The gelatine employed is Heinrich's, that being certainly a very good make, and one generally obtainable; but it is probable that any ordinary good gelatine will answer.

Gelatine	20 grains
Bromide of potassium	15 ,,
Distilled water	¾ ounce

Let the gelatine soak in the water for a few minutes whilst the bromide is dissolving, then heat up to 130° F., or thereabouts; and stir in, also heated to the same temperature, a solution of—

Nitrate of silver	20 grains
Distilled water	1 ounce

A matter of great importance in the preparation and use of gelatine emulsions, is the amount and quality of the light by which the various operations are performed. The need for particular attention to this point arises not only from the very sensitive character of some of the preparations, but more especially from the length of time—compared with that of the preparation of a collodion plate—to which the gelatine emulsion is exposed to the light of the "dark-room" during its manufacture, and during the coating and packing of the plates. For mixing ordinary emulsions, a sheet of yellow paper pinned round a candle will suffice, but it will be well to have a lantern fitted with glass which may be used as the support for one, two, or three thicknesses of golden fabric according to the strength of the light and the sensitiveness of the emulsion in hand.

During the coating and setting of the plates, some such lantern is necessary, as the light reflected from the ceiling, in the case of using a candle surrounded by yellow medium and not covered at the top, would be sufficient to affect the emulsion, exposed as it is in large surface, and remaining so exposed for some length of time. It is proper, if the lantern is used on or near the coating slab, to have so much additional thickness of golden fabric or whatever medium is used, on the side which lights the plates whilst on the slab, that there is only sufficient light to see them; but on the side which lights the plates whilst being coated, there may be light sufficient to see work with comfort. The coating occupies seconds, whilst the setting takes minutes.

The silver may be mixed by stirring in with a slip of glass, the gelatine and bromide being contained in a small jug, a cup, or a glass; or the bromide mixture may be contained in a flask or phial, and the silver poured in a little at a time, the flask being swirled round the while. In either case, the "emulsion," as it is now termed, is placed in a saucepan or boiler, and the lid being replaced, heat is applied till the thermometer shows 150°. After two or three hours of cooking at about this heat, the emulsion is removed from the hot water, and when at a heat just as great as can be borne by the hand with comfort, say from 100° to 120°, is mixed with the following solution, which has been prepared and allowed to reach the same temperature meanwhile:—Gelatine, 140 grains, swelled in cold water for half-an-hour, then drain, put in a clean jug, and add 5 ounces of water, hot enough to dissolve it, say at 180°, or higher.

The mixture of the cooked emulsion with the gelatine solution must, of course, be made by yellow light, and with good stirring. From half an ounce to one ounce of methylated spirit is now stirred in, and the emulsion is filtered through a piece of clean cambric, and may be used for coating, as it is; but I prefer to add half a drachm of a solution of chrome alum, made by dissolving twelve grains of this substance in one ounce of water. This solution must be poured into the emulsion whilst being vigorously stirred, otherwise it may cause coagulation of part of the emulsion. The object of using chrome alum is as a safeguard against frilling.

This emulsion, which is only a modification of the original one by Dr. Maddox, is one which the beginner in emulsion work is strongly recommended to make as a commencement of his operations. It is very simple and easy to make, no washing being required, and is not so easily spoiled by want of attention to niceties as some other preparations. Moreover, the quality of the photographs that may be produced with it is excellent; in the clearness, "bare glass," character of the shadows, it reminds one of wet-plate negatives; the one thing wanting is speed, and in this particular it does not compare with some of the modern processes; but there are many cases where the quality of high speed is not essential, and where, indeed, such rapidity as was obtainable with wet collodion is quite sufficient. Copying, photographs of still life, landscapes when not instantaneous, transparencies, and portraits in the open air, are some of the uses to which it may be very successfully applied; whilst there is another advantage to the beginner—that if he should happen to spoil a batch, the cost is insignificant. This argument is perhaps not worth mentioning compared with that of the quality of the result obtainable.

If somewhat quicker plates are required, the stewing of the emulsion may be prolonged to six or eight hours, and the bromide of silver still be in a condition in which it bears to be distributed through the large amount of gelatine given. It is not absolutely necessary that the temperature should be kept at the fixed point of 150°. To ensure this would require constant care, and some special appliance. The heat may fluctuate from 170° to 120°, and to keep within these limits is tolerably easy. If there is no convenience for having a gas stove under the boiler it may stand in the dark room, and a quart or so of the water may be taken out occasionally, and replaced by boiling water. Another method is to make the emulsion in an opaque bottle—I have made many experimental batches in ginger beer bottles—and when mixed and corked the bottle may stand in a boiler on the kitchen hob. In this case, if any emulsion is seen to lie round the cork, it must be removed before pouring the emulsion out of the bottle, as on account of having been exposed to light, it is unfit for mixing with the stock in the bottle. When ginger beer bottles are used, great care must be taken to thoroughly clean them with hot water and a bottle brush, after each batch is made; as a very little old emulsion might set up various evils in a new batch.

For spreading the emulsion on the plates, a slab of glass must be carefully levelled, and the plates laid upon it to "set" as they are coated. The most convenient method of coating is to pick up the plates in a pneumatic holder, and pour a good sized pool of emulsion nearly on the middle of the plate; and then, by slow movement, allow it to run successively to each corner of the plate, and pour off the surplus into the coating vessel. Emulsions of different makes require that different quantities should be left upon the plates. If the coating is too thin, there will be halation or a fogging round the high lights. With the formula given, the plates will have a sufficient coating if each ounce is made to do for six or seven quarter or three half-plates. As a way of ensuring this quantity, the emulsion may be measured on to the plates with a silver teaspoon, which commonly holds rather more than one drachm, but then there is not sufficient for it to flow readily to the corners of the plate, and it must be assisted by the back of the spoon—not rubbing against the glass, however—or by the tip of the finger, or a glass rod.

When the plates are "set," so that upon being stood upright the emulsion does not run, they are ready to be stood up to dry. The drying should take place in absolute darkness, and to ensure this in an ordinary household without some special appliance is not very easy.

If a dry cupboard is available which can be rendered quite light-tight by hanging curtains over the door, covering the joints and keyhole, that will suffice. It must of course only be opened at night or when no light but that of the yellow lamp illuminates it. A small number of plates may be dried in dry weather in large box or chest of drawers, taking care to cover the lid of the box or the front of the drawers with opaque cloths.

SOME RECENT EXPERIMENTS IN EMULSION PHOTOGRAPHY.

BY A. L. HENDERSON.*

In my lecturette to-night I do not expect that there will be much to startle experts in the way of novelties; but I flatter myself that, at all events, an animated discussion will follow which may throw light on some points which, to me, are inexplicable.

I think I may as well commence by showing what influence gelatine has on emulsion. Of course, you must be aware that to get the best results it is necessary to have a chemically-pure gelatine; this is not easily obtained, and it necessitates some little purification. My experiments in this direction number some hundreds, and it would be tedious for me to detail anything like that number; but I will just mention a few. The most common method is to mix albumen with a solution of gelatine, and warm up, so as to coagulate the albumen. This coagulation takes a great deal of colouring matter with it; but it also robs it of some of its setting properties. Animal charcoal acts very much in the same way. Neither of these methods sufficiently purify gelatine according to my appreciation. Gelatine contains a large quantity of some gas, probably carbonic acid. I think the experiments published by myself some time ago prove this, and for the benefit of those who may not have heard of them, I may as well reiterate them. Take a solution of gelatine—say Coignet's—place the same under a receiver, exhaust the air, and watch the result. The moment you begin to pump, the gelatine will effervesce over the vessel, but, if we let in the air, it will subside, and, after repeating this operation several times, the effervescence ceases. This, in my opinion, shows the presence of gas. Now this gas is injurious to emulsion, not so much from a chemical point of view, but from the peculiar pits they show when plates are prepared. The best cure for emulsion prone to pits of this kind is the addition of a drop or two of liquor ammonia to each ounce of finished emulsion. I am well aware that credit is given to the presence of grease as a cause of pits, and I am not going to deny that some kind of pits are due to grease. You may remember that Mr. A. Brown exhibited some gelatine that contained (placed purposely) grease to a large extent, and yet there were no traces of spots. Carbonate of magnesia, ox-gall, soap nitrate, bicarbonate of potass, and neutral salts will often remove insoluble matter. With ordinary gelatine it will be noticed that the smaller the quantity used to emulsify with, the clearer the shadows will be, and this is due to the smaller amount of impurities. "Of all evils, choose the least." The impurities forming compounds of silver are objectionable; but, you will ask, how are we to avoid this? Well, purify the gelatine first, wash it in water to remove all the soluble matter, next soak it in a solution of bromide of potass (5 grains to the ounce); you may leave this all night, if you please; pour this off and rinse, then proceed to make your emulsion with it. It is not necessary to treat the whole of the gelatine this way, only that which is used to emulsify with. I know several professional plate-makers who precipitate with alcohol all the gelatine they use for emulsification, and I have no doubt this method is almost as good as the other mentioned. Gelatine treated by either of these methods, then boiled with liquor ammonia until all the setting properties are destroyed (this is the compound of meta-gelatine I call leucine), may be stored away in stoppered bottles for future use; it will keep indefinitely—*i. e.*, I have some of the first I made, years old, still good, and it seems to work better by keeping. I think I have said enough to show the importance of having pure gelatine.

I will now explain one point that governs rapidity—viz., the amount of gelatine used in emulsifying. It may not be generally known that with less than a grain per ounce excellent results are obtained, provided that directly the solutions are mixed, more gelatine is added; the state of the silver bromide is constantly being altered, the more gelatine that is added. I will make an experiment to show this. I have here some silver nitrate and some bromide of potass each dissolved in a small quantity of water. I will mix them, and you will see a dense precipitate of silver bromide will be thrown down; I will wash this to free it from soluble matter; now I will add a few threads of dry gelatine, and apply heat to melt it. You will perceive that immediately the bromide of silver begins to break up, if I add more gelatine, the emulsion gets finer. I have not yet ascertained the limit of this action. I daresay speed of emulsion is influenced this way. I confess I cannot find a theory that will explain this. Professor Stebbing, some time ago, published a statement that if bromide of silver was boiled in the presence of free bromide and gelatine, a fine division of the silver took place. He believed it was owing to the free bromide; but this is not so—it is due to the gelatine alone.

I will now dwell on the addition of iodides in emulsions. Some time ago, a boiling formula was given to me, which contained a large proportion of iodide. This formula gave good results, but required two hours' boiling to give 20 on the sensitometer, although the party who gave me the receipt stated that he got 26 with forty-five minutes' cooking. This formula was given to Mr. Gregson, of Blackburn, a clever amateur, and I will read a portion of his letter to you. I merely mention this that you may see the uncertainty of the boiling method. He says: "I tried the boiling formula you gave me—result, ruby when mixed; blue stage reached in thirty minutes' boiling, and plates gave a trace of 20 on the sensitometer; fair quality, but short of density, rather. Forty-five minutes' boiling gave 14 on sensitometer, and sixty minutes gave 4 on sensitometer, but no fog. I guess if boiled a little longer, no image at all."

There are many ways—about eight—of adding iodide to emulsion: first, it may be put in with the gelatine, and converted into silver iodide before adding the bromide; secondly, it may be put in with the bromide and converted simultaneously (this is the method usually employed); thirdly, add the bromide first, leaving a small excess of silver, converting the said excess of silver by the addition of any iodide; fourthly, saturate the silver with iodide (filtering out the precipitate, by this method, more or less iodide will be introduced, dependent on the strength of silver solution); fifthly, the iodide may be added to the emulsion directly it is made; sixthly, mixing a pure iodide emulsion to the bromide one before coating; seventhly, by the addition of iodide acid, either to the silver solution, or to the bromide (this salt of silver is comparatively white, and has its advantages over other methods); eighthly, by adding to or washing in a solution of iodide of potass the emulsion, after the soluble salts have been taken out; this will effectively remove fog from an emulsion, but it will slow it considerably. Iodide in any form in an emulsion is advantageous, but in a rapid emulsion the colour is objectionable—yellow, green, or canary colour renders it difficult for actinic light to pass through, and consequently a thin image is the result, besides slowing development and fixing. It appears that iodide in emulsion coats, or partially converts, the fine particles of silver bromide into silver iodide at a low temperature, thereby preventing, to a great extent, the bromide of silver becoming coarse; and it will be noticed that when iodide is added to a bromide emulsion before being washed, and the plates coated with it are placed in hyposulphite fixing solution, they remain a long time before any apparent fixing takes place; then very suddenly the fixing takes place, leading one to think that when the outer skin or coating of iodide is dissolved, the hypo acts more energetically on the silver bromide.

Iodide is a great restrainer, and a greater amount of ammonia or heat may be applied in preparing emulsion without fog. I do not wish it to be understood that it directly increases speed. I daresay there are other compounds that will answer better. I have expressed an opinion that iodide of silver cannot exist in the presence of an excess of free bromide when subjected to great heat; and my ideas are, to a certain extent, borne out by Potilitzin's and Humpidge's experiments, lately recorded in the scientific journals:—"One of the most familiar of reactions, that of the displacement of bromine by chlorine, we have described some of Potilitzin's results; more lately, Humpidge, ignorant of the former's experiments, has been working in a similar direction, and finds, even at ordinary temperature, that bromine is capable of displacing chlorine in certain proportions, under given conditions. He covered freshly-precipitated chloride of silver with bromine water, and allowed it to stand for some time, at various temperatures; the results were very remarkable. After twenty-four hours, at a temperature of 11° C., 5·28 per cent. of the chlorine had been displaced by bromine; after seventy-six hours, at 11·9°, 10·15 per cent.; after seven hours, at 44·4°, 11·28 per cent.; and after twelve hours, at the same temperature, 1433 per cent. This experimenter is continuing his researches; but, so far even as he has gone, his results well deserve recording."

Regarding the washing of emulsion, a great deal may be said. I am sorry to learn that many makers still adhere to the dirty, messy way of straining or breaking it through mosquito netting. After a time the fibre gets filled up with bromide of silver, and no amount of washing will remove it, and consequently the subsequent emulsion passed through takes some of the bromide with it, and causes black spots. Nothing can be better for breaking up emulsion than a vulcanite or well silvered metal tube covered at one end with No. 16 wire gauze. While I am talking of washing emulsion, I may as well mention that an emulsion which will sometimes give a slightly foggy result will invariably give clear negatives if warmer water is used in the washing, or if the emulsion is precipitated with alcohol; the reason is that meta-gelatine is more soluble in warm solutions.

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* Read before the London and Provincial Photographic Association.

I would like to say something about the sensitometer—Warnerke's. That clever instrument is in many ways far from perfect yet. I could not do without it. It is most valuable for comparing one's own results, but useless for comparison with others; no two tablets seem of the same density; and emulsion makers seldom use the same formula. Some time ago, a plate-maker asked me to test some plates for him; they were not quick—14—and the No. 1 indication was poor and thin, which is quite the reverse of what might be expected. Strange to say, a plate registering 22 gave much more density; but the camera test reversed this order of things, for the slow plate gave the densest image. I was informed that the plate contained no iodide.

Very fine results may be obtained by mixing emulsions of different speeds, but it has to be done carefully. It must not be thought that an emulsion—say giving 1 and 7 respectively on the sensitometer, and mixed in equal quantities, would give the mean speed, 4. In practice it will be found that to get the mean speed, (*i.e.*, 4) you would require to mix one part of No. 1 to three parts of No. 7. It must also be remembered that emulsions of various speeds vary in colour, and also in density; and if a large quantity of a slow emulsion, (*i. e.*, one giving a yellow or red colour) is mixed with a small quantity of very rapid, the slow will completely destroy or eclipse the rapidity of the quick one. To get the mean density of emulsions, the proportions given for speed seems about the same.

In conclusion, I will give you a formula for a very rapid emulsion—*i. e.*, one that will give 25 on Warnerke's sensitometer with half the usual exposure recommended. I have no idea of the speed compared with collodion, or even with a plate exposed the usual 30 seconds.

Formulæ.

No. 1.—	Nelson's gelatine No. 1	20 grains
	Water	4 ounces
	Carb. ammon.	60 grains
	Br. potass.	180 ,,
	Iod.	10 ,,
No. 2.—	Ammonia-converted silver nit. ...	240 ,,
	Water	4 ounces
	Nit. acid	2 minims

Mix the silver to the gelatine in a fine stream, place the jar in three quarts of boiling water, leave all night, then add dry gelatine 480 grains. Warm to melt the gelatine; let this stand another day; break up through 16 mesh gauge, and well wash. A good developer is as follows:—

No. 1.—	Pyro	4 grains
	Br. potass	2 ,,
	Water	1 ounce
	Sulphite soda	$\frac{1}{16}$,,
	Nit. acid...	$\frac{1}{32}$,,

Mix sulphite soda, nit. acid, and water, then add pyro. This will keep concentrated indefinitely.

No. 2.—	Liq. ammon.	4 minims
	Water	1 ounce

For use take half of each. In lieu of ammonia take carb. potass 40 grains.

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A FEW STRAY "SHOTS" IN IRELAND.

BY ADOLPH W. BEER.*

We leave the rails at the next station, viz., Thurles—city of mud cabins and ruins, dirty and world-forsaken in appearance, with a picturesque castle keep commanding the river and bridge—a genuine ideal Irish city, and crowded with unique studies. But, seeing how the hours were fleeting, and considering the quantity of work arranged for in the day, we reluctantly at once took a car for Holy Cross Abbey and Cashel. Here let me mention that the price demanded for "three of us" for a drive of about fifteen English miles to Cashel, including calling at the Abbey, and a delay of an hour or two, was the sum of five shillings.

We have pleasant remembrances of that lovely drive from Thurles to Holy Cross Abbey; and the recollection of a certain sleepy old mill embedded in the rushes of the almost stagnant river, with a few gnarled trees scattered round, and the surface of the stream broken up by green islets shrouded in graceful foliage, makes one long for another opportunity of better showing our appreciation of its loveliness than simply admiring and—passing on.

But here we are at the famous Cistercian Abbey of the Holy Cross—perhaps the most perfect monastic remain in Ireland, and certainly yielding to none in interest or beauty. If looked at near, or far off, across the woods and meadows or over the babbling boulder-strewn stream, it is unique in its perfect assimilation with its surroundings, and as the warm glow of the afternoon sun softens and brightens its grey lichen-covered walls, the colour, so charming, photography altogether fails to render. The east window is of great beauty and especial interest, on account of its unique design.

The Cloister Court is just lighted right, and with one or two details of doorways and buttresses, with the delicate arcading that once ran right round the courtyard, made pleasing pictures. The nave is very plain, with stonework supports, and seems to be used as the cemetery of the district. In one of the small transepts is a marvellous piece of shrine work, said to have been the receptacle of the pieces of the true Cross, that gave the Abbey its name, and afterwards used as the temporary resting place of the bodies of the monks, previous to burial, upon which the mediæval craftsman has lavished an infinite amount of most elaborate carving and decoration.

In a cell "one of us" changes his plates most successfully, the others barricading the entrance with a large focussing cloth. One more "shot" from the opposite side of the river, with the mill wheel to balance the picture, and we adjourn to a dirty cottage called the "Inn," for our well-earned refreshment, ere proceeding to Cashel.

At about 3.30, we are again on board our jaunting car, trusting to be able to get to Cashel in time to utilise the evening light. Here we have "reckoned without our host," or rather, our steed, for the long rest has made the mare skittish, else she preferred returning to her stable at Thurles to turning her nose Cashel-wards. Consequently, we had about thirty minutes fun (?) with an Irish self-willed mare, the termination of which amusement nearly left us up to our necks in a soft ditch, or crucified on a high thorn hedge. However, by dint of apples and coaxing, we got fairly away at last. But the evening was rapidly closing in, and a dull heaviness—so dear to the heart of the landscape photographer—pervaded the air, as on surmounting a little hill the Rock of Cashel could just be seen, while the Slieve-na-Man Mountains behind were putting on their night-caps of white mist.

Dull and cloudy in the morning, but fairly clear, and time being limited, we at once attack—with long focus lenses—the famous rock. Mounting the hill, and entering the enclosure, we notice that we are within the walls, not only of what has been an ecclesiastical structure, but also a fortress of no ordinary strength.

The first object of notice is the cruciform cathedral, plain but strong, the early English window of three lights being notable for having them surmounted by an unusual rose window. This cathedral was burnt in 1495, by the Earl of Kildare, who had a grudge against the Archbishop, and whose only apology for this sacrilegious act was, that he would not have set fire to the building if he had known that the Archbishop was *not* in it.

Adjoining the cathedral is the interesting building called Cormac's Chapel, by far the oldest building on the rock. Petrie says: "It is the most curious and best-preserved structure in the country, combining the richest Norman decoration with the high stone roof peculiar to Irish architecture."

The south entrance is by a beautiful Norman door. The north doorway, which was evidently the principal entrance, is a most unique and elaborate work of seven orders, but in a most unfortunate position for obtaining photographs.

Inside the chapel is the sarcophagus of the founder, King Cormac, A.D. 908, a perfect gem of early Celtic work. The very peculiar carving over the great north door, through which this picture is taken, represents a Centaur shooting a mythological animal.

In the city of Cashel, buried in back lanes of cabins, are the ruins of another abbey, but the bad light, combined with the unpleasant nature of the surroundings, prevented us getting a shot at it. We decide that we have had "Not too much Cashel, but just Cashel enough," during the short period of our stay here, so we engage a car for Gould Cross Station en route for Dublin.

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* Continuation of a communication to the Birkenhead Photographic Society.

The morning finds us bent upon a stroll round Dublin, and through its principal streets—Sackville Street and O'Connell Street—we pass on our way to the R. C. Cathedral. Before looking through Trinity College, we glance at the stately buildings formerly (and not impossibly again) the Parliament Houses of Ireland. After passing through the House of Lords in the interior, we see on the opposite bank of the Liffey the Seat of Justice, viz., the Four Courts. With a run round the Castle precincts, noticing Chapel Royal, our business in Dublin is completed.

We now drive to the Amiens Street Station, and book for our last excursion, viz., the Hill of Howth. The train runs round the north side of Dublin Bay, along a narrow neck of land, with open sea on either side shining in the brilliant sunshine, and soon reaches Howth. We climb up its quaint straggling street, hanging on, as it were, by its eyebrows to the hill side, and are soon by the abbey gate. The magnificent view that here unfolds itself makes one agree with Bradbury, when he says that a visit to Howth is alone worth visiting Ireland for, even if there were nothing else to see.

At our feet is the Abbey of Howth, beyond, the wide-reaching arms of that gigantic failure, Howth Harbour: and further still, bright and clear, though several miles away, the Island of Ireland's Eye stands out sharp and distinct, and the ruins on it can be distinguished with the naked eye.

Lovers of wild rocky coves, bold headlands, and rugged coast lines, can here find ample subjects for studies, with ever-changing effects, and beautiful in every mood and phase of the unrestful sea and wind.

Howth Castle (the ancestral residence of the Earls of Howth), where, according to tradition, the fate of their "long ancestral line" is dependent upon the life of a famous yew tree of fabulous age—we see and photograph.

Then, tired, but delighted with our week's excursion, we return to Dublin, and the boat from North Wall bears us away from the Emerald Isle.

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LESSONS DERIVED FROM PIN-HOLE PHOTOGRAPHS.

BY BARNARD S. PROCTOR.*

The rule for finding the focus of a lens for an object at any distance, its focus for parallel rays being known, is as follows: Multiply the distance of the object by the focus, and divide the product by the distance minus the focus; *e.g.*, the distance being ten yards, and the focus for parallel rays ten inches, multiply 360 inches by 10 inches=3600, and divide by 360 minus 10, *i.e.*, by 350.

350)3600(10·28
350
——
1000
700
——
3000
2800

The focus for an object at ten yards distance is thus found to be 10·28 inches. Or you may take the focus as a unit, state the distance of the object in foci, and divide by the same number minus one. Thus, 10 yards=36 foci, divide by 35 foci=1·028. the distance expressed in foci, and convertible into inches by multiplying by 10. Suppose you are taking a view with a 10-inch focus lens, your foreground being 9 to 10 yards distance and the background as many miles away, you focus for 10 yards. and have the objects at 9 yards, and those at 9 miles about equally out of focus; the focus for the former being about $\frac{1}{4}$-inch behind the plate, and that of the latter being $\frac{1}{4}$-inch in front of the plate. The size of the stop which may be tolerated under these circumstances will be such as, when its diameter is divided by 40, gives a fine just visible point, the reason for which you will readily see. The objects too near and too far are $\frac{1}{4}$-inch out of focus; $\frac{1}{4}$-inch is $\frac{1}{40}$ of the distance between the aperture and the plate. The cone of light which passes through the aperture comes to a point at its focus, but will, if intercepted by the plate at $\frac{39}{40}$ of its focal distance, still have a measurable size of $\frac{1}{40}$ that it had as it passed through the lens. Another cone of light which has come to a focus $\frac{1}{4}$-inch before it reaches the plate will diverge again to practically the same extent by the time it meets the plate.

With an inch aperture the finest lines that are thus a $\frac{1}{4}$-inch out of focus will have a thickness of $\frac{1}{40}$th inch on the picture, a degree of focal aberration which, under many circumstances, would not be willingly tolerated; but if we put in a stop of $\frac{1}{10}$th inch diameter, these out-of-focus lines are reduced to a thickness of $\frac{1}{400}$th of an inch, a degree of fineness rarely required.

So far I had written before Mr. Pae's paper of February; now I may add a remark or two bearing upon what arose at that meeting.

It may be remembered that Mr. Pae drew a diagram of a camera with two foci on the black board, and that I objected to it as tending to mislead, from being so much out of proportion. He amended it, and, on my still objecting, challenged me to draw it as it ought to be. This I declined to do without a calculation. That calculation I now propose to put before you. The diagram represented a camera in section, to show the difference between the position of the focussing-screen when its distance is changed to bring into best focus two objects, the distance of one being 90 feet, and that of the other three miles.

He drew the camera, and represented one line as being 3 inches from the lens, this representing the focus for the objects at three miles' distance, and a second line in the unamended diagram was $4\frac{1}{4}$ inches from the lens, to represent the focus for objects at 90 feet. Taking the shorter form of the rule 1 previously quoted, we convert the three miles into terms of foci. Thus three miles × 5284 = 15840 feet × 4 = 63360 foci; divide this by the same number, minus 1—

$$63360 \div 63359 = 1·0000015.$$

This is the measure or foci for parallel rays of the focus for an object three miles' distance, proceeding in the same way for the foreground, 90 feet = 360 foci ÷ 359 = 1·0002785, giving as a difference between the two expressed in foci, 0·0002770, or, in fraction of an inch, 0·0008310—that is, with a 3-inch lens, there is rather less than $\frac{1}{1000}$th part of an inch difference between the foci for objects at 90 feet and at three miles. This, I think, is sufficient to show that I was justified in objecting to his drawing any inference regarding the distortion of objects due to the focal error in the case he took for illustration, and sufficient to justify my objection to his statement that he had observed focal error amounting to inches under the cirumstances he described.

Now let us see what would be the distance of an object from the lens which would give 4·2 inches focal distance as against 3 inches for the most distant objects. The rule in this case is—divide the observed focus by the observed focus minus the focus for parallel rays, the quotient gives the distance of the object expressed, or foci. The observed focus = 4·2, the focus for parallel rays 3·0; the difference is 1·2, which, divided into 4·2, = 3·5 — the distance of the object in foci × 3 = 10·5, the distance of the object in inches—$10\frac{1}{2}$ inches instead of 90 feet.

As I have criticised Mr. Pae without mercy, I have felt that I might call down upon myself an equally unmerciful treatment, and I have spoken of parallel rays with a measure of fear and trembling. I was conscious that the sun's rays might not be parallel, and after a little consideration I came to the conclusion that they might not be divergent either, so I resolved to calculate what they are likely to be, and have come to the conclusion that they are converging when they reach the face of the earth. The atmosphere is a refracting medium with an index of 1·000294, and a curvature of about 4,000 miles radius; any column of it bounded by a plane on the earth's surface is a thick plano-convex lens, the focus of which may be calculated by dividing the index of refraction by its excess above one (1·000294 ÷ 0·000294=3402), which gives the focus in terms of the radius. 3402×4000 gives 13608000 miles as the focus. The sun being seven or eight times that distance, its rays will be rather more convergent when they reach the earth's surface, than they were divergent when outside its atmosphere. To get truly parallel rays, we should catch a planet at about 13 millions of miles distance.

Reverting to Mr. Pae's diagram, the last point which I shall attempt to criticise to-night is his assumption that objects out of focus are consequently represented larger or smaller than they should be. Supposing for the moment that the focal differences had been approximately what Mr. Pae represented, what effect would this have upon the relative size of near and distant objects? Taking the proportions of Mr. Pae's diagram, and representing the arrow in focus at 3 inches as a certain measurement in the horizon, and the arrow at 4·2 inches as a line in the foreground, which, according to the laws of perspective, should have the same measure upon the plate at 3 inches, but only comes to a focus at 4·2, the result will be that every point will be represented as a diffused patch of light or shade, so misty that not a single line or point would be visible as such, and no picture would be obtained. If you know the extent of the focal aberration, you may calculate the point towards the end of the line where the image ceases to have its full share of light, and the other point beyond the legitimate end of the line, where the image has not only ceased to be visible, but where it entirely ceases to receive any rays from the object; between these two points the line gradually fades from its full strength down to nothing, and the total length of the line may be regarded as either shorter or longer than its legitimate dimensions.

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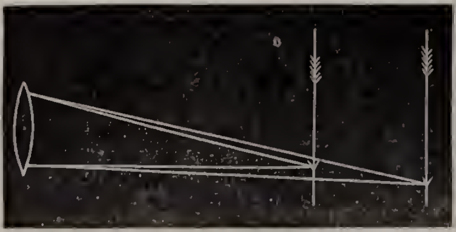
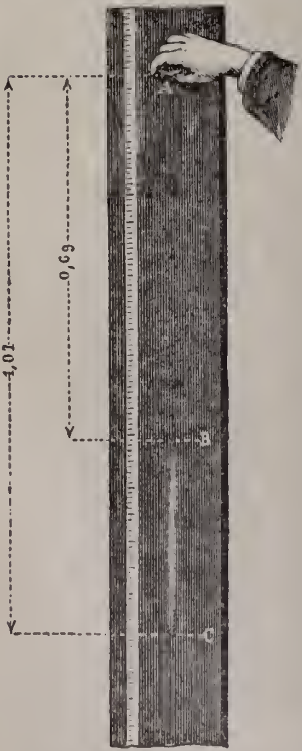
* Continued from page 183.



FRENCH CORRESPONDENCE.

Determination of Length of Exposure—Action of Sulphocyanide of Ammonium on Gelatine—Negative Photometer for Reproduction of Interiors.

Determination of Length of Exposure.—M. de la Baume-Pluvinel's method of determining length of exposures is based, as I have had occasion to state previously, on the reproduction of a body allowed to fall freely by the side of a graduated scale. The body in this case is a polished metal ball dropping from A (see cut), at the same time using the shutter. The photograph will show a black trace over the white background, indicating the distance traversed by the ball during exposure, as from B to C in the print. The calculation of time is rather complicated, but still it can be accurately obtained. Unfortunately, doubts may be entertained on the exact determination of points B and C. The longer the exposure the greater the amount of error, but practically a sufficiently accurate statement may be arrived at. For the convenience of operators, M. de la Baume-Pluvinel has drawn up the following scale of varying exposures with the space traversed. To show the working of it, let us take the case of the diagram :—



Given S (one of the spaces traversed) = 0·69 m.
„ S (the longer one) „ 1·07 „

On referring to the table, it will be seen that—

Falling 0·65 m. time occupied = 0·36405 sec.
„ 0·04 „ (making 0·69) „ = 0·01100 „

To get the number 0·01100, take the exposure for additional 0·01 c.m.—that is, 0.00275×4=0·01100. The length of time for 0·69 m. fall is therefore 0·37505 second =between three- and four-tenths of a second=$\frac{37}{100}$ of a second.

Table for deducing, from the rate at which a body falls, the length of exposure given by instantaneous shutters.

Spaces traversed. M	Time taken. S	Correction for every c.m. S	Spaces traversed. M	Time taken. S	Correction for every c.m. S
0·05	0·10097	0·00836	1·00	0·45155	0·00220
0·10	0·14279	0·00622	1·10	0·47359	0·00211
0·15	0·17389	0·00561	1·20	0·49465	0·00202
0·20	0·20194	0·00477	1·30	0·51484	0·00194
0·25	0·22577	0·00421	1·40	0·53428	0·00188
0·30	0·24732	0·00396	1·50	0·55304	0·00181
0·35	0·26714	0·00369	1·60	0·57117	0·00176
0·40	0·28558	0·00347	1·70	0·58875	0·00170
0·45	0·30291	0·00328	1·80	0·60582	0·00166
0·50	0·31930	0·00312	1·90	0·62242	0·00162
0·55	0·33488	0·00298	2·00	0·63859	0·00158
0·60	0·34977	0·00286	2·10	0·65436	0·00154
0·65	0·36405	0·00275	2·20	0·66976	0·00150
0·70	0·37779	0·00265	2·30	0·68481	0·00147
0·75	0·39105	0·00257	2·40	0·69954	0·00144
0·80	0·40388	0·00249	2·50	0·71395	0·00141
0·85	0·41631	0·00241	2·60	0·72810	0·00139
0·90	0·42838	0·00235	2·70	0·74197	0·00136
0·95	0·44012	0·00229	2·80	0·75559	0·00134
1·00	0·45155		2·90	0·76896	

I think it useful to publish these numbers, but I prefer the clock dial form, and taking the angle formed by the hand traversing a certain space while performing one revolution in a second. This apparatus has been well carried out in the making by M. Baluze, and I think I am right in recommending it as best answering the purpose. By an ingenious contrivance, a pneumatic arrangement, the hand instantly revolves from left to right round the dial, and in the space of a second arrives again at its starting-point, when it stops spontaneously. A second pressure of the handle sets it in motion again, and its action will continue a great number of times. The dial being subdivided into 600 parts, renders it capable of being used with very rapid exposures. The preceding table does not permit of such practical valuations, as the minimum space traversed is 0·05 m., giving an exposure, roughly speaking, of one-tenth of a second. How, then, can $\frac{1}{500}$ of a second be computed?

Action of Sulphocyanide of Ammonium on Gelatine.—Referring again to the action of sulphocyanide of ammonium upon gelatine, of which I made mention in my last letter, a fresh experiment has proved that it succeeds, if used cold, in developing carbon prints or gelatine reliefs, but, curiously enough, it swells pure gelatine, while the mixture that is used in the carbon process is stripped off. I have not yet been able to account for this difference of action. I have taken this pure insoluble gelatine, and immersed in a hot 20 per cent. aqueous solution of sulphocyanide of ammonium, with the addition of 3 per cent. of bichromate of potash, and it has dissolved. It is remarkable that all that has submitted to the action of light resists the action of the sulphocyanide of ammonium bath. For Woodburytype reliefs it greatly assists the development.

Negative Photometer for Interiors.—A great number of the carved panels in the Palace of Versailles are to be photographed for circulation among art workmen. A Commission is appointed, of which I am one of the members, to carry out this work, and on going over the various apartments, I remarked that, as so many parts are dark, it will be difficult. All depends upon getting to know the right exposure, or much time will be lost. Unfortunately, a practical photometer is wanting, and I have been contriving one which shall give rapidly the degree of light, and allow a minimum exposure to be fixed upon. This photometer is composed of slips, two centimetres wide, cut off the plates to be used. These are shut up in a box, from which they drop into a little dark slide, bearing on one side a graduated scale in ten tints, more or less transparent, numbered from 1 to 10. Exposure of 30 seconds is obtained opening the shutter covering this scale. Next, let the slip of glass fall as if into the box, in a little flat vertical vessel containing a ferrous oxalate solution. This vessel, in an ebonite case, which is removed as soon as the developer has acted for five minutes, and the degree of light can be seen in the liquid itself and the exposure can be reckoned, taking into account the diameter of diaphragm, focal length, &c. This little negative photometer is not bulky, the development is carried on on the spot, and it may avoid numerous and expensive trials. To renew the developer, one has two little bottles, one containing oxalate of potash, and the other sulphate of iron, in saturated solutions. They are mixed in the usual way at the time of exposure, using 4 parts of oxalate of potash and 1 of sulphate of iron. Two lines engraved on the glass vessel serve to measure the exact amounts.

Leon Vidal.

Proceedings of Societies.

Photographic Society of Great Britain.

A technical meeting was held on Tuesday last, the 23rd inst., in the small room attached to the Gallery, 5a, Pall Mall East, Mr. John Spiller in the chair.

Mr. Dresser opened the meeting by exhibiting prints on the new rapid paper. He commented on the difficulty of obtaining any definite tone that was wished for, and found it difficult to obtain half-a-dozen consecutive prints of precisely the same tint. He also showed enlargements made on the paper in question, and found that these toned with more difficulty than direct prints from the negatives. By adding sufficient sulphuric acid to the hypo bath to liberate a good deal of sulphur, he obtained a ready means of toning, but he looked on such sulphur-toned prints as curiosities. They had been attached to the walls of his experimental room, so that he could watch the fading.

Mr. Francis Cobb spoke feelingly as to the difficulties of toning, and said that he had found that after a batch had ceased to be efficient in toning "rapid" prints, it would still tone prints on ordinary albumenized paper.

Mr. Ashman spoke well of the sulphocyanate toning bath, and also of the borax bath, and said they were especially good for gelatine paper.

Captain Abney remarked that the sulphocyanate bath was much used with collodio-chloride paper in the old times, but he had found a tendency to "pink-and-ink" tones; the lime bath he found to be much better.

Mr. Shew exhibited a camera in which the focussing-screen moved backwards on links, like those of a parallel ruler, two links on each vertical edge.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 19th inst., Mr. W. K. Burton in the chair.

The usual routine business was disposed of, and the Chairman invited Mr. A. L. Henderson to deliver his lecturette on "Some Recent Experiments in Emulsion Photography" (see page 203).

At the conclusion, the Chairman, after thanking the Lecturer for bringing forward many subjects of interest in emulsion work to discuss, announced that Mr. Henderson was ready to answer any questions arising out of his paper.

Mr. W. E. Debenham enquired if the effervescence spoken of was not partially due to acid in the gelatine as well as carbonates in the water. Would the potassium salt be removed in washing? His general experience did not harmonize with the Lecturer's regarding the influence of the gelatine in giving clear shadows. Was bromide of silver capable of displacing iodide? Regarding rapidity of emulsions with iodide, he did not think such plates were as rapid as bromide alone, although its presence conferred a distinct quality on the emulsion. He did not find a similar formula, published by Captain Abney, to be satisfactory in that respect, for he had never obtained high speed with it.

Mr. Henderson replied that, using distilled water, he had found it necessary to exhaust the air six times. He believed some gelatines contained a substance insoluble in water, which could be extracted by means of a bromide and iodide salt, and thus washed out. He felt justified, in the face of his experiments, in saying that bromide of silver had a greater affinity for iodides at high temperatures than chlorides. Emulsions containing iodide he found more rapid than bromide alone, and if the proportion was large, the image would not be seen at the back of the plate.

Mr. W. England: Does Mr. Henderson find silvered copper-wire mesh necessary for breaking up an emulsion?

Mr. Henderson replied that he used it so coated.

The Chairman's experience was that it became advisable to use plated wire with ammonia emulsions, or the copper would be acted upon, and the emulsion exhibit the well-known green colour.

Mr. England: Warm water was recommended for washing emulsion. About what temperature would be considered best?

Mr. Henderson said it was unimportant, so long as it was not hot enough to liquefy the pellicle, but sufficient to dissolve meta-gelatine.

The Chairman observed that some emulsions which have been set in very cold water will withstand the influence of fairly warm water.

Mr. A. Mackie suggested that the apparently large amount of effervescence might be due to an imperfect method of exhaust.

Mr. F. W. Hart said that it would be more satisfactory to exhaust over mercury; it would be worth the trouble as an instructive experiment, and he promised to test a sample of Mr. Henderson's gelatine in that way.

Mr. A. Cowan asked Mr. Hart to express his opinion regarding displacement of haloids; but that Mr. Hart did not care to do, for he thought the whole subject might be gone over analytically, when it might be proved that former observers had not covered the ground.

The discussion then turned on the molecular formation and condition of silver haloids in the presence of gelatine.

Mr. E. Twiss held that the action of gelatine was mechanical, and dense mediums created coarse molecules. Boiling the emulsion reduced the density.

The Chairman remarked that his experience did not coincide with that theory, and

Mr. Henderson contended that the addition of gelatine separated the particles in a manner which, to him, seemed inexplicable.

Mr. A. Haddon detailed an experiment wherein he had examined bromide of silver with a Coddington lens as the changes were brought about by heat; the final shape was hexagonal.

Mr. J. B. B. Wellington, in reply to the Chairman, said he mixed one part of a rapid emulsion to five parts of slow.

Mr. H. S. Starnes believed that in mixing rapid and slow emulsions it enabled him to get a sharply-defined line of light on a medium ground, and this he held to be in favour of his theory regarding the vibratory state of molecules themselves when acted upon by light.

Mr. J. Barker took exception to much that had been said regarding the haloids, and held to the opinions he published some years previously. He did not agree with the Lecturer that gelatine separated the particles of silver bromide; it only formed a mechanical mixture which the action of heat alone separated. The best results could be obtained by mixing the haloids and silver all at once.

Mr. Henderson then briefly replied. He wished Mr. Barker would try the trituration method of emulsifying. Mr. Starnes would find that the strength of light had much to do with white objects overlapping shadows. He did not think a red emulsion capable of being rapid; if it were green, then it would be rapid. Several thicknesses of a certain green medium, such as coloured gelatine, would appear ruby by transmitted light, and yet not be so in reality. Regarding reflected colour, he said he could boil pure bromide (ammonia) emulsion until it appeared yellow like the bromo-iodide, and the image would pass through the back of the film.

The Chairman then briefly reviewed the points touched on by Mr. Henderson. Certainly, he said, if iodide be used in a boiled emulsion, it went somewhere, for it was not precipitated, and he agreed with Mr. Debenham that it conferred a distinct feature in the quality of the plate. He believed the highest speed was obtained with a dilute solution boiled for some time. Regarding the sensitometer, he agreed with the Lecturer, that it was a most useful instrument when intelligently used. When shreds of emulsion were allowed to stick together round the sides of the vessel, twenty-four hours' washing would not give a satisfactory emulsion. The whole paper was so interesting and important, that he should move an adjournment of the discussion in order that they might have an opportunity of seeing the paper in print. He then called for a hearty vote of thanks to Mr. Henderson, which was accorded, and it was agreed to adjourn the discussion until April 16th. It was announced that on April 9th Mr. W. K. Burton would deliver a lecturette on "Developers."

Hyde Amateur Photographic Society.

This Society held its meeting on Wednesday evening, the 18th inst., a fair number of members being present. Mr. F. W. **Cheetham** occupied the chair.

After transaction of routine business, the **Chairman** called on Mr. John Pennington to give a demonstration with the new printing paper.

Mr. **Pennington** had several prints that had been previously toned and finished, and said these prints had been brought to show to what perfection he had attained with the paper. After exposing six prints to an ordinary gas flame four minutes, he at once proceeded to develop, tone, and fix them.

During the demonstration, discussion was freely entered into as to the cost, time saved, and the results generally obtained; many expressing themselves highly pleased with the paper.

Bolton Photographic Society.

The March meeting was held at the Baths, on the 5th inst., Mr. R. **Harwood** in the chair.

The major part of the evening was occupied with discussing arrangements for the forthcoming soirée, to be held on April 22nd.

Mr. **Ahatt** gave a lantern exhibition, when Messrs. Knowles, Mercer, Austwick, and others exhibited slides. A number of coloured slides were also shown, prepared by Mr. Chatham Pexton.

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Talk in the Studio.

South London Photographic Society.—The next meeting of the above Society will be held at the Society of Arts, John Street, Adelphi, on Thursday next, April 2nd, at eight o'clock. Mr. G. M. Satebfield will give a demonstration of his "Rapid Enamel Paper." Messrs. Morgan and Kidd will exhibit the capabilities of their "New Paper for Negatives."

A New Departure in Printing.—In one of the series of articles on "Gelatino-Chloride for Positive Printing," written for us by Messrs. Ashman and Offord, there will be found working details for preparing a gelatinized contact printing paper that is sensitized on a silver bath by floating just like albumenized paper, and in all other respects treated in the same manner. It can be produced to give the highest or any degree of gloss, and appears to retain its whiteness in the sensitized condition for an indefinite period. The article in question, which will shortly appear, also deals with single transfer paper such as used by the carbon printer. This paper, when salted and sensitized, yields results of great excellence.

Restoring Spotty or Stained Negatives.—This may often be satisfactorily done by converting the image into chloride, and redeveloping with oxalate developer. Belitski dissolves one ounce of alum in a pint of water, and then adds to this 140 grains of bichromate of potassium and three fluid drachms of strong sulphuric acid. The negative is allowed to remain in this solution until it has become thoroughly yellow, after which it must be very thoroughly washed indeed. It is now exposed to a bright light for some minutes, and then immersed in the oxalate of iron developer until it is quite black. Now rinse, soak in a solution containing one part of citric acid to fifty of water, and finally wash. The point most to be noted is a thorough washing after the bichromate bath.

Colour-bred Curs.—According to the *Sanitary Record*, Dr. Horbacewiez has reared puppies in variously coloured lights, and he finds that the coloured lights, in their influence on development, may be arranged in the following decreasing order:—Red, orange, green, white, blue, and violet. Dr. Horbacewiez also draws attention to a striking difference in the individual character of puppies, according to the colour of light in which they lived and grew. Thus "green" puppies presented extreme liveliness, cheerfulness, and playfulness, accompanied by ease and gracefulness of movements; in addition, they were invariably good-humoured and kind. "Orange" puppies were also prone to play, but their movements were heavy and awkward, and their temper rather cross—they fought each other on the least provocation—and stubborn. "Violet" and "blue" puppies were of a quiet, almost apathetic disposition, the "blue" especially so, since they never played. "Violet" showed a curious fondness for barking. "Red" puppies did not manifest any liveliness.

Photographic Club.—The subject for discussion at the next meeting, on April 1st, will be "On Toning and Finishing Prints on the New Rapid Paper." The Hon. Secretary has removed from Hampstead to 1, Beacon Hill, Camden Road, N.

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To Correspondents.

⁂ We cannot undertake to return rejected communications.

⁂ Our Publishers desire us to state that next Friday being Good Friday, the News will be published one day earlier than usual. Advertisers will please note.

T. T.—See article on page 417 of our volume for 1884.

Thos. Stokoe.—Thanks; they are mentioned on page 194.

J. J. H.—1. It is sold by Cornelissen, Artists' Colourman, Great Queen Street, London, W.C. 2. About one-tenth of an inch may be taken as about the general thing, but less will be satisfactory. 3. Quite practicable. The colouring is quite a matter of taste, and the fresh plaster does not adhere to the mould if this is well brushed over with an emulsion made by boiling together soft soap, tallow, and water. Make the preparation quite thin. Let us know the result of your experience.

P. Fincham.—Thank you very much; we will endeavour to avail ourselves of your kind suggestion. Will you write a short account of it yourself, and make an illustrative diagram?

P. Moll.—1. Quite a matter of taste. Certainly it seems to us that the spot is by no means an ornament. 2. A meaningless phrase.

Fred W. Cheetham.—Thanks for a copy of the presentation print; it is excellent.

Forester.—1. You must be proposed by two members, and pay a subscription of a guinea a year. The Photographic Society of Great Britain is the only one that publishes its proceedings in the way you mention. It will give us much pleasure to propose you as a member. 2. The maker does not intend the lens to be used in such a way, but good results are generally obtained. Try it with the back lens partly unscrewed, so as to give greater distance. If any, it would be complex, and would require a knowledge of each one of the four curves, and the optical qualities of the two kinds of glass used, so perhaps it would be better to find it by experiment. 3. Not yet.

William Lang, Jun.—1. They shall be sent you, if they can be found. The small dynamo referred to weighs about 180 pounds, but more portable and equally useful instruments are now made. We will write to you.

L. W. Kessler.—It is not made commercially, as workers generally prefer to prepare it themselves.

Dee.—Nothing of the kind. The Act only applies to the retail business, and not to wholesale transactions or sales to trade consumers or manufacturers.

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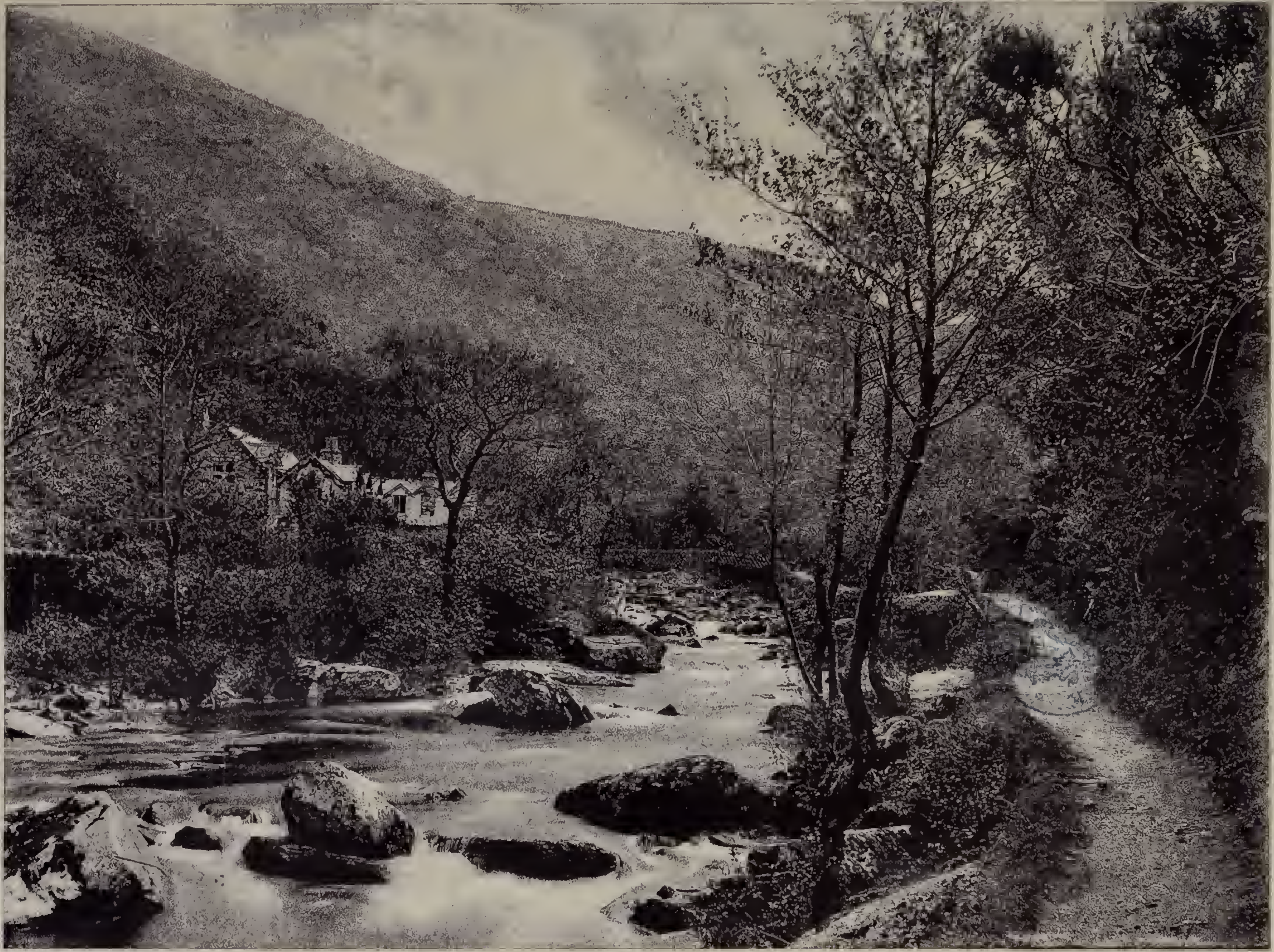

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX., No. 138—*April* 3, 1885.

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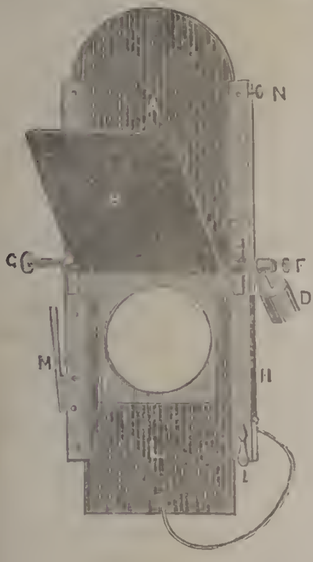
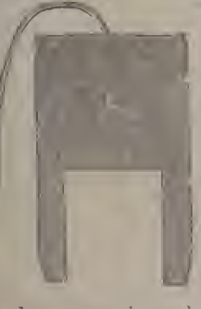
INSTANTANEOUS SHUTTER OF REYNOLDS AND BRANSOM: SOME NOVEL FEATURES.



The combined drop and flap shutter introduced by Messrs. Reynolds and Bransom some years ago is well known; but to make the improvements now introduced intelligible to those readers who are not familiar with the apparatus, we may once more point out the main features.

There are two movable parts, B and A, the former being a flap, which opens when unbolted or released, the counter-weight D acting as a motor. A is a plain drop, which falls and covers the opening of the lens as soon as the flap B is fairly open. It is needless now to point out how the action can be accelerated by the use of india-rubber bands.



The most noticeable addition just made is the use of an attachment by which the shutter can be readily converted into a simple drop-shutter when extra-rapid exposures are required. A separate piece, L (which, when not in use, is stored away on the back of the framework), forms the lower half of the simple drop, and for focussing, this separate piece is placed as shown in the first diagram (L); the flap being meanwhile allowed to remain stationary in position shown, where it serves as a sunshade. For exposure, the (now compound) drop is pushed upwards so that the portion lettered L covers the lens aperture, and exposure is made by releasing the catch M—this release being preferably made by a pneumatic action not shown in the diagram.

If the attachment, L, is not used, and the drop, A, is fixed into its position by the set screw, N, the shutter can be used as a simple flap; the counter-weight D being in this case either removed or set in the same direction as the flap.

The shutter is made of ebonite, a material of which the excellent qualities do not seem to be sufficiently appreciated by makers of photographic apparatus.

* * *

LATITUDE OF EXPOSURE.

It is well known that, in the case of any plates—either wet or dry—which have been extensively used for negative making, the latitude of exposure has been considered not to be great, unless the developer be altered to compensate for divergencies from what is termed the "normal exposure." It is assumed, we believe, that this state of affairs belongs of necessity to any negative process which could be devised. That this assumption is not correct may be easily enough proved.

Were it possible to produce a process in which the amount of silver—or other material forming the image—which is reduced by the developer on any portion of the plate, in a certain period of time, shall be directly proportionate to the amount of light which that portion of the plate had received, we should have a process allowing an infinite latitude of exposure without the necessity for varying the developer at all. The only factor which would require variation would be the duration of development. We should have to develop for a length of time inversely proportionate to the length of the exposure which had been given. Say, for example, that one second's exposure gave a negative requiring a hundred minutes' development, a hundred seconds' exposure would give a precisely similar negative with one minute's development.

That such an ideal plate will never be produced is probable, but that an enormous latitude of exposure *without variation of the developing solution* may exist is proved by experience gained with the new rapid printing paper.

We have performed a series of experiments with this paper, and have got results which we think will be interesting to our readers.

Those who have worked the rapid paper are aware that to get a print of the red colour which is amenable to toning, an exposure enormously greater than would be required to get a print on a rapid gelatine plate requires to be given. We should be inclined to place the ratio of exposures at several hundred to one. If, however, the "rapid paper" be developed with a strong ferrous oxalate developer, but slightly restrained, the sensitiveness does not compare so very badly with that of a gelatino-bromide plate. We have experimented with the particular commercial paper which we have generally heard spoken of as the rapidest of the various samples in the market, and have succeeded with this in getting 12 on the standard sensitometer. This makes the paper to be about five times less rapid than a plate of fair sensitiveness, ten times less rapid than one of great sensitiveness. Even using the very weak and powerfully restrained developers recommended to be used with the paper, we have been able to get 10 on the sensitometer by prolonging the development for about twenty minutes.

Exposing to an ordinary fish-tail burner at a distance of six inches we found that twenty seconds were necessary to give an image which would show all the figures of the sensitometer after long action of the weak developer.

We continued exposing one piece of paper after another under the sensitometer, increasing the length of exposure and developing in each case—with solutions of the same strength—till the last figure of the tablet became visible. We at last reached exposures of twenty minutes, or sixty times the minimum which would show the last figure, and in each case we got an image which could scarcely be distinguished from its neighbour, except for the colour. The length of time taken for development kept *de*creasing nearly in the same proportion as the length of exposures had been *in*creased. Beyond twenty minutes of exposure the nature of the image began to change greatly. It became thin, and showed lack of vigour.

These experiments show an enormous latitude of exposure, and this without varying the developer at all, but merely in virtue of variation of the time of development.

The natural question, after considering these results, is, "Can we have no analogous latitude in the case of gelatino-bromide plates?" To this we incline to reply that we can. We cannot, perhaps, gain so great a latitude, and even to gain a much smaller one requires that we should increase our *minimum* exposures; that we should expose for at least about twice as long as the shortest time that would give us a satisfactory image. If we do this, and use a weak and powerfully restrained developer, it will make no appreciable difference in the quality of the negative which we will get, whether we have exposed twice as long as the shortest admissible time, or eight or ten times as long. We will not require to alter our developer, but merely to leave our plate for a shorter or longer time in the solution, according as the exposure has been longer or shorter. As there are many subjects for which it is not of the smallest consequence whether the exposure be a second or a minute, the method which we have indicated may be useful. We hope shortly to give the results of further experiments.

◆

NOTES FROM NEW YORK.

Testing Dry Plates with a Radiometer—A Standard Developer—Deterioration of Dry Plates, Gelatino-Chloride Plates, and Paper—International Lantern Slide Exchange—The National Convention of Photographers—Compressed Pyro Tablets.

Considerable discussion has been made at some of the meetings of the Amateur Society here in reference to the testing of dry plates, and it has been somewhat gratifying to the committee in charge of the matter to know that their work has been regarded by many dry plate makers as of much importance. A report made at the meeting of Feb. 10th set forth the conclusions they had reached as to the use of the radiometer in connection with an ordinary kerosine lamp, and while the method of using the radiometer is in many respects new, it is not surprising that it should call forth different opinions from scientific men. It has been said that the radiometer is affected probably more by heat than light, and consequently it is in a measure a false guide for measuring the actinic force of light. Whether these conclusions were based on actual experiments is not stated, but it is interesting to know that the experiments made by the dry plate committee seem to disprove them, for after several careful tests it was shown that whether the lamp was turned high or low, the actinic power was the same with the same number of revolutions of the radiometer. By employing a constant uniform developer, the same numbers of the Woodbury tablet were brought out on the sensitive plate. That the light varied in power and heat was also proved; and as the heat increased by the long-continued burning of the lamp, the light seemed to increase in a corresponding ratio, as its flame would reach a higher point, and on development the same numbers on the same plate were brought out. The plan adopted was to place the radiometer six inches away from a kerosine lamp with a flat wick $\frac{5}{16}$ of an inch wide, and to hold the plate exposed behind the Woodbury tablet accompanying the Warnerke sensitometer, eighteen inches away from the light, giving an exposure equivalent to five revolutions of the radiometer. The result obtained by this method was equal to thirty seconds' exposure by Warnerke's phosphorescent tablet. In a later report, issued at the meeting of March 10th, the committee state that they have made over a hundred experiments upon twenty brands of plates, and used the makers' developer and the standard developer; in many cases there was more brought out by the latter developer than with that advised to be used by the manufacturer. It was advised that a small amount of bromide be used in developing the very sensitive plates, otherwise none was needed. The formula adopted by the committee was as follows:—

Yellow Prussiate, Potash, and Soda Developer.

No. 1—Water	... ...	32	ounces
Yellow prussiate of potash (480 grains to ounce)	...	3	,,
Carbonate of potash	...	3	,,
Carb. of soda (granulated)		3	,,
No. 2.—Water	... ...	32	,,
Sulphite of soda (480 grains to ounce)	...	3	,,

The chemicals are dissolved in the order as mentioned above. To develop a 5 by 8 plate with normal exposure, $1\frac{3}{4}$ ounces of No. 1 are taken, into which are put $\frac{1}{4}$ ounce of No. 1 and 4 grains dry pyro. If under-exposed, three to four times as much of No. 1 may be added without harm; if over-exposed, a few drops of No. 1 will be sufficient.

The committee discovered that one manufacturer of plates prescribed a larger amount of chemicals to be dissolved in a given quantity of water than it would take up, and called attention to the unnecessary waste involved.

They carefully tested the cardboard boxes and separating frames in which the sensitive plates were packed, and in every instance found them loaded with hyposulphite of soda. This, they believed, was one serious cause of the rapid deterioration of the plates, and in support of this view they produced a plate, seven-eighths of its surface showing a metallic lustre, which was caused from the hypo in the paper. They suggested packing the plates in needle paper, which, they said, was free from hypo, and varnishing the separating frames after they were cut, and also varnishing the inside of the paper boxes.

It is to be hoped manufacturers will look into this matter, as the rapid deterioration of sensitive plates, in a changeable climate like ours, should, if possible, be prevented.

Mr. John Carbutt, of Philadelphia, has lately introduced the new gelatino-chloride plates and opals, and is about to furnish the new "Rapid Printing Paper" (gelatino-chloride), with which he made a very successful demonstration the other evening before the Amateur Society.

Mr. F. C. Beach also read a paper on the subject, and made a few experiments. The new paper, with some possible improvements likely to be added, is looked upon very favourably.

Mr. Carbutt hopes to avoid the tedious operation of toning, and thus simplify the manipulation. He adopts the use of magnesium as a light for exposing.

An important feature of the meeting of March 10 was the award of the presentation print by the judges, Messrs. Abram Bogardus and Chas. A. Needham. The picture selected was entitled "A Winter Scene on Orange Mountain," by Randall Spaulding, of Mont Clair, N.J., and was much praised for its artistic merits, perfection of detail, natural cloud effects, and the general sombre appearance of the scene. A copy of the print is to be sent to each member of the Society at the close of its first year in April.

Several forms of drop shutters and improved cameras have been shown recently, and one or two successful lantern exhibitions have been given.

That of Mr. C. R. Pancoast on February 10th, illustrating many ancient places in India, was specially interesting and entertaining. The plan proposed by Mr. Beach, for an international exchange of lantern slides and negatives, is meeting with much favour, and when once the details are worked out, is likely to prove quite useful to all amateurs in this country. Mr. Henry Smith, at River Cottage, Hornsey, promises to take an active part in the scheme upon your side of the water. Considerable talk is being made about the proceedings of the annual convention of photographers, to be held next summer at Buffalo. One element hope to secure days for experiments and illustrations, others confine their attention more to the business portion.

In view of the unsatisfactory results obtained at the last convention, it is probable that the occasion this year will be worthy of the attention of all photographers.

The gentlemen in control have the reputation of being active and up to the times. Reports from amateur clubs and societies indicate a growing interest in photography, and probably more will enter into its practice than any previous year. Improvements are continually being made. It is impossible to get a camera or shutter which will not be antiquated in one or two years, owing, we presume, to the necessity of improving which pervades all photographic manufactures. The introduction of the pyro in compressed minute discs or tablets, called "Pellatone," by the Scovill manufactory, is one of the improvements which should be mentioned. They are very convenient where one has no means at hand for measuring, and dissolve readily.

The Amateur Society now employs a stenographer, and has lately begun the publication, for distribution among its members, of its "Proceedings."

The New York Amateur.

New York, March 17th, 1885

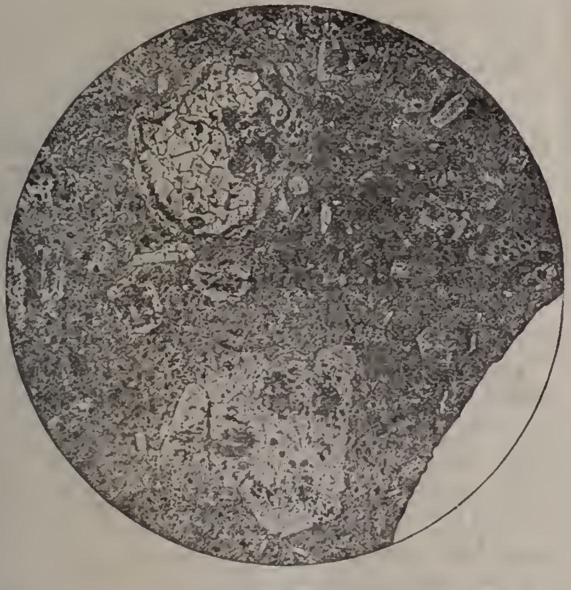
◆

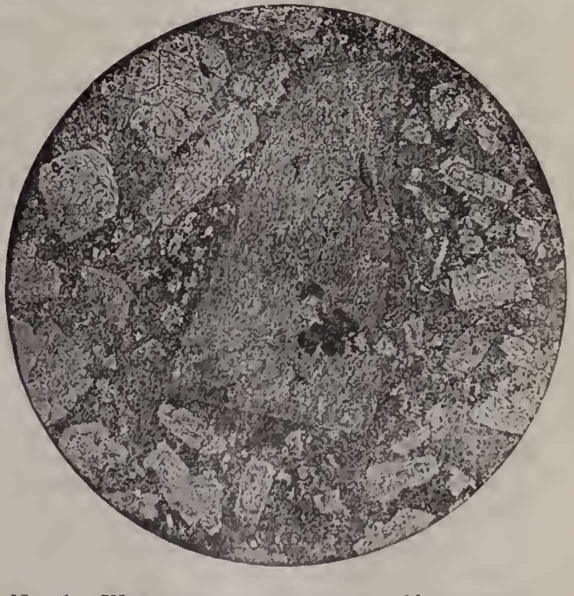
PHOTOGRAPHING ROCK SECTIONS.

BY DR. J. FOULERTON.

The rock sections—porphyry and felstone—are enlarged 12 diameters with the inch objective of the microscope without eye-piece.

The method adopted to obtain sharp definition up to the edge was first to get an image of 7 or 8 inches diameter, and then to place a stop of ¼-inch below the object, thus reducing the image to three inches by stopping out the circumferential rays. It is advisable that the thin cover-glass should be next the stop, as the much thicker glass of the slide allows the light to spread out and causes indistinctness around the circumference of the image.





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NEWTON'S FERROCYANIDE DEVELOPER.

BY I. H. JENNINGS.

In November of last year, Mr. H. J. Newton, of New York, published the formula of a new developer, which differed notably in its composition from any other in general use by the photographic world. It was claimed for it, that it presented advantages in requiring only a minimum exposure of the plate, and gave full detail with plenty of density—in short, was a powerful yet controllable developer, and was a step in advance of most of the developers now in use. The formula is as follows :—

No. 1.—Water	9½ ounces
Carbonate of soda ...	480 grains
Yellow prussiate of potash	480 ,,
Sulphite of soda	160 ,,
No. 2—Water	9 ounces
Chloride of ammonium ...	510 grains
Solution of one drop of H_2SO_4 in one ounce of water	1 drop
Pyro (1 commercial ounce)	437 grains

For a plate 8 by 5, that has received a drop-shutter exposure, take—

	Water	5¼ drachms
	No. 1.	2¾ ,,
Also	Water	7 ,,
	No. 2.	1 drachm

Thinking it looked good, I determined to give it a fair trial, and judging from an experience of it in photo-micrography, for three or four months, I am well satisfied with it. I have not tested it against Beach's potash developer, nor have I yet been able to try it in landscape work, but for photo-micrography it is admirable. The exposure appears shortened by fully one-third, and negatives abounding in detail, strength, and density are easily obtained. The colour of the negatives is not the nice black-and-white given by potash, but is of a strong olive brown, and very non-actinic. Owing to this fact, care must be taken not to push the development too far, or unduly dense negatives will result.

I do not wish to praise this developer as the "best," seeing how many good developers are already before the public, all of which give good results when used with intelligence; but I think the ferrocyanide developer has advantages in cleanliness and freedom from green fog, as compared with ordinary pyro and ammonia, and is more powerful, requiring much less exposure of the plate. During the cold weather of this winter I have found it work exceedingly well, and uniformly bring out brilliant and plucky images.

One word of warning: there are some makes of plates that will not stand this developer without fogging, unless bromide be used. The same may be said of plates that have received an excessive exposure. When I first tried the developer I got fogged images on several negatives in succession, and felt inclined to blame the plates, but for the fact that on one or two from the same box I got negatives of exceptional brilliancy. These, I afterwards discovered, had received the correct exposure, while the others were over-exposed and could not have been saved without the use of bromide. After this I found it best with every plate to start with two drops of a ten-grain per ounce solution of bromide of potassium, increasing the dose to six or eight drops if necessary. Using the bromide I found I could count on every plate turning out a success with a much shorter exposure than I had been accustomed to give—fully one-third less, and in some cases perhaps one half—which is a decided advantage when working with artificial light.

◆

AT CINTRA WITH A CAMERA.

BY H. C. GARLAND.

"Lo! Cintra's glorious Eden intervenes,
In variegated maze of mount and glen."—*Byron*.

A pen-and-ink sketch may not be an inappropriate accompaniment to the photographs of Cintra's principal features, the Pena and Moorish Castles. Starting from Lisbon at eight o'clock in the morning in a carriage whose horses, though merely fed on straw, and very little of this, go like the wind, we arrived at our destination about ten, having had two stoppages on the road, the whole distance being fifteen miles.

On the road, the feature that forced itself on us most palpably was the dust. No such thing is known on this road as a water-cart or a sweeping-machine, all that are possessed in the neighbourhood being occupied in the city of Lisbon during the nights.

The change of air is particularly noticeable as you near Cintra; it is purer and considerably colder—in fact, it is as cold, if not colder, than any part in the north of Portugal. After our two hours' drive on such a road as I have described, it may easily be imagined that white clothes, black faces, dry throats, and ravenous hunger, were circumstances requiring urgent attention, which, in fact, they received at one of the most English hotels I have met with in my continental experiences. It is needless to say that being true Englishmen, and true Collares wine being obtainable at a fabulously low price, we paid special attention to the dry throats.

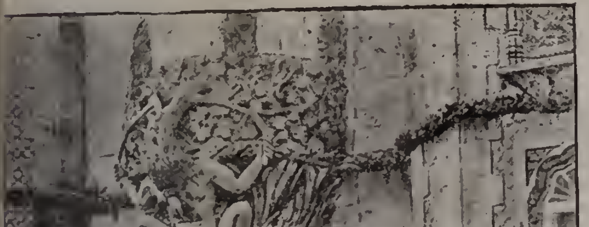
To find this world-renowned spot in the zenith of its beauty, it should be visited in the spring. Then the foliage, standing out bright and clear against the deep blue sky, here and there the gray stones of ancient castles and cottages peeping soberly, while the more modern white *palacete* stands out with its startling red tiles, the whole surmounted by the Pena and Moorish castles, a thousand shades of wonderfully contrasting colour co-operate to make a harmonious whole—a picture only imaginable when it is present to the eyes. I say this advisedly, for each time I visit it I am equally struck by this, the most enchanting resort, apart from the attractions society offers, it has ever been my fortune to visit.

A GATEWAY AT THE PENA PALACE.

"The Pena Palace," was built by the king D. Manoel on the rock which he so often ascended to see if he could descry the returning fleet of Vasco da Gama, and from which, in fact, he was the first to discover it. When the monastery was secularized and sold, it became the property of a private gentleman, from whom it was purchased in a ruinous state by his Majesty D. Fernando, who has changed it into a fairy-like palace. The cloisters and chapel exist nearly in the same state as in the time of the monks, so that the building may be said to be a combination of palace, castle, and convent.

We hire donkeys (a special feature of a trip to Cintra) to lift us to the Pena Castle on the top of the hill. Several times during the ascent they reverently bend the knee in adoration of the scene before them, and necessarily their riders follow suit a little in advance, though on one occasion, at a specially steep point, my companion, Mr. Harold Goodacre, who at the time had charge of the camera, slid gracefully off what the natives innocently believe to be a saddle, and sat ungracefully on about the most stony and uncomfortable bit of road we had hitherto traversed. The camera and other photographic paraphernalia accompanied him, and I, being considerably more agitated by a possibility of their being prematurely mixed and my plates exposed, than by any consideration for him, made use of some horrible English, which, strange to say, seemed familiar to our guide. I exposed three plates on the Pena Castle; one on the grotesquely-carved arch designed by His Majesty Don Fernando, and beautifully executed by the Cintra stone masons, and then made our way to the Moorish Castle, renowned for its ruins and view, where I exposed several plates.

THE PENA PALACE OR CASTLE, CINTRA.



CARVED ARCH AT THE CINTRA PALACE.

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THE CRUISE OF THE *CEYLON*, 1885.

A Voyage to the Spanish Main with a Camera.

BY NORMAN MAY.

On the morning of February 6th we were well out at sea, gliding along with a fair though light wind; and for nine days we saw not a single ship to relieve the monotony of our life. We were now getting into the regions of the North-East "trades," here a warm wind, very different to the icy North-Easter that blows in winter over our own island. As we neared the tropic of Cancer the heat increased, and our sea-water baths in the morning became unpleasantly warm, the reverse of bracing. The sunsets were remarkably brilliant, with an afterglow that gave us a twilight quite unusual in these latitudes. The sun as it neared the horizon sank down almost perpendicularly into the sea, a large glowing orange mass, often streaked with dark stretches of cloud, which, by comparison, made the orb more bright and fiery golden. On our bows the tops of the white clouds would be tipped with the sun's last rays, and astern the clear sky alternated between liquid blue and a delicate green. A truly tropical sunset is very beautiful.

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* Continued from page 196.

Flying fish were now getting abundant, and the fragile nautilus hoisting its tiny pink sail a thousand miles from land, was for a morning or two a source of interest. All signs of life were welcome, and a great sensation was created on board at the advent of a little stranger in the shape of a common yellow butterfly, which was carefully captured and as tenderly released. We saw a few whales, blackfish, and a thresher, two frigate birds, and, as we neared land, a pair of bo'sun birds.

On Sunday morning we have service on deck, and very impressive is service at sea. The capstan, covered with a cushion and the Union Jack, does duty as a reading desk, and a piano and cornet are used to accompany the hymns and chants. Nearly the whole of the passengers, and as many of the sailors as can be spared, attend; and though we have clergymen on board the *Ceylon*, the captain, in accordance with the usual custom, reads the prayers, lessons, &c. No sermon is attempted, so the service is short, a quality not so well appreciated on sea as on shore. We have lotteries or sweepstakes every day but Sunday, as to the amount of the ship's daily run in knots; and on two or three days we have held regular "sports" for the sailors, such as climbing the greasy poles, steeplechases, obstacle races, tournament, cockfighting, and other amusements common at sea.

On the 16th of February, leaving Dominica on our starboard bow, we passed close to the beautiful island of Martinique, clothed with foliage to the summit of its highest hill, and here we had our first sight of the tall straight palms standing in relief against the sky. This, our first glimpse of the West Indies, charmed us greatly, and many were the regrets that time would not permit our calling at Fort Royal or *Fort de France*, its capital town and port, snugly ensconsed in a well-sheltered bay. Steaming past Fort de France, and just before we reached the southern extremity of the mainland of Martinique, we passed the celebrated Diamond Rock, an isolated pyramid six hundred feet high, which in 1801 actually took rank and was entered in the Admiralty books as "H.M. Sloop of War Diamond Rock." Lord Howe, finding that the French vessels escaped into Port Royal by running between the rock and the mainland, seized it, and planted a battery of guns on its summit; for one year the rock was held by a handful of men under Lieut. James W. Maurice, but in June, 1805, sixteen French ships of war and gun boats attacked the strange fortress, whose garrison, after destroying three gun-boats, were obliged to capitulate (*Silver*).

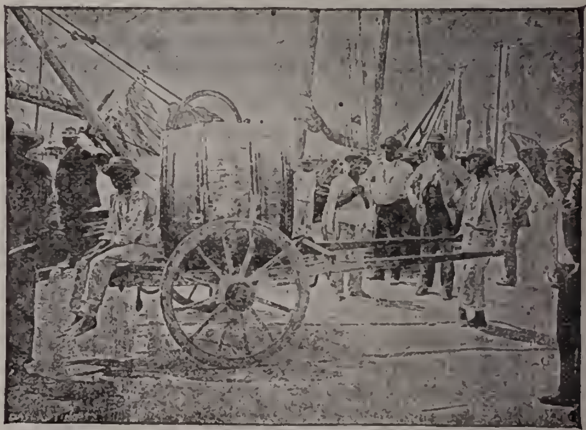
I succeeded in getting a cabinet negative of the Diamond Rock from the bridge of the yacht as we steamed past. Leaving the island of St. Lucia, celebrated for the quality of its sugar, behind us, we steered straight for Bridgetown, at present the seat of the Government of the Windward Islands.

From my post at seven o'clock, on the morning of Tuesday, February 17th, I saw Bridgetown (the port town of Barbadoes) lying about half-a-mile from the spot we had chosen as anchorage. Low, flat, and unprepossessing as it looked from the sea, it is really an interesting and comparatively thriving West Indian town. It seemed especially interesting to us who had just passed eleven monotonous days on a smooth sea, unbroken even by a gale, and under a torrid and almost cloudless sky.

Barbadoes is considered to be peculiarly healthy, though warm, the heat being tempered by the N. E. trade wind, which blows constantly over the island. The uniformity of temperature, so marked in Barbadoes, is one of the chief causes of its salubrity, and the reason of its being used as a sanatorium for the neighbouring islands. Tubercular consumption is almost unknown. A resident told me the death rate of the island was only 13 per 1,000, a marvellously low and hardly conceivable figure for a hot climate. The dryness of the air, and absence of those sudden changes of temperature so productive of all diseases, have much to do with the longevity of its inhabitants. Barbadoes, however, labours under the disadvantage of being visited occasionally by awful hurricanes, by which thousands of people have perished. Earthquakes, too, are not uncommon.

Going on deck after an early breakfast, I was much amused at the boatloads of jabbering negroes and negresses, all vaunting the superiority of their wares, or endeavouring to pass on board testimonials as to their capabilities as washerwomen. Clad in the cleanest of white starchen garments, one full-blooded old negro woman's ebony face was a perfect picture. Perfectly good-humoured was this crowd, chattering, grinning, and showing their white, regular, strong teeth.

After an early breakfast we went ashore in the ship's boats, and landed on a wharf literally swarming with negroes, a large proportion of whom seemed to have no particularly pressing business on hand, and were waiting for something to turn up. Some vessels were being laden with sugar, brought down in barrels to the wharf in long trucks, pushed swiftly along by three shouting negroes.



A schooner was discharging its gaudily-dressed negro-passengers from another island, and altogether the narrow wharf was a scene of noisy, amusing, picturesque confusion. I went straight to the hotel recommended to us as the best in the place, and treated myself to a delicious so-called "lemon squash," made with fresh limes, far more refreshing than the drinks that go by the name of lemon squash in England. A lemon squash is made in the West Indies by taking a bottle of soda water, a little sugar, the juice of fresh green limes, of which two or three slices are also thrown in, and a few lumps of ice; the whole being then swizzled into a froth by a peculiar shaped stick, or shaken up by mixing in two tin tumblers, one inverted over the other, the upper one a little smaller than the lower. The hotel seemed quite cool after the heated cabins of our ship, and the meals were enjoyable, much inferior as the accommodation was to any good English hotel.

The houses in Barbadoes are low, chiefly of one storey, the roof being usually covered with shingles of red wood; some were, however, roofed with corrugated iron, the glaring patches of which did much to destroy the quaint picturesqueness of the streets. The roads in Barbadoes are very white and trying to one's eyesight. Formed of white coral, they are dusty and dazzling, rendering the use of blue spectacles almost a necessity. Living is cheap in the island, house rent being the chief item of expense; owing to the dense population labour is cheap, and domestic servants (black) plentiful. The vegetation of the island is brilliant and luxuriant, frangipanni and other flowers of beautiful smell and varied and lovely hue, being intermingled wth tropical trees; spreading figs, with their curious hanging air roots; the slender cocoa-nut palm, with its cluster of nuts; tamarinds, cordelias, and crotons growing in the gardens of the houses at Bridgetown.

A stranger will be struck by the teeming population and the immense number of negroes he will meet in the roads, especially women, the men being away at work in the day time. The lately-started tram cars are crowded with passengers, the fares being low, and the venture should pay a handsome dividend to its shareholders. There is a railway running to a point some twenty-five miles from Bridgetown, but the population is poor, and as the sugar industry is now in a very bad state, as a financial scheme it is not a success; a dividend of 4 per cent. is, however, guaranteed by the island government to the shareholders. The permanent way has been very roughly laid, and the line is far from level, therefore rapidity of travelling is out of the question. For a considerable distance the line runs along the sea coast, and the views occasionally are very fine. Somewhat stony, bleak, and barren in parts on the land side, looking along the coast line, even on a calm day, the scene is very fine. The long, white rolling waves rushing shoreward, beat with resistless force against and over the huge, rugged, detached masses of coral rock with which the shore is strewn, splashing, dashing, and spouting the foam and spray in thick showers high in the air, and sending the mist far inland.

During our stay in Barbados, we chartered a special train to take us the length of the railway. Starting at ten in the morning, we seemed a long time getting clear of Bridgetown, the line running, after the fashion of railways in America, over the streets and roads, entirely unprotected by gates, hedges, or fences. We passed in near proximity to negroes' houses, the inmates crowding the fences and lining the roads, staring enquiringly at a train full of "white folks."

We passed through fields of waving sugar cane, with their black labourers; clumps of cocoa-nut palms, and untenanted sugar mills; wind-mills after the pattern of those so familiar to us in Kent and Sussex; and at about half-past eleven halted for lunch in a little bay, which reminded one somewhat of North Devon in its general outline. The rough coral rocks here had been detached in large blocks by an earthquake, and hurled down to the sea; their bases had been washed away by the action of the sea, a comparatively fine pivot of rock, in some cases, only remaining, after the manner of the Logan rocks or stones of Cornwall. Groups of these rocks were piled in a manner greatly resembling Stonehenge. We selected a spot with overhanging trees for our luncheon, and the table-cloths were laid on the sand, pieces of coral rock being used to keep them down. We found it somewhat dangerous to stand under the cocoa-nut palms, the heavy fruit being very likely to fall unexpectedly on one's head. Our iced lemonade and claret was very enjoyable in the tropical heat, and full justice was done to the cold meats, &c., provided. Here we gathered specimens of coral, delicate sea weeds, and a curious kind of brown pod, containing purple coloured seeds, about the size of large marbles, called "horse nickers."

After a stay of about an hour and a-half, we rode on to the terminus of the railway, a barren and uninteresting place, at which we stayed only long enough to turn and water the engines. On our return journey we stopped to inspect a sugar mill in full work, and saw the whole process of sugar-making, from crushing the freshly-cut cane between huge iron or steel rollers, boiling and clarifying the liquid, &c., till we were able to taste the crystals of pure sugar. The machinery alone of this mill, made by a Scotch firm, cost £8,000. We were offered the best moist sugar at these works for 2d. a pound. On returning to our train, we found one of our passengers had joined some of the negro plantation hands, and, to the music of our band, was dancing blithely, as much to the amusement of the assembled negros as our own. *Vis-a-vis* with a strapping negress, the sight was very curious, and met with much laughter and applause.

Pursuing our way to Bridgetown, we passed through many sugar plantations, the sharp-edged leaves of the cane sweeping near, and sometimes entering, the carriage windows, making it dangerous to look out. For some distance along the line a hedge of cactus has been planted, which, mingling with cabbage palms and breadfruit trees, will one day make a beautiful hedge, as well as grateful shade from the burning sun.

We arrived at Bridgetown just before dark, and after dinner several of us went to the Club, a cool, though, as it seemed to us, a somewhat ill-found and bare place. The streets of Bridgetown at night were pitchy dark, the gas being out of order. The next morning I was up betimes, and with a resident, to whom I fortunately had a note of introduction, drove through the English barracks to the beach at Hastings, an admirable bathing place, protected by reefs from those predatory sharks so common in these waters. One meets with so many subjects for the camera, that it is somewhat confusing, especially as our sight-seeing and photographing has to be done at almost express speed. However, in the course of the morning I was able to take a view of the Government buildings, a funny little darkey boy with some sugar cane on his shoulder, a group of men on the quay with a sugar truck, and a peddler woman with a tray full of fowls on her head. (This last one, unfortunately, was honeycombed by the ants in my bedroom at Trinidad, who seemed to take a fancy to the gelatine film, as it was placed to dry.) There were many picturesque peddler women with sweetmeats or oranges on their heads: others retailed long sticks of sugar cane, of which the negroes are so fond, at a halfpenny or a penny a stick; some had bananas, or pea-nuts.

There are no first-class photographers; possibly a good man would make a fair living, though, for the matter of that, a good man can do very well anywhere, without ostracising himself, or submitting to be parboiled. The goods sold in all the shops or stores, which close at five in the afternoon, are all of English, German, or American production; the only native things in the way of curiosities we were able to purchase being shells, sea porcupines, flying and other curious fish, edible frogs, and carved cocoa-nut shells.

Leaving Barbadoes at 8 p.m. on Wednesday, Feb. 18th, we were soon *en route* for the Island of Trinidad and the Spanish main.

Notes.

The camera as a surveying instrument! Comparatively little has been done as yet in the direction of accurate measurements with the aid of the camera, but much remains to be done; and the fact that the German government has just set aside a sum of 10,000 marks to be used in making photo-grammetrical investigations, augurs well.

It is to be hoped that the *tableaux* to be presented at the Fancy Dress Ball at the Institute of Painters in Water Colours, on the 19th of May next, will be photographed. They will be illustrative of art in Greece, Italy, France, Spain, Germany, Holland, and England, and will in the matter of costume and historical detail be the most complete arrangements of the kind ever attempted. The best authorities of the day have the superintendence of the dresses and grouping, and it would be a pity if a record were not preserved. Simply for reference the photograph would be invaluable to art students.

A word or two as to H. A. H. Daniel's charming picture of Woodside, Lynmouth, which was issued with the News of last week. Mr. Daniel says:—"I took 'Woodside, Lynmouth' on a bright day with pretty effect of early spring light, and in the morning. The plate was a slow one of my own make, with iodide; so slow as to be only three times the speed of a wet plate. Development with pyro and ammonia. I back all my plates because I believe greatly in doing so, as one is fully repaid for the extra trouble; had the plates in question not been backed I must have got halation, where, as it is, there is not a trace."

A story contained in the last number of the *Photographic Times* looks more theatrical than real. Two foot-pads followed Mrs. Curtis into a studio in Chicago, and when the lady was being posed, one of them rushed at her, seized her satchel, and escaped; but he had been photographed in action, and was promptly arrested.

Experiments by Mr. Brereton Baker show that the combustion of carbon or of phosphorous takes place with great difficulty in absolutely dry oxygen. Indeed, charcoal may be heated to redness in dry oxygen, without burning. It has long been known that absolutely dry chlorine neither bleaches nor acts upon brass or copper.

Whom can I get to build my studio? This is a question we have often been asked, but we have been obliged to say that we knew of no one who made a special feature of contracting for work of this class. Messrs. Houghton and Son, 89, High Holborn, tell us that they are now prepared to contract for erecting studios in any part of the country.

The advantages which actresses derive from advertising by photographs are greater than one would imagine—always supposing the actress has personal attractions. Here is a case in point. The scene is in the Strand; the place, a photographic print-seller's shop. A group of young men are gazing admiringly at the portraits of —— the latest theatrical star. "By Jove! I must go and see her," observed one. "What piece is she playing in?" asked a second. "Oh, what does that matter?" exclaimed a third; "she's awfully pretty; that's enough to make any piece go. Never saw a more fetching photograph." There may not be much in the incident, but it is sufficient to show that a new actress who wishes to succeed, must begin by calling in the aid of the photographer.

About £14,000 per annum is paid to the present staff of examiners of patents—that is to say, nearly £1 per patent. Under these circumstances one might reasonably expect to have the specifications examined properly, and some stop put to the present system of allowing old inventions to be re-patented time after time.

Mr. John Greaves, the Secretary of the Oldham Photographic Society, is endeavouring to obtain special terms from the railway companies for the members of his own and other photographic societies. It seems that the members of the United Anglers Society can travel by some of the principal lines at a reduction of about 33½ per cent. on the usual rates, besides enjoying special privileges as regards return tickets. As a matter of abstract justice it is perhaps difficult to see why one class of pleasure takers should have any advantage over any other class; but those persons who desire to assist in the movement had better address Mr. Greaves, at the Lyceum, Oldham.

The value of a negative may cause endless disputes, and few values are so ill-defined or variable. Still it is interesting to note that a large firm of photographic publishers has just entered into an arrangement with a practical landscapist to supply a series of 12 by 10 negatives of English scenery at half a guinea each; the purchasers to have the option of refusing any they may not consider up to the standard.

Last week we referred to the dark room accommodation enjoyed by the various photographic societies in London, but not one of the London Associations is so well off in this respect as the Society of Amateur Photographers in New York, as each active member of this latter Society is entitled to use the dark room at any time. Here is the rule:—Each active member is entitled to the free use of the Society's dark room and library at any time, access to the rooms being had by a key in the elevator, which key will be given to the member on showing his membership ticket to the elevator boy.

A curious light is thrown on that very indefinite being, the photographic canvasser, by some proceedings which took place last week in the Marylebone Police Court. One of the fraternity was charged with assaulting an operator. According to the evidence of the latter, the canvasser entered the studio, where "he had no right to be," and on being warned that he must behave himself, struck the operator a blow in the jaw; whereupon a scrimmage took place, in the course of which the canvasser added to the blow a scratch on the face. The defence was that the canvasser asked the operator to give him his canvassing frame out of the studio, and as the operator would not, he went for it himself, and in return the operator "went" for him. The magistrate did not take a very serious view of the matter, probably considering the statement that "both parties had been drinking together," a full explanation, and bound the canvasser over to be of good behaviour. It is to be hoped that only the operator suffered in the affray, for a more unsuitable place for a pugilistic encounter than a photographic studio we cannot imagine. Canvassers must evidently be very dangerous individuals, or it would not be held that a studio is a place where they "have no right to be."

According to the *Lady's Pictorial*, an artist mounted on a scaffolding has been sketching what remains of the countenance and figure of good Queen Anne, whose statue in front of St. Paul's has for so long been an object of derision. If it is necessary to produce a duplicate of the present not very noble object, why is it not photographed?

Nothing in the whole range of annoyances to which the photographer is subject is worse than the cracking of a valuable negative in the printing-frame. It is a fatality difficult to guard against, and impossible to foresee. Unequal pressure, unequal expansion, an inequality of surface, will each effect the purpose; but the cause primarily is the brittle and unyielding nature of glass. We are not aware whether De la Bastie's toughened glass has ever been used for photographic purposes; probably, were it not for the awkward fact that the merest scratch sometimes sends it flying into a thousand splinters, it would prove superior to the ordinary article.

Mr. F. Siemens, of Dresden, has, however, been making experiments, which have resulted in a glass quite as tough as De la Bastie's, without the drawback referred to. Mr. Siemens heats his glass in a radiation furnace, and cools it between metal plates in a press, by which means it is enormously increased in strength, and, if desired, can be made so hard that a diamond will not make an impression on its surface. This hard surface presents another advantage for photography, as the chances of a chemical combination being set up with the salts of silver in the film are reduced to a minimum. In the days when plates were used over and over again, troubles from this source were innumerable.

Patent Intelligence.

Applications for Letters Patent.

3755. Harold Dennis Taylor, 6, Grosvenor Terrace, Bootham, Yorkshire, for "The improvement of photometers for estimating photographic exposures by the employment of standard parliamentary candles, &c."—24th March, 1885.

3766. Alfred Horace Dawes, 8, Quality Court, London, for Improved apparatus for transporting and exposing sensitised films or plates."—24th March, 1885.

3773. Alexander Melville Clarke, 53, Chancery Lane, London, W.C., for "Improvements in photographic paper and in sensitive emulsions therefor."—*E. & H. T. Anthony and Co.*, United States.— (Complete Specification.)—24th March, 1885.

3996. Alexander Cowan, 36, Porchester Terrace, Bayswater, London, for "An improved automatic camera and changing-box combined."—30th March, 1885.

Patents Sealed.

3865. Thomas James, 37, Renshaw Street, Liverpool, county of Lancashire, Sewing Machine Agent, for "Improvements in the process of obtaining typographical impressions from photo-relief surfaces."—Dated 25th February, 1884.

Specifications Published during the Week.

424. Alexander Lamont Henderson, of 49, King William Street, in the City of London, Photographer, "Improved method of and apparatus for coating glass or other plates, paper, cardboard, or other material, with liquefied gelatine or other fluids particularly applicable for coating plates for use in photography."—Dated 12th January, 1885.

A band and reservoir apparatus, having some resemblance to the apparatus figured on page 199, but the point specially claimed is a stop-cock arrangement for regulating the flow automatically as each plate comes under the duct.

7606. Duncan Campbell Dallas, of 12, Crane Court, Fleet Street, in the City of London, Engraver and Printer, for "Improvements in obtaining printing and other surfaces"—Dated 6th February, 1885.

My improvements have for their object the production of drawings or designs upon metal and other suitable surfaces by means of a heated pen of the character described in the specification of Letters Patent granted to John Henry Johnson, dated 9th May, 1881, No. 2016; and in the specification of a Patent now being applied for by William Henry Dalton, dated 26th February, 1884, No. 3985, both inventions being communications from Samuel Henry Crocker, late of Railton, Tasmania, but now of Melbourne, Victoria, Australia, Mechanical Engineer.

When the drawing is complete, the surface is rendered conducting by any of the well-known means which will not injure the drawing—viz., by coating with plumbago, copper, or other suitable metallic bronze powders or solutions. After a sufficiently thick deposit of metal has been made upon the drawing, the surfaces are separated, and after being properly prepared for the purpose, it can be printed from after the manner of copper-plate printing, or used for any purpose to which intaglio designs can be applied, such as for rollers for calico printing, dies, and surfaces for embossing, plates for pottery decoration, goldsmiths' work, furniture plaques, and other artistic work.

In place of depositing metal upon the original drawing made by means of the hot pen, casts may be taken therefrom in plaster of Paris or other suitable material, which can be employed either for stereotyping, printing, or for decorative or other artistic purposes either in intaglio or relief.

8566. George Wilson Morgan, Photographer, 5, Crimon

Place, Aberdeen, Scotland, for "Mechanically shifting photographic backgrounds."—Dated 4th June, 1885. *Provisional specification.*

Any number of painted scenes from two to twelve or more are tacked on to rollers and suspended in a rotating case moving on journals at the top of a frame similar in size to an ordinary photographic scene frame. Any scene required by the operator can at once be brought into position by causing the case to revolve until the scene required comes to the front, when it is by simple mechanical arrangement lowered to the studio floor, and by the same arrangement again drawn up into case, and if desired, another scene brought to the front and lowered in its place, and so on, thus effecting as many changes of scenery as there are contained scenes in the rotating case.

Patent Granted in America.

313,899. Aaron K. Tuttle, St. Lawrence, N. Y. "Reflecting stereoscope."—Filed March 26, 1884. (No model.)

A form of stereoscope in which the pictures are placed one over the other, as in the instrument of Grubb.

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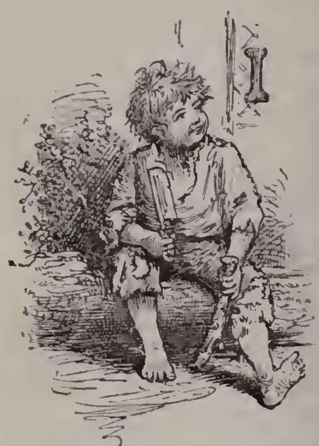
ARTISTIC FEELING IN PHOTOGRAPHS.

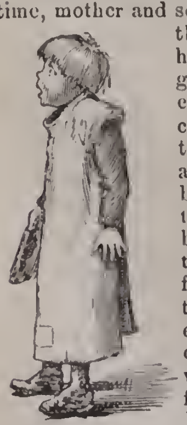
BY A. H. WALL.

Part II.



In the memoirs of William Collins, R.A., father of our famous novelist—who, by-the-bye, was named Wilkie after his godfather, the great Scotch painter — the following story appears.

Having observed a barefooted boy in picturesque rags and disorder beside a cottage door, Collins concluded that here was a capital subject, suggestive and full of character. So, having jotted down his notes, and made a sketch or so, in his usual fashion, he entered into some arrangements with the little fellow's highly-gratified, much-curtseying mater, to bring the boy to his studio in the morning.



Imagine the painter's dismay when, at the appointed time, mother and son were ushered into his painting room, the latter's carelessly-tossed and tumbled hair flattened and plastered down with grease, and his Murillo-like rags exchanged for a clean pinafore, which covered him in a dismal, foldless monotony of speckless white from chin to ankles. His feet, previously bare, had been put into shoes nicely blacked, with the laces neatly tied. His rich red and brown flesh was shiny with soap, and his thick woollen stockings were without a fold. The artist would have explained that what he wanted was not this elaborate holiday toilet, not the boy's clothes, but the natural boy himself, with all the gleeful happiness of perfect freedom and independence, unrestrained by a single thought of what he was wearing, or how he looked.

"Bring him to me again exactly as he was when I saw him first," said Collins.

But no, not she, indeed! The good woman would do nothing of the kind; and I fancy I see her as, stiffly erect, she marched away with her gaping offspring, her face flushed in anger, and her bosom heaving with righteous indignation. If her son was not to be painted with a clean face and his Sunday clothes, he should not be painted at all.

Collins let her go. To paint the model in accordance with the mother's wish, instead of telling a story, *expressing feeling*, and illustrating character, would have been to produce that kind of human "front elevation" which is too often seen in portraits, both painted and photographed; something which would have had about as close a relationship to the real boy, his story and actual character, as the front of a house has to the thoughts and emotions of those residing therein.

The blunder of this ignorant unsympathising peasant was very excusable. She only displayed that which is shown by more than one half the people who come to photographers for portraits; thinking of their clothes rather than themselves, and being as careful to repress every touch of sentiment, feeling, and character when before the camera, as if uniformity of expression, or rather want of expression, was the only one thing desirable in portraiture.

A camera and a dry plate would have enabled Collins, without the boy's knowledge or the mother's consent, to secure largely, not, of course, perfectly, all he wanted, all the actual facts exclusive of colour.

To illustrate the moral I have here in view, I enclose for the editor to use, if he sees fit, a pair of slight, hurriedly-made sketches, showing the rustic cottager as he might have been, and as he probably appeared when introduced by his proudly exultant parent to the artist's studio.

Artists, as a rule, it should be remembered, use their models for the mere facts of form and colour; simply as the means whereby they realize scenes of actual life which have impressed their imagination most strongly, or scenes which their imaginative powers, coupled with observation and memory, have previously created.

They give to airy nothings, as Shakespeare says, "a local habitation and a name." But they aim to get as close as they can to nature always. The photographer, on the other hand, depends entirely upon nature; he must see his pictures before he depicts them. He cannot work them up by slow degrees, adding idea to idea, and improvement to improvement, as he goes along. It is now or never with him. There is, therefore, all the greater reason for his cultivating the power of artistic perception, and having a quick sympathetic feeling for the poetical, picturesque, and beautiful. It is very rare indeed to see a picture produced photographically from posed models which does not betray its artificial origin, in which the models do not proclaim their profession as mere actors; and however clever they may be as actors, in no case do I believe that such a picture can bear comparison with one taken rapidly from actual nature, in which the actors were not conscious, but unconscious models. The only instance I can remember to the contrary was one given by my dear old friend, the late O. G. Rejlander, in a photograph called "Did she?" and how that was obtained is a story which only enforces the objection I am urging.

The photograph—which is well-known, having been published—represented one man with a face wonderfully expressive of sly mischief, whispering in the ear of another, whose exclamation, "Did she?" gives its title to the picture. Looking at it, you thoroughly realized the artist's feeling and his story. There was no mistaking either, and one might well ask, how could it be more real if, instead of mere actors, the parties photographed were unconscious of the camera's presence? As a matter of fact, the incident was actual, and first suggested the picture. But it was not depicted to the artist's satisfaction until he obtained for his models the very pair by whom it was first suggested, nor then until the slanderous story which had first called up the one man's expression was re-whispered in his ear by the other. Rejlander—who was, it should be remembered, both artist and photographer—carried away a vivid remembrance of the actual scene as he first witnessed it, and declared that it was reproduced in the acted scene with wonderful similarity. Thus the feeling by which the artist was originally impressed, and which the models had previously actually and naturally felt and expressed, was perpetuated to affect the feelings of many hundreds who have since chuckled and laughed over it by sheer force of sympathy. The triumph thus won was, I remember, not an easy one, nor accomplished until several attempts had proved failures, especially those made with other than the original actors.

It is often said that the only way in which an actor on the stage can make his audience feel and sympathise with the imaginary person he represents is by himself feeling and sympathising with that unreal, but apparently real personage. The principle of effective representation on the stage and in a picture is the same: both spring from a reality, not a sham. The actor who does not feel the passion he expresses, fails to touch the feelings of the spectator. The picture that represents sham instead of real feeling, pretended instead of real action, will never impress the spectator with a sense of its reality, and will consequently not awaken either thought or emotion.

Some years ago Mr. Millais—he was then but an Associate of the Royal Academy—exhibited a picture which he called "A Dream of the Past." It represented an old knight in the dim glow of summer twilight, fording a river on his weary war-worn steed. The grim old warrior, who appeared to be returning from battle, was represented carrying a couple of rustic children with him, and the touching feature of the incident was not so much in the strong contrasts of the conception, as in the kindly, almost tender, care with which the ancient knight's iron hand preserved a little peasant girl, clinging to the mane of his lofty charger, from falling into the water. Looking at it, I was struck with a something that conveyed an idea of artificiality or want of feeling in the treatment which prevented its affecting my feelings to the extent I fancied it should do.

Some little time after, Mr. Ruskin, describing this work, pointed out that in many respects it was untrue. "If," said he, "Mr. Millais meant it to be old armour, rough with wear, it ought to have been deadened and darkened in colour, hacked with the edges of weapons, stained with the stains of death. If he meant it merely to be dusty, the dust should have lain white on some of the ridges, have been clearly absent from others, and should have been dark where it was wetted by the splashing of the horse. The ripple of the water against the horse itself, however, being unrepresented, it is little wonder that the dash of the chance spray was omitted."

It is astonishing how easily we are offended by a want of truthfulness in even the finest works of the best painters. Reading Ruskin's closely-investigative criticisms, I said to myself, "It was something in the picture, then, that was wanting, and not, as I feared, something in my own perceptive powers or feelings, that made me dissatisfied with Millais' painting." If the great artist's feelings had gone forth to his subject, as the great art-critic's did, he would not, I think, have failed to realize it in all its features. In other words, it was because he had not imagined it truthfully that the artist did not represent it truthfully. And imagination is weak or powerful in proportion with the depth or strength of feeling associated with it. This is the lesson I am here anxious to enforce upon the young photographic art-student.

Let us take another illustration of what feeling means in a work of art.

In a recently published work, we are told how the daughter of the great novelist, Charles Dickens, when little and ill, was privileged to be in her papa's study while he was at work. She saw him every now and then rise from his desk to act before a glass that which he was describing in words, exciting his own feelings with imaginary actions before he attempted to describe those actions, which afterwards so powerfully affected the feelings of his readers. And he has himself somewhere told us that the characters he depicted were as real to him, while he was writing of them, as if he had known them in life, and was actually describing only that which he had actually seen—that their emotions were so much his own that tears fell as he depicted the deaths of little Nell and little Dombey, and he laughed as long and heartily over the humorous passages as if they were really and truly enacted in his presence.

And so it is in every phase of art, the earnestness of the orator, springing from the depth and sincerity of his feelings, moves his hearers to enthusiastic warmth, just as the actor's does, just as the novelist's work, produced under similar conditions, does, and just as the artist's work will, if as feelingly rendered. So let the photographer, who is emulative of their power, and who is dealing with objects that are poetical, picturesque, or beautiful, realize to himself the sentiments and emotions naturally belonging to such subjects, before he attempts their delineation by light, lens, and chemicals, in the firm assurance that work so produced cannot fail to be higher and better work than that which is conducted mechanically and without FEELING.

HINTS FOR PHOTO-LITHOGRAPHERS.

BY PROFESSOR G. SCAMONI.

Retouching Linear Photo-Litho Transfers.—It very often happens that pen-and-ink drawings which are intended for photo-lithographic reproductions are so unsuited for the purpose, that it is next to an impossibility to obtain a negative with the details well out and clear hair lines; in fact, it is only by judicious retouching upon the stone that anything like satisfactory prints are obtainable.

In order to do this, proceed as follows:—The gummed-up image on the stone, after having been, as usual, rubbed over with re-transfer ink, etched with weak acid, and rolled in with litho ink of a middling consistence, is powdered over with French chalk, to prevent the fresh colour from smearing, and then brushed over with a thin etching ground, composed of jeweller's rouge (*caput mortuum*) and weak gum-water. This transparent ground materially assists the work of going over the delicate lines and faintly visible details of the photo-lithographed picture with the engraver's needle.

Particular care must be taken that the point of the needle penetrates but slightly, and to an even depth, into the surface of the stone. As a gauge, the depth produced by the scratch of a writing diamond, or diamond splinter, under slight pressure of the finger, may be taken as a guide. Points made of broken-off diamond splinters, and known as toothed ones, are especially useful for broad lines, but for filling in larger shaded portions, roulette tools[*] of different forms may be used.

When the engraving is finished, dab the parts with a little palm oil, and after the lapse of a few minutes, to allow the fat to penetrate, rub up the whole picture with re-transfer ink, until the newly-made lines appear as black as those of the transfer itself. Now gum-in the stone, and when dry, or a few hours later, roll in with re-transfer ink; afterwards re-gum, and proceed to clear out any thickened or smeared portions of the design, and finally etch with gum, acidified with dilute phosphoric acid. Clearing out is best done with a broad etching needle, ground flat, and sharp pointed skewers of wood, dipped into diluted phosphoric acid mordant. If any portions of the design should appear weak or rotten after the second rubbing up, it is advisable to go over them with litho writing ink before the final etching is proceeded with. In this manner one is able to execute a perfectly satisfactory reproduction from a really defective original, without the least detriment to the artistic character of the drawing.

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[*] A. F. Renard, of Paris, Rue de Gravilliers 24, makes the best tools. A very instructive proof-sheet, showing a variety of roulette and berceau tints, can also be obtained there.

Zinc Plates Coated with Carbonate of Lime.—I may embrace this opportunity of bringing to notice the calcareous-surfaced plates lately introduced by O. Muller, of Leipsig; these, being a good substitute for the expensive Solenhofer stones, deserve especial merit on account of their adaptability for cheap transportation, besides other excellent qualities. The calcareous coating, which is upon thin sheet zinc, and hardly a millimetre in thickness, is as even as the ground surface of a lithographic stone, and can be employed for engraving purposes as well as for transfers and direct drawing with the pen.

The manufacturer supplies beds of wood, or iron, in any desired size, upon which the plates are fastened by means of stretchers, for printing upon in the steam press. The following etching fluids are recommended for use with the plates:—For direct writing and transfers, add four parts of phosphoric acid to a solution of 25 parts of picked gum-arabic in 100 parts of water. For chalk or crayon drawings, to a solution of 25 parts of gum in 100 of warm water add 1 part of phosphoric acid. Full instructions for using the plates are to be obtained of the manufacturer. For photo-litho and zincography I can recommend the following mordants: boil down 160 parts of gall nuts with 1,500 of water until reduced one-third, filter, and add 125 of thick gum, and 6 of phosphoric acid. No. 2, add a strong solution of tannin to the ordinary weak nitric acid etching fluid until it assumes a brown colour.

A Method of Strongly Etching a Stone.—I recommend the following method when it may be necessary to subject an image on stone to a very energetic etching, and it is of special importance not to lose the finest detail. The stone is inked in and gently etched in the usual way, after which it is washed and fanned quite dry. It is next dusted with fine resin or asphalt powder, and the excess is carefully brushed off with a powder puff, when a sheet of hard glazed paper is laid on the stone, and it is passed through the press.

The stone is now levelled, and its surface covered with proof spirit, and this is immediately lighted, taking care that the steadiness of combustion is not interfered with by air currents. As the spirit burns out, the resin and the fatty ink become thoroughly united, just in the same way as they unite when a zinc plate is heated at the back in preparing it for etching. When the stone is cold it may be etched very freely; indeed, so much as to leave the image in very perceptible relief. For etching stones prepared in this manner, I prefer dilute phosphoric acid and gum rather than nitric acid, and in inking-up I use an ink which has been mixed with a solution of asphalt in turpentine.

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THE GLASS HOUSE LIGHTED FROM THE SOUTH.

BY VALENTINE BLANCHARD.

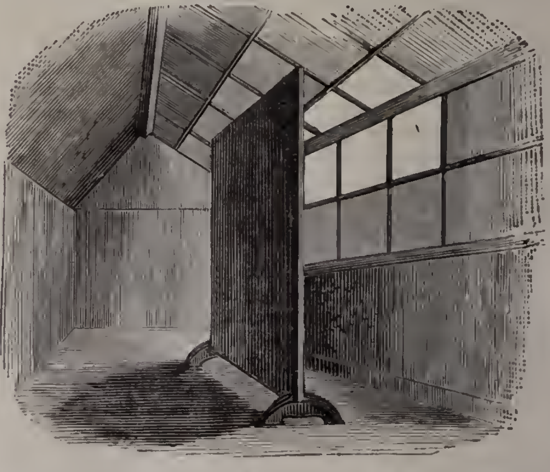
I think a few supplementary remarks from me may possibly make more clear to the readers of the journal the points of peculiarity in the construction and management of the studio in question.

On reference to ground plan (February 27th, page 132), it will be seen that the screens* are placed opposite the south light; and a reference to the second illustration will show that the screens are sufficiently high to cut off the south top light coming through the clear glass. After a little consideration the reader will readily see that the direct rays of the sun can be made to fall on the screen, and yet a sufficient amount of direct light—not sunlight—will fall on the sitter to give point to the high-lights, in addition to the light subdued and filtered through the ground glass. A judicious management of the screen—which, of course, should move readily on castors—will enable the operator to work without difficulty at any time of day. For example, at midday it does not matter at which end of the studio the sitter is placed, for, of course, when using the south light, dark blinds cover the east light studio; but in the early morning the sitter would be placed at the east end, and the direct light would come in from the south-west, and, in consequence, no direct sunlight could possibly fall on the sitter. In the afternoon, the west end of the studio would be used, and the direct light would be from the south-east.

It is scarcely necessary to say that the south light is only to be employed where, from structural difficulties, no other light can with advantage be obtained.

Undoubtedly very beautiful pictures can be obtained with a south light, but the difficulty of correctly estimating the exposure is immense.

The accompanying illustration will, I think, help the others in making the matter clear. More of the studio might have been included, but I thought it would have been at the expense of clearness. The shaded portions represent either ground glass, or, better still, light blinds made of *papier mineral* stretched on light wooden frames and made to run freely on copper wire. In making full-length portraits, of course two screens are necessary, as shown in ground plan (p. 132), for of course the camera should be in the dark, and all the light necessary directed to the sitter.



Very beautiful portraits, full of delicacy and gradation, can be obtained in a studio with the side facing south, and glazed entirely with ground glass; but as far as I have been able to learn, all those who have tried it, find great difficulty in getting point and force in the high-lights, particularly on grey days, or when the light is yellow and feeble.

By the plan indicated above, this difficulty is overcome, for by the use of the screens, not only is all the portion of the studio not needed on the portrait darkened, thereby helping immensely in giving relief to the eyes of the sitter, but sufficient pure light is admitted to give effect to the high lights, whilst the remainder of the light, softened by the *papier mineral* blinds, gives great delicacy to the whole picture. The screen can be placed at such an angle that the sitter can only see the extreme edge of it, so that scarcely any of the light is cut off, and yet all the sunlight is absorbed by the side of the screen not visible to him. Of course the screen must be absolutely opaque.

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* By an oversight, in describing the ground plan, the dotted lines are made to take the place of the straight ones. The passage should be, "The straight lines may be taken as representing the sun's rays at noon." The error is obvious; but perhaps it is better to call attention to it.

PHOTOGRAPHY AT A FANCY DRESS BALL—MY SYSTEM OF ARTIFICIAL LIGHTING.

BY W. BARRY.

"In aid of the medical charities of the town." So ran the bill which our local knight of the paste-brush was decorating blank walls with in the town of Hull, in spite of the legend "Bill-stickers beware."

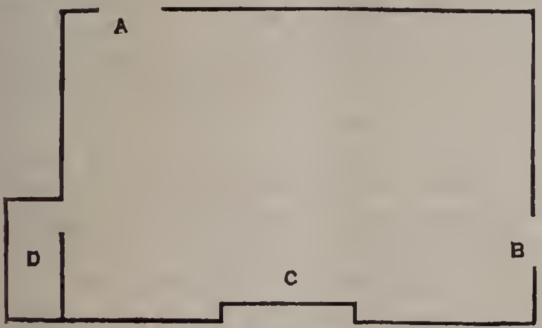
I was seized with a charitable impulse. I can augment the funds of the charities by handing over part of the proceeds, and thus smother any idea of possibly losing caste expressed in the remark, "Barry is so slack that he seeks custom at such a side chance as a fancy dress ball." I made my terms as follows:—I would attend at the rooms and photograph all that so wished, providing that the committee would provide a private room as a studio, I to charge the guests five shillings for admission thereto; give one sitting, supply three cabinet copies of each person so paying, and hand over half the proceeds to the fund, of course. Such an advantageous bargain was at once closed with, and I had two days for preparation. So now, what will be more interesting to the reader than how were the pictures got, which have earned this eulogium from our Editor, "The lighting is so good that the artificial illumination is not apparent to the observer," I will endeavour to tell. I had in my possession a Moule's photogen, or lamp. There is nothing in its shape or construction which contributes to success; it is merely, as it were, a glass box to confine fumes evolved from the burning composition which emits the light. Any shape will do—mine is hexagon—only let it be broad and high at the top, so as to give plenty of air space. An elongated street lamp describes it exactly. The composition is made as follows:—

Saltpetre	... ...	18 pounds
Sulphur	... ...	5 ,,
Realgar	... ...	$3\frac{1}{2}$,,

Crush and mix; this will suffice for sixty or seventy exposures.

I admit I felt a little nervous about my results, and gave the lighting great thought, and consulted dame nature a good deal; but, *nil desperandum*. So packing a cab with the lamp, several lengths of tin tube to fit on the lamp top and convey the fumes into the open air, also the tin of pyrotechnic composition, I and my joiner took possession, and surveyed the scene of operations.

Here is a plan of the room. A, door; B, window;



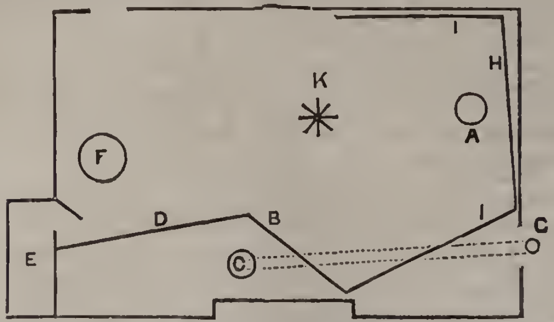
C, fireplace with gas bracket over; D, a closet, with gas bracket in; no window. To this bracket we at once screwed an Edwards' lamp, which consists of an argand gas burner, ruby chimney, and cap. Two glass panels in door were covered with brown paper, the door shut, and here "presto!" was the most convenient dark room wherein to change the plates, possible, and close to the camera. Three or four more journeys of the cab, and a background, head-rests, and other impedimenta of the photographic art, or rather necessaries, began to give the room a studio-like appearance.

The room was thirteen or fourteen feet high, and I wished to fix an eight-burner gas star light, to illuminate the room and to pose and focus by; for of course the actinic light from lamp is only on during exposure of the plate. A piece of scantling was fixed over the fire-place, across the room, about eight feet high, and the star light fixed pendant in the centre; a piece of tubing laid along the scantling being slipped on the bracket over the fire-place to convey the gas, and this difficulty was mastered. The next difficulty was not got over so easy; it cropped up on two legs, and consisted of the "man in charge." Our hammering had brought him up, and ditto his ire; he entered as if he expected to see the walls denuded of plaster, and bristling with a perfect *chevaux-de-frise* of nails. "Why, what's, what's all this about?" he breathlessly asked (he had left most of his puff on the stairs). We humbly explained. "Never knew such a thing in my life; never been mentioned to me: you cannot go on." We expostulated, and explained all our fittings were merely wedged; we had a modicum of sense left to know that nails would not be agreeable in the walls. "No, you must stop," continued our wet blanket. But we stuck to our vantage of nine points of the law; so at length, he went in quest of the next official second in rank.

My hopes rose; the two entered; more explanation, and, after much debate, shaking of head, stroking of chin, &c., consent to continue was given, with the final dictum of "Don't damage the carpet." Probably he had the sloppy wet process in his mind's eye. We assured him all would be well, and—exit both. Thus, after losing half an hour, the clouds rolled by, and we proceeded to cover a large stretcher, seven feet by four feet, with tissue paper, supported by strings stretched across the frame, as the sheet were small.

We next unrolled a large piece of white sheeting, and fixed wires across the room to carry this sheeting over the sitter's head, and to hang down to the floor on each side, the background forming the back of the alcove thus made. To coin a word, I have called the alcove, or canopy, "Barry's cot;" for this cot is the peculiarity and originality of my system of artificial lighting. I think I may presume to say original, for I have never seen it adopted, or even hinted at. The course of my commune with dame Nature which suggested it was as follows:—

The sun is the source of all light called daylight, which represents my lamp. If this sun's light was not diffused by the attributes of our atmosphere—viz., clouds and mist intervening, and being shone on and through, diffused and reflected in innumerable directions, and reflected and reflected again and again, *ad infinitum*—if all this did not take place in the action of Nature, we should have sharp illumination and direct cast shadows, as is known to be the case on the surface of the moon, which is destitute of atmosphere, and consequently of clouds. Thus we should have the appearance of every object around us depicted as in the majority of artificially-lighted photographs. Here was the difficulty. I had the source of light sufficiently actinic, but which needed to be broken up, reflected, and reflected backwards and forwards, across and across, *ad infinitum*, all of which is summed up in the phrase *perfect diffusion*. As all know, the naked light is useless to produce a pleasing and correct portrait; it has been used with a tissue paper screen in front. This is well. I so use it, but the mistake is made in using a small reflector to throw the light up on to the shaded side of the sitter's face; the result is, the model is cross-lighted, the eyes squint, and the face resembles nothing so much as a corpse; but by surrounding the sitter, top and sides, with a thin reflecting material, you artificially fulfil the whole condition of daylight, for, what are the clouds but a gigantic surrounding of a transparent reflective medium, which, with the sun as the light giver, lights all things soft and pleasant? My system imitates all this in miniature. Eventually our room or studio, when ready for action, stood thus. A is the sitter, enveloped top and sides with thin white sheeting placed at such a height and width as just to keep it out of the field of the lens. B is the tissue paper screen in front of the lamp C, which was raised on a tripod from the floor about five feet; D is an opaque curtain which served to hide the operations of the assistant who attended to the light. A small fire in the grate heated a thin rod of iron, with which the composition was ignited. E is the changing room; F the camera; G is the tin tube fixed to lamp to carry off the fumes through the window into the open air, of course passing over the top of the tissue screen and the sheeting or cot; H is the background; the two lines marked I, represent the edges of the sheet hanging down at each side of the sitter, which to the left of the sitter reach as far as the tissue screen as drawn, and this sheeting, as explained before, is extended over the sitter's head about background height; K is the gas star light. The rest of the accessories can be disposed to suit the operator's fancy and convenience. It will be seen that the light shone through the tissue paper portion of the "cot" on the left front of the sitter; this gave the direct light, while the white "cot" reflected and reflected, and also admitted in some measure light all over from the outside; the effect was thus most charming.



The time slipped on, the dancers assembled, a brilliant company. Soft, dreamy waltzes stole through the air, and "a thousand lights shone on fair women and brave men;" but time still kept on slipping, and as yet no light from my lamp had shone on anyone, fair, brave, or otherwise, in spite of cards hung about the ball room, setting forth the fact that Nature was again conquered (or shall I say imitated?), and photographs would be taken without daylight. At last I singled out the M. C., who gave me a sitting. I will describe the *modus operandi*, as it was a type of all.

An assistant in the lobby issued tickets and got the pay beforehand, endorsing each ticket with the name and address of the purchaser. A second assistant barred entrance into the studio at all unless possessed of a ticket, and then only one at a time; this is a very necessary arrangement, and contributes wonderfully to the successs, for I pity both operator and sitter when there is a crowd in the room, or even a third person, unless he is one of your trained employées. On delivery of the ticket at the door, it was numbered, and thus made to correspond with consecutive order of the exposed plates, so avoiding after confusion as to the identity of each picture. A third assistant attended to the lamp in the curtained-off portion of the room. A fourth changed the plates. I posed and focussed the sitter by the aid of the light from the gas star, which just enabled me to see the figure on the focussing screen sufficiently well. The lens was then capped, slide inserted, shutter drawn, a word of caution to the sitter not to close the eyes or to be disconcerted at the strong light about to be created (this is very requisite, for the transition from the miserable yellow gas light to the pure white actinic illumination is very severe), a final glance to see all is right, &c.

"Now!" is the signal given. The assistant applies the hot iron to the composition, and the sitter is bathed with a beautiful soft white light—literally bathed, not shone on, but flooded back, sides, and front, with just sufficient direct light from the left front to prevent flatness. Of course the lens cap is removed simultaneously with the application of the hot iron, and in from ten to twelve seconds, according to the quantity of the powder put in the lamp saucer, the light fades, and we are again in gloomy depths of gas illumination. "Thanks, that will do." The slide is removed, the plate boxed, the slide is fitted with a fresh plate, and again all is ready for the fray, which outside the door is getting very severe. Cannot sell the tickets fast enough; once more proving the sheep-like qualities of mankind, "get one, and the rest will follow." The doorkeeper needs to be of Herculean proportions to restrain the entrance of the would-be sitters *en masse*, but he succeeds, and each enters singly and orderly.

The waiting for turn is another advantage, for to take a negative of a sitter fresh from an active stirring galop, with every fibre and muscle quivering with exertion and excitement, as all veterans of the photographic art will know, is out of the question.

The residuum of the last charge is removed from the lamp, a fresh scoop of powder inserted, the iron rod is placed in the fire to heat. All this is done during the time the next sitter is being posed. "Now!" is again given; up comes the light, and another sitter's form and feature are secured for posterity, and thus all "goes merry as a marriage bell" until the small hours of the morning, by which time I had manipulated about sixty sitters, and the cashier was in possession of about £10. I developed my nocturnally-exposed plates, along with my usual day's work, with pyro.

My sitters are delighted with the results obtained without the inconvenience and loss of time in donning their costumes in the daytime.

The medical charities duly acknowledged receiving their quota of the proceeds, and I—well, I had my expenses paid, turned the tables on my chiaroscura friend who said I could not do it, and provided the material for this article.

Since the above was penned, I have used the light and system at a grand fancy dress ball at Scarborough with corresponding success, in conjunction with Mr. W. D. Brightman, of the Esplanade Studio, Scarborough.

RAPID CONTACT PRINTING PAPER.

BY W. A. WATTS.*

GASLIGHT is not a good means of exposure; the prints are very likely to be under-exposed, and gas is by no means uniform. Daylight, when convenient, is all right; but it varies much, and I think the manufacturers understate the time of exposure.

For the amateur, however, magnesium is certainly the simplest, and not so expensive as might be imagined; three inches will expose four negatives at a cost of ¼d. or less.

The developer is made of two solutions in equal proportions. A contains 8 oz. oxalate of potash (care being taken that it is neutral), and ½-oz. of bromide ammonium to 50 oz. water. B, 10 drs. sulphate iron to 10 oz. water. B must be added to A.

As each print is developed, I pass it into the washing-water—under a running tap, if practicable—and after washing some five minutes, transfer the first to the alum bath; this contains alum in proportion of 1 to 20, and removes all traces of the iron, which would otherwise interfere with toning. They should not be left in this bath more than five minutes, or it would bleach them somewhat. They are then washed again to get rid of the alum.

By the time the last print is developed the first will probably be ready for toning. The makers state that any toning bath will answer; but I tried the borax bath, which I generally use, and found they toned very slowly; they tone much quicker in a bath containing a trace of chloride of lime, and the makers recommend the following, which answers well:—

Acetate of soda...	4 drachms
Chloride of lime	16 grains
Water	8 ounces

Keep this as stock, and, when required for use, take 1 ounce of the solution, add 1 grain of gold from usual solution, and 10 ounces of warm water, and use it when quite cold. It will not keep good more than a day.

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* Abstract of a communication to the Liverpool Amateur Photographic Association.

As the prints are toned we throw them into water, and when all are finished give them one or two changes, and then fix in the usual hyposulphite solution (1 to 4), though I believe the makers now recommend it to be used weaker.

Ten minutes will suffice to fix them, and we have only to submit them to the usual washing, though less will, I believe, suffice than for albumenized paper prints; still it is well to be on the safe side. Then they will be dried, and here comes the only real difficulty; of course they may be dried by simple exposure to the air, in which case they have a matt surface, and it is recommended to squeezee them out to a piece of plate glass, previously well cleaned and polished with French chalk. This gives them a beautiful gloss which many people admire. I have, however, found great difficulty in getting them off the glass afterwards; and it is very aggravating after getting a good print to find it either tear on taking it off, or stick persistently so that it will not come off at all.

I have not satisfied myself as to the cause of the difference, since some say they come off without any difficulty; whilst others, not usually less careful, find it succeed very badly. I am inclined to believe the difference is mainly due to differences in the quality of the powdered French chalk as sold.

I find, however, that drying them upon, as polished, a variety of American leather-cloth—or rather oilcloth—answers very well, and they are detached from this without any difficulty.

You will see that the whole process may be carried on in gaslight, which is a great convenience; the only precaution necessary is to moderate the light somewhat when changing and developing—shielding paper and tray from direct light as much as possible. The after operation may be done in comfortable gaslight.

Correspondence.

CRITICS AND CRITICISM.

Sir,—I felt not a little surprised when I saw my picture, "At the Wheel," and my remarks thereon, were the subject of a paper read before such a distinguished body as the Edinburgh Photographic Society, the report of which appeared in your issue of March 20th.

I trust you will allow me a little of your valuable space, so that I may say a few words (not in any controversial spirit) in defending myself from the somewhat severe criticisms of such an able gentleman as Mr. Stewart.

After quoting my remarks on the faculty of observation, Mr. Stewart goes on to say: "It is the faculty which enables the artist to judge from what particular spot and at what particular time to take his picture, so as to get the best possible results out of it." I fully endorse these words, and in my Whitby pictures I contend, that with the very limited time at my disposal, I did get—I hardly like to blow my own trumpet—the best possible results. That there are defects in the picture in question I do not deny; I was fully cognisant of them long ere the features of the swarthy helmsman were indelibly fixed on my plate. I had two alternatives—arrange the details so as to be nechnically correct and artistic and find my time gone, or have a shot at it and make the best of it. That I did right, the ultimate success of my picture fully proves. That it is as good a picture as was possible to make out of the subject, I do not wish for one moment to contend. I get my living by practising the fascinating art, and I must have pictures that will "pay," and I cannot afford to devote anything like as much time as I should wish to this line of work, but I must make the best of my opportunities.

Mr. Stewart does not agree with me in thinking that the cultivation of the faculty of observation in this direction is so rare. The cultivation may not be rare, but I am not going to believe that the successful cultivation is not rare because such eminently skilful gentlemen as Mr. H. P. Robinson and Mr. Adam Diston are able to produce most beautiful pictures, which win the admiration of all judges. Let Mr. Stewart give twenty names from amongst the thousands of photographers, then I will believe that there is no truth in my statement.

The defects in my picture are "inevitable"; had I the brush of a painter I could have produced, with the same materials, a very different result; but alas! our sensitive plates are not canvas.

As to the remarks anent some of the "properties," I must remind Mr. Stewart, that the main sheet he refers to belongs to another vessel; and that had this steersman faced right in front, it would have been a no more correct picture, and I should not have produced a flattering likeness of my hero.

One must admire the careful pilot, as he shows by the anxiety depicted upon his face how all his thoughts and energies are bent upon the one aim of his mind—the safety of his ship, crew, &c., and as he navigates his vessel through dangerous shoals, making the huge monster shape his course to his will like a well-trained steed; but the man in our picture is in sole charge of a small lighter, safe within the harbour a few yards from the quay, so I think he may be allowed the luxury of a whiff of the fragrant weed.

Should I be justified in losing a subject by waiting for the little pig to put his foot in a trough? I should by all means prefer the porcine creature to be displaying all his traits with perfect truthfulness; but if I saw a chance of producing an effective picture, I should not throw away an opportunity because the subject was not arranged quite *comme il faut*.—Yours, &c., Geo. Hadley.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 26th ult., Mr. T. C. **Sillar** in the chair.

Mr. **Henderson** exhibited, by permission of Mrs. Phillips (widow of the inventor), the vistascope alluded to upon a previous occasion. It is a box of four compartments, the sides and bottom of which were lined with mirrors, some simple device being arranged thereon; observing the reflected images by means of a small hole at each corner, a perfect vista was seen. The instrument, Mr. Henderson thought. could be utilized by photographers. He also showed, on behalf of Mr. J. G. Tunny (Edinburgh), a series of paper negatives made by that gentleman upon Talbotype paper in the years 1844 to 1851. Mr. Henderson likewise showed prints he had made from them without retouching or dodging in any way, and considered them as perfect as prints from any other kind of negative. The negatives, which were of exceedingly find texture, had not become perceptibly yellow, and in most cases the wax remained in as good condition as when applied; they also indicated the permanent character of metallic silver reduced from iodide by means of a gallic acid developer.

Mr. W. M. **Ashman** said the long exposure appeared the chief drawback to the process, and mentioned that the bromide paper negatives sent to the Society by Messrs. Morgan and Kidd were in every way perfect; moreover, it was quite unnecessary to render the bromide paper negatives transparent.

Mr. W. E. **Debenham** thought Mr. Tunuy's negatives were particularly interesting as illustrations of the old paper negative process; but he could not agree with Mr. Henderson in saying they were as perfect as negatives by any process.

Mr. J. **Barker** contended that the old process gave a power of piling up silver which gelatine bromide papers did not possess.

Mr. **Cowan** called attention to the advantages of the perchloride of iron reducer for chloride plates, which also enabled him to obtain perfectly clear shadows. His stock solutions were perchloride of iron five per cent., hydrochloric acid two and a-half per cent., hypo the ordinary fixing strength. To reduce an image considerably, the solutions were employed as above. If only a slight amount of reduction was requisite, the solutions were to be diluted considerably. Several members advocated the ferrid cyanide method, but Mr. Cowau said that it did not answer with chloride plates so well as the plan suggested.

Mr. J. B. B. **Wellington**, in making an emulsion with sulphite of soda, deposited the silver upon the glass vessel; 80 grains of sodic sulphite and 100 grains of silver nitrate were put into 5 ounces of water, and the pp. redissolved in ammonia; upon heating to 160° F., the silver was deposited in the metallic state. He failed to get a good emulsion with the addition of sulphite.

It was thought that with slight improvement the method could be utilized in making mirrors commercially.

Mr. **HENDERSON** found sulphite of soda in an emulsion productive of red fog; not so sulphurous acid.

Mr. **DEBENHAM** considered the addition of this salt favoured the theory that fog was attributable to traces of nitrite with the nitrate.

Mr. W. H. **PRESTWICH** remarked that if fog was due to the nitrate of silver, the failure should be more general; he understood that all the samples they used came from one of two sources.

Mr. **BARKER** advocated fusing the silver, which he thought favoured the formation of some nitrite.

The value of sulphite of soda in development was next discussed. Some of the members stated that with ammonia it produced green fog, while others held directly opposite opinions.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE monthly meeting was held at the Free Library, William Brown Street, on the 26th March, Mr. J. H. **DAY** in the chair.

Mr. R. Thacker and Mr. R. G. Brook were elected members of the Association.

A communication from the "Woodbury" fund was read, and after some discussion the matter was decided to be one for the individual consideration of the members.

Mr. **BOOTHROYD** exhibited an instantaneous shutter which was highly approved.

Mr. W. A. **WATTS** then read a paper on new rapid paper, and showed the manipulation of the paper, producing four prints from as many negatives, by simultaneous exposure to magnesium light. The prints were developed in subdued gas light, and much interest was taken in the process.

Mr. W. H. **KIRKBY** demonstrated the making of gelatine emulsion. He referred at some length to the production of bromide of silver by two processes; the first being Abney's precipitation method, which he characterized as being simple, and with ordinary care producing slow plates and clear dense negatives. He then gave a description of a boiling process.

Mr. **RILEY** exhibited a very compact and neat little folding camera or view-finder of his own construction.

ST. HELEN'S ASSOCIATION OF SCIENCE, LITERATURE, AND ART.

Photographic Section.

A MEETING of this Section was held on the 18th inst., at the Association Rooms, Mr. **HEATHER** in the chair.

The **CHAIRMAN** delivered a lecture on "The New Rapid Printing Paper," in the course of which, after pointing out the advantages of using this material, he proceeded to demonstrate its utility by producing prints, the exposures varying from three minutes with an ordinary gas flame, to three seconds when using magnesium wire. The details of the process were fully expained, and, as far as possible, illustrated.

During the evening a number of prints were exhibited by Mr. Brook and other gentlemen, showing the effects of various toning liquids.

Mr. **SHERLOCK** also exhibited some prints of ferns in natural colours, and explained the process by which they were produced.

Talk in the Studio.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next ordinary meeting of this Society will be held on Tuesday next, April 7th (instead of the usual second Tuesday in the month), at eight p.m., in the Gallery, 5A, Pall Mall East, when Mr. W. S. Bird will read a paper on "The Photographic Reproduction of Pictures in the National Gallery by A. Braun et Cie," when some thirty examples will be shown. As the walls of the Gallery will be unoccupied on that evening, it is proposed to hang upon them specimens of photography, especially prints on gelatino-chloride paper. The Gallery will be open after 1 p.m. for that purpose.

PHOTOGRAPHIC CLUB.—The first out-door meeting of the season will be on Bank Holiday, April 6th, 1885, at Esher. Train leaves Waterloo at 9.45. Major Verney, pioneer for the day, will provide convenience for changing plates, &c. Those attending are expected to bring the camera.

2.4.85

To Correspondents.

FORRESTER.—1. We have written to the Secretary for the form, and will send it to you. 2. Monckhoven's intensifying process is as follows:—Twenty grammes of mercuric chloride, and the same weight of potassium bromide, are dissolved in one litre of water. The negatives are allowed to remain in this until they become white all over, after which they are well washed, and immersed in a solution made by dissolving 20 grammes of nitrate of silver, and 20 grammes of pure cyanide of potassium, in 1 litre of water. See p. 602 of our volume for 1879.

S. S.—It is very well made, and very useful.

X. Y. Z.—The supplements printed by the Sprague process are in reality photo-lithographs, but the first impression on the stone is made by a secret process.

THOS. STOKOE.—Write to the Willesden Waterproof Paper Company, Willesden, London, N.W.

NOVICE.—1. They all—unless, perhaps, the hydroxylamine developer—deteriorate by oxidation, and the course you suggest is the only one. 2. No; it is the rel[illegible]nt which tones so easily.

HARVEY H. BEALE.—It is gratifying to find that you have been so successful in working with them. See articles on "Coloured Photographs on Glass," in our volume for 1883, pp. 611 and 740.

J. C. HANNYNGTON.—Next week.

W. GAMBLE.—1. A depth equal to the space between the lines for the fine parts, but with a maximum depth of about a sixteenth of an inch for whites not exceeding half an inch across. Large whites are usually cut out. As far as we know, the processes are practically identical. 2. It does become weaker as the action goes on. We prefer the process with nitric acid. 3 No; at least, we have never heard of any. 4. We have found four hours quite sufficient, and cannot understand the reason of your process being so slow.

THOS. E. SANSOM.—You can gather the information from a series of articles which appeared in our volumes for 1883 and 1884, but cannot reasonably expect full details in this column.

C. H. E.—Soak them in a mixture of one part of sulphuric acid and six of water.

EVELINA.—It is better to avoid contact with metal, but if metal must be used, copper plated thickly with silver is best—unless, indeed, you can use solid silver. Pure tin is fairly safe, but tin-plate not to be recommended. If you will explain exactly what you want to do, we will endeavour to help you.

F. W. B.—Not very safe unless reflected backwards and forwards several times from such a surface. In practice it is far more convenient to employ a transparent medium.

PRINTER.—You can partially disguise them by using a so-called encaustic cerate, or paste; white wax 1 ounce, oil of turpentine 5 ounces.

M. COLAN.—You fail because you do not wash sufficiently. Try again.

AMATEUR.—The Exhibition of the Photographic Society takes place in October next, and you had better reserve the pictures until that occasion. If you allow the dealer from whom you purchased your apparatus to exhibit them meanwhile in his shop window or his show-room, they will not be admitted to the Exhibition.

MICRO-PHOTO.—We fancy you must be mistaken, or we should certainly have heard of it; perhaps, however, you have been deceived by appearances.

BEGINNER.—1. It is merely a trade circular, and only differs in degree from others of the same class. 2. Something of the kind has been contemplated, but it seems to be generally considered that the annual exhibition in Pall Mall meets all the necessities of the case. 3. The name was printed by mistake, and withdrawn in the later issues.

ACTINISM.—The following is the formula as given by M. Bardy:—

Gelatine	300 parts
Water	1,900 ,,
Chrysoidin	40 ,,
Glycerine	46 ,,
Water	609 ,,

M. J. PERRIS.—Perhaps you are thinking of Mr. Muybridge's pictures. Refer again to your original source of information.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1388.—*April* 10, 1885.

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10.4.85

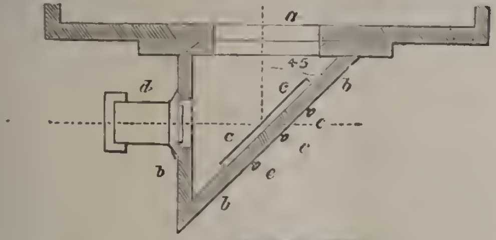
DIRECT PHOTO-TYPOGRAPHY AND PHOTO-LITHOGRAPHY BY THE CHROM-ALBUMEN PROCESS.

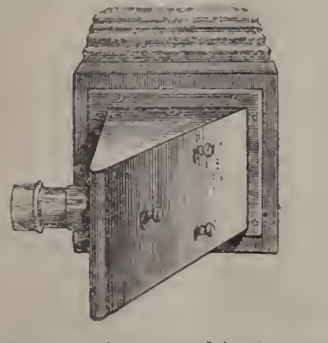
Professor J. Husnik has recently published full working details for the direct process on zinc, and the process not only gives us a ready means of reproducing the finest stipple or grain sketches with all their original characteristics, but it also saves the labour and delay of making the transfer, and the delicate task of inking up the first image on the metal plate.

It is quite true that the asphalt process gives results equal in sharpness and quality to those obtained by the chrom-albumen method; but as the sensitiveness of the bitumen film is very slight in comparison with that of the bichromated albumen, the latter method has a decided advantage.

Any direct process on zinc requires the use of a reversed negative, and it is only necessary now to refer to the method of obtaining these by means of the prism or mirror, a proceeding to be recommended when the negatives are to be made specially for the work.

Mr. Romain Talbot's convenient arrangement for using the mirror is shown in the subjoined figures, the first cut showing the arrangement in section, and the second exhibiting the external appearance of the camera when fitted.





A circular mirror, *c c*, is mounted in the triangular box, and this mirror can be adjusted to the exact angle of 45° with the face of the camera by means of adjusting screws, of which the heads are shown on the outside of the box. Commercial plate glass is not sufficiently true on the face to be used for the mirror, unless one is exceptionally fortunate in finding an accurately surfaced piece; but it is necessary to obtain a true disc of glass from an optician. For silvering the glass, one cannot do better than to quote the directions for working Common's process, given by Major Waterhouse in a previous volume of the Photographic News.

"The solutions recommended by Mr. Common are three—

(1)	Nitrate of silver	1 ounce
	Distilled water	10 ounces
(2)	Caustic potash	1 ounce
	Distilled water	10 ounces
(3)	Glucose	½ ounce
	Distilled water	10 ounces

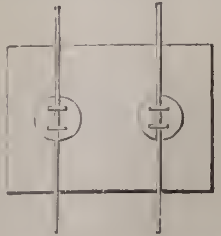
"The above quantities are sufficient for 250 square inches; consequently an ordinary copying mirror 8 by 6 would require rather more than 2 ounces of each solution, and other sizes in proportion.

"The caustic potash and distilled water must be quite pure. Ordinary caustic potash will not answer at all. The best to use is known as *pure by alcohol.*

"The glass surface to be silvered is carefully cleaned with strong nitric acid, applied, as recommended by Mr. Browning, with a Buckle's brush, then well washed in clean water, and after rinsing with distilled water, laid, face downwards, in a dish of distilled water till wanted.

"Before cleaning the glass, it will be necessary to arrange for supporting it face downwards in the depositing dish, so that the surface to be silvered may be quite horizontal, and just below the level of the fluid, which should be about half an inch above the bottom of the dish.

"I have generally used a large cork, about four inches in diameter, cemented to the back of the plate, and fitted with three strings, by which it could be suspended in a level position and adjusted to any height by winding the string over a roller placed at a convenient height above the dish. As this arrangement was not available, I fixed on the back of the plate two ordinary wide-mouthed bottle corks of equal thickness in the positions shown in the figure, and to these corks attached thin slips of bamboo running transversely across the plate, and of sufficient length to rest on the sides of the dish, thus:—



The slips of bamboo gave the arrangement a certain amount of spring, by which the height of the plate could easily be regulated by putting on weights till the surface of the plate was just below the level of the fluid in the dish.

"To prepare the silvering solution. A sufficient quantity of the silver solution No. 1 (2 ounces) is put into a perfectly clean glass. Ammonia is dropped in till the precipitate first formed is just re-dissolved. The same quantity of potash solution No. 2 as of silver is now mixed in, and the precipitate again dissolved by ammonia. A little more silver solution is then added to produce a distinct turbidity, and distilled water to make up the quantity necessary to fill the depositing dish to about three-eighths or half-an-inch, and the mixture is then filtered through cotton into another clean glass vessel.

"The same quantity—two ounces—of filtered solution of glucose No. 3 as was taken of silver and potash, is now mixed in, and the whole poured into a depositing-dish (which should preferably be of glass well cleaned with nitric acid).

"The glass plate is then taken out of the distilled water, and laid face downwards on the silvering solution, being supported—as before described—just above the surface, so that the solution does not cover its back.

"Mr. Common places the requisite quantity of distilled water in the dish, in which the mirror has been remaining face downwards, and then, having lifted the mirror up, pours in the undiluted silvering solution, together with the glucose solution, stirs well together, and then carefully lowers the mirror again into the dish.

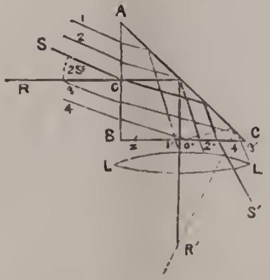
"Almost immediately after the immersion of the plate, the silvering action begins, and, if things are going on well, a brilliant reflecting surface will be seen at the back of the plate; and in forty minutes, or even less, a good deposit of silver will be obtained. It is usually recommended to stop the action as soon as the silvering fluid appears clear and free from turbidity; but it is not always easy, I find, to see this.

"After silvering, the plate is thoroughly well washed, finishing with distilled water, and dried off quickly. A slight cloudiness of the surface may appear, and must be removed by polishing before the mirror can be used. It is better to allow the mirror to remain a day or so before polishing, in order to harden the coating.

"To polish the plate, it should be slightly warmed, and perfectly dry, and rubbed very gently in small circles with a piece of very soft and dry chamois leather, afterwards using a little jeweller's rouge.

"Mirrors should always be kept in a dry place, and will require re-polishing from time to time."

Although, when the reflecting prism is used, the exposures are a trifle longer than in the case of the mirror at its best, the liability of the silvered surface to become tarnished is so great—especially in a crowded city—that much is to be said in favour of the prism. It must, however, be remembered that the reflecting prism is not suitable for use with wide-angle lenses. The following sketch sufficiently illustrates the action of the reversing prism, and it is usually mounted in a triangular brass box that fits on the external end of the lens mount.



To prepare the chrom-gelatine solution, dissolve thirty grains of ammonium bichromate in four ounces of distilled water, and after having added, drop by drop, sufficient liquid ammonia to make the orange colour of the solution change to a bright yellow, the white of a fresh and tolerably large egg is added. When well mixed, the preparation is filtered through fine muslin, and afterwards through filtering paper.

A plate of planished zinc, as sold at the lithographic material stores, is now carefully cleaned with the fine emery paper (No. 000) sold by dealers in watch-makers' materials, care being taken not to touch the clean surface of the metal with the hand. Strong ammonia solution is now poured upon the metal surface, and well rubbed on with a tuft of blotting-paper. The plate is now thoroughly rinsed under the tap, drained, placed on a levelling-stand, and the prepared surface is flooded with the chrom-albumen solution. The liquid must be allowed to flow in waves several times backwards and forwards on the plate, and some must be allowed to flow off at each corner of the plate. The operation of flooding and flowing off at each corner must be repeated. Now bring the plate into an upright position, in order to allow the superfluous fluid to drain off, wipe away the fluid which collects at the bottom edge, and by rocking the plate while held in a nearly horizontal position, diffuse the remaining liquid evenly. The plate is now gently and cautiously warmed over the flame of a spirit lamp, the plate being held at a very slight inclination, so that the upper edge dries first, and the liquid does not flow back on the portions just dried: at the same time, great care must be taken that the plate is not so much heated as to coagulate the albumen; but if the plate is not made so hot as to feel unpleasant to the back of the hand, there is no fear of coagulating the albumen.

When dry, the surface should be yellow and brilliant; if it is dull or matt, too much bichromate has been used, or the drying has been too slow. It is scarcely necessary to say that the work of coating and drying should be done in a room lighted with yellow light. The exposure required is merely a short one, less than the time necessary to make a print on albumenized paper; and after exposure it is necessary to ink the plate over with a very thin but uniform layer of printing ink, taking care that the roller is in good order, and not too heavily charged; after which the zinc plate is placed in cold water, and after having been allowed to soak for a few minutes, it is carefully mopped with a tuft of lint or cotton-wool, this operation being continued until the whole of the subject is perfectly developed. In case of under-exposure, the lines wash off; and in case of over-exposure, it is difficult to clear the ground.

The plate is now etched into relief by the usual chemigraphic method (see vol. for 1882, page 690).

It is scarcely necessary to say that this method is applicable to photo-lithography, it being merely necessary to take a transfer from the zinc.

GLASS.*

Concluding Article.

Patent Plate.—Any series of articles on glass would be incomplete if allusion to the material known as patent plate was omitted. In the days of wet collodion, when photographers got good prices for their work, patent plate was extensively used in portraiture, and also by landscape photographers for all large sizes, as no negative was considered safe unless upon patent plate; or, in other words, a negative would be intrinsically worth as many pounds if on patent plate, as shillings if on ordinary glass—it being the custom to print in pressure frames against stout plate glass, which method was a fruitful source of fracture of negatives if not on patent plate.

The rage for cheapness has, however, caused a demand for a vastly greater proportion of common glass; so that the quantity of patent plate now actually employed for negative work is probably even less than it was in the wet collodion era. From a technical point of view this is to be regretted, for patent plate is really a very beautiful and fairly perfect article, and seeing the vile quality of the glass which has somehow found its way to be coated with gelatine emulsion, and thus become transmogrified into more or less valuable negatives, one cannot help frequently feeling that if dry plate makers would advocate better glass—patent plate—all parties would be benefited, and the character of the work enhanced.

---

* Reference to previous articles, vol. xxvi., pages 675 and 737; vol. xxvii., pages 3, 98, 226, 419, and 757; vol. xxvii., pages 338, 386, 626, and 770; vol. xxix., page 129.

We have already alluded to the fact that when cylinders are blown for making sheet glass, the surface is in a fairly perfect condition; but it is, in the after processes of flattening, actually spoiled by being scratched, distended, indented, and otherwise impaired. To remedy these defects, one of the Messrs. Chance suggested and carried into execution the idea of grinding sheet glass down to a level surface, and afterwards polishing that surface. Accordingly, the method adopted in the manufacture of patent plate was, that a sheet of stoutish sheet glass, carefully selected, free from usual defects, was placed flat upon a machine with a covering of wet leather, to which the glass adheres by suction. Another similar sheet, likewise made to adhere to a leather seat, is placed on top of the first; machinery causes the two sheets to rub each other in various directions horizontally, sand and water being thrown in between. The grinding is soon accomplished, and each opposed surface will have a fairly flat or level condition, the hills being ground off to the level of the valleys, and nought save the natural springiness of the glass itself prevails to prevent a really true and flat surface being obtained. Both sides of each sheet are served in this manner, and then they are removed to another machine and similarly treated with fine emery, which brings up a semi-polish. Finally, as in the case of polished plate glass, the ultimate surface is obtained by polishing with rouge.

The similarity of the two processes—polished plate and patent plate—will be apparent; the difference lies more in the rough material: in the first it is *cast* glass, and in the second it is *blown* glass that is employed. The first may be made of 1 inch or more in thickness, the second can be made 1-16th of an inch in thinness. Polished plate can be had with 100 feet or more in each plate; patent plate rarely exceeds 10 or 12 feet in area.

Originally an English invention, at the expiration of the patent, the process was soon taken up by foreigners, with the result that for every foot of patent plate made in England, there are probably one hundred feet made in Germany. In Bavaria there are several manufactories where nothing else is done than grinding and polishing sheet glass into patent plate. The glass is not made at the same works; they buy it from those who merely make the sheet glass. This foreign-made patent plate comes to England, and goes to every other country on the face of the globe, for the reason that it is less in price than the English made article. It lacks somewhat the finish of the home-made glass, and it frequently is certainly not flat—by reason of the natural elasticity already referred to—but it has been ground and polished, and it is patent plate, and sells accordingly. For photographic purposes doubtless this foreign article would do just as well as the best English, and in certain sizes, say up to 8½ by 6½, could be had at a very reasonable price indeed; so that we say advisedly, dry plate makers would do well to try whether their customers would appreciate and pay for the luxury of gelatino-bromide-coated patent plate.

There is one serious drawback to the use of this article, and that is, the softness of its surface as compared with the hard fire-skin of the ordinary sheet-glass now used for dry plates; this tenderness of surface admits of it being very easily scratched, but more still is the tendency to staining. Staining inevitably results whenever the glass is allowed to lie about among other dirty glass or drippings of developers, and when this staining occurs, it is very rarely indeed that it can be removed by any means short of re-polishing the glass. In gelatine plate photography the causes, or rather the excuses, do not exist as they did in wet collodion work, when so much patent plate was spoiled by untidy manipulators.

In bringing this series of articles to a conclusion, we have been compelled to forego any description of the numerous processes to which glass can be submitted to improve or alter it, such not concerning very much the photographer. Yet there are certain processes we should like to have touched upon, such as the silvering, toughening, etching, &c.; but the pressure upon our columns, the claims of more important matter, not only preclude the extension of this series, but have frequently caused them to stand over hence the somewhat disjointed manner in which the articles have appeared. The reference at foot will enable readers to peruse them in back numbers.

THE BEHAVIOUR OF THE HALOID SALTS OF SILVER IN THE SOLAR SPECTRUM, AND THE EXALTATION OF THEIR SENSITIVENESS TOWARDS CERTAIN PARTS OF THE SPECTRUM.

BY DR. J. M. EDER.[*]

Colouring matters as optical sensitizers, with special reference to the green, yellow, and red rays.—Although bromide of silver is acted upon by spectral yellow, and by the rays beyond the yellow, yet the action is so slight that the resulting images are thin and vague. In the year 1873 Prof. H. W. Vogel discovered the fact that certain colouring matters, when added to an emulsion of silver bromide in collodion, make such emulsion sensitive to the green and yellow and red rays of the spectrum; and this discovery of the use of optical sensitizers was made practical use of not only by Vogel, but also by Waterhouse, Becquerel, and later by Ducros du Hauron, and Cros.

In the meanwhile photography underwent a complete revolution by the introduction of the gelatino-bromide process. New methods of exposing and developing had to be found, and the "optical sensitizers" which were at that time employed to colour the gelatino-bromide emulsion exhibited, at first, such doubtful results, that Prof. Vogel considered that insensibility on the part of gelatino-bromide emulsion to optical sensitizers was characteristic of this modification of bromide of silver although the feeble sensitizing effect of aniline red was recognized by him. At the close of the year 1882 the firm of Attout (called Tailfer) and Clayton obtained a French patent (No. 152,645, Dec. 13th, 1882, and March 29th, 1883) according to which gelatino-bromide of silver was rendered highly sensitive to yellow by the addition of eosine. They called their plates "isochromatic," and applied them to photographing coloured fabrics, &c.

The beneficial influence of eosine was subsequently recognised by Schumann, and Professor Vogel introduced plates into commerce which were coloured with a dye-stuff but little known, called azaline.

On the theoretical and practical aspects of this matter, I have undertaken experimental researches with 140 varieties of dye-stuffs.

The application of a colouring material to bromide of silver in gelatine may be effected in two different ways: the dye may be added to the liquid emulsion, or may be employed in aqueous or alcoholic solution as a bath, in which the dry plate is immersed.

The proper degree of concentration of the colouring material is the first condition of success. Too much dye lowers the general sensitiveness of the plate by stopping excessively the passage of the rays of light. If too little dye is used, the action of the optical sensitiser is too small compared with the general sensitiveness of the silver bromide.

The best degree of concentration is different with different sensitizers. It is best to begin with an addition of from 2 to 4 milligrammes, to 100 cubic cent. of emulsion, or the same quantity may be dissolved in water, and the solution is then employed as a bath, in which the dried plates are immersed for from two to five minutes. Dyes of very powerful character must be diluted; others may be ten times more concentrated. Eosine, for instance, when employed of a strength of only $\frac{1}{10000}$ per cent., suffices to sensitise the emulsion notably to the yellow-green, although no red colour can be detected by the eye. The dye may, by several hours' washing, be apparently removed from the emulsion, and yet its characteristic effect be noticeable in the photograph of the spectrum.

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[*] Continued from p. 165.

THE INFLUENCE OF VARIOUS DYE-STUFFS UPON SILVER BROMIDE IN GELATINE.

Of the great number of dye-stuffs experimented with, only a portion proved successful as optical sensitisers for silver bromide in gelatine. In the action of these we must discriminate:—

1. *The influence upon the general sensitiveness of the stained bromide of silver plate.*—The sensitiveness to the blue and violet portion of the spectrum is sometimes so much lowered that only perhaps one-tenth of the original sensitiveness remains. I have found most of the violet and green dyes, and many others, to possess this characteristic.

2. *The influence upon the relative sensitiveness of the film to green, orange, &c.*—Independently of whether the sensitiveness of the stained silver bromide in gelatine to the blue portion of the spectrum is lowered or not, the effect of certain dye stuffs is to increase the sensitiveness to yellow, orange, &c. For example, the use of Bengal rose reduces the sensitiveness to blue to one-third or one-sixth, while the sensitiveness to yellow-green (in the neighbourhood of line D) is much greater than with an undyed plate. Cyanine produces a similar result. The general sensitiveness is, in this case, lowered, and the relative sensitiveness to yellow-green increased. With a plate thus stained the exposure for taking a picture by daylight must be increased from three to six times.

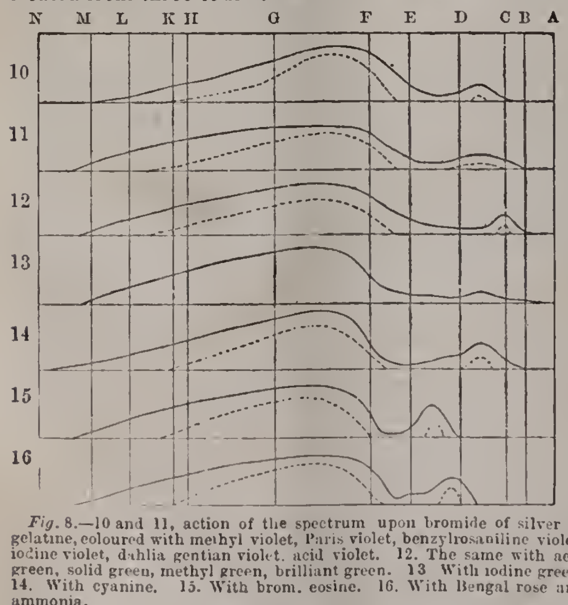

Fig. 8.—10 and 11, action of the spectrum upon bromide of silver in gelatine, coloured with methyl violet, Paris violet, benzylrosaniline violet, iodine violet, dahlia gentian violet. acid violet. 12. The same with acid green, solid green, methyl green, brilliant green. 13 With iodine green. 14. With cyanine. 15. With brom. eosine. 16. With Bengal rose and ammonia.

If a photographic plate is to reproduce colours with the same degree of light as that with which they affect the human eye, the orange at C, and the light blue at F, should have a similar effect; the yellow at D eight times, and the green-yellow at E about ten times stronger. Green at E is about three times as luminous as light blue. The violet, on the other hand, should only have about one-tenth of the effect of the light blue. Up to the present time no process has been described which promises to fulfil these requirements. By the interposition, however, of a yellow glass, the blue is so much weakened that upon a *stained silver bromide gelatine plate*[*] the yellow-green works much more powerfully than the blue and violet. This is seen in curve 17, which represents an eosine plate lighted through yellow glass. Here, however, the action ceases in the red or orange. For a plate which—whether by optical or chemical aid—shall render all colours with the same effect of light as that which they produce to the eye, I propose to reserve the name "orthochromatic." As is known, the photographic plates in use up to the present time render orange and yellow much darker (almost black) than dark blue and violet, which operate almost like white.

Hofman's violet, as well as several commercial varieties of this colour, such as dahlia, primula, and iodine violet,[†] cause an increased sensitiveness in silver bromide in gelatine to orange, yellow, and green. The general sensitiveness is lowered, and the increased sensitiveness to orange has its maximum between D and C, rather nearer to D. With a short exposure this maximum appears in the situation shown in curve 10; with a longer exposure the action extends over C towards the red, and continues through the green, with a minimum between D and E. Very similar is the action of methylviolet, Paris violet, and particularly benzolrosaniline violet (methylviolet B B), gentianviolet B, gentianviolet B R, as well as acid violet. The increase of sensitiveness to the orange follows the addition of all these colours in very nearly the same place, only that sometimes the curve stands out steep and strong (curve 10), and in others (with an alteration of concentration and longer exposure) the action falls away generally, the curve rising to a weak maximum between C and D, and being very flat in the orange, extending towards the red near B. The intensity of the action of the blue upon such coloured silver bromide is greater than the orange.

Of green dyes, acid green, bitter almond oil green (in commercial kinds, solid green, malachite green, new green, Bengal green), besides ethyl green (solid green J, brilliant green) and methyl green show, very similarly, a maximum in the red at C. With a short exposure the action of the less refrangible rays is restricted to this more or less clearly pronounced maximum (curve 12); with a longer exposure, however, an action is noticed in the red up to B, as well as in a slight degree through the yellow and green. On the other hand, a much more powerful action arises in the blue as far as the ultra-violet. This sensitizing for the red rays by the green dyes mentioned, can only be shown with strong direct sunshine and powerful concentration, and cannot always be recognised with certainty. The same may be said of aldehyde green and chlorophyl,[‡] which, however, in my experiments very seldom caused any distinct sensitiveness to the red, in bromide of silver in gelatine, to be noticeable.

* * *

A LEAF FROM A TRAVELLER'S NOTE BOOK.

Did you ever travel in the photographic trade? When I say travel, I don't mean tramping about the country pushing a kind of perambulator and dark-box combination, and taking the rustics at sixpence a head. No, I mean the regular downright commercial business—in fact, to use the good old-fashioned term, I was a bagman. How many years ago is of no consequence, nor does it matter what I travelled in, because it is not about any particular photographic material that I wish to talk. By no means; what I am going to say refers rather to photographers than to the stuff they use.

---

[*] The sensitiveness of an ordinary unstained bromide of silver gelatine plate to yellow and red is so slight, that notwithstanding that a yellow glass be interposed, a painting cannot be photographed upon it with a correct intensity for the various colours.

[†] Employed as a bath dissolved in alcohol the same with the other violets soluble in alcohol.

[‡] According to Becquerel, Ives, and others, chlorophyl is a good sensitizer in collodio-bromide of silver for red and orange

I was well up in operating. To tell the truth, I had a studio of my own, but business being bad and the weather ditto, I thought I would utilize the dull foggy days in pushing the particular ingredient which I had invented. So off I started with samples in a black bag.

It wants a little courage to travel, especially for the first time. When I got to photographic studio No. 1, I looked at it for quite two minutes before I ventured to step in. It wasn't a very attractive place; the frames of the show-cases were scorched by the sun, and roughened by wind and rain. The studio—over a shop built out from the house—sadly wanted painting, and had a deplorably neglected look with the strips of dirty white tissue paper and rusty black calico hanging in all directions, the result, I suppose, of experiments in lighting. Was it any good at all introducing my merchandise? Would the proprietor buy, and, if he bought, would he pay? I solved the question by going in.

I stumbled up a dark staircase and precipitated myself into the reception room, which was in reality a part of the studio. Three cane-bottom chairs and a looking-glass on an eighteen-penny toilette table constituted the furniture. There was a couple of cases of glass positives on the walls, and a square of faded carpet on the floor. A curtain on a rod formed the division between the reception room and the studio. No one was in the reception room, but the sounds of a violin came from the studio.

I felt half inclined to turn tail, everything looked so miserable; however I did not, but coughed instead. The curtain shifted, and a tall, cadaverous, lantern-jawed man with a big black moustache, and wearing a dingy gold-banded smoking cap, came out hastily.

"No, I don't want any," said he shortly, in answer to my introduction.

This won't do; he ought to want some, I thought. "Well," I resumed aloud, "if you give this a trial"—

"No, I can't: I'm very busy."

"Bad light for photographing," I ventured to observe.

"Good enough for teaching the violin." And he bolted back behind the curtain and left me to find my way down stairs.

This was not promising, but the ice was broken, and I had conquered my diffidence when I got to the next establishment. This was a somewhat imposing shop with a vast expanse of plate glass through which nothing was to be seen but emptiness and a couple of pianos. In the wide doorway were cases containing the oddest mixture of good and bad photographs I had ever seen.

In I went, the glass door as it opened sounding a bell which awoke the echoes in that dreary waste of wall and floor. A slovenly boy appeared, and him I asked if Mr. —— was in.

Yes, he was in; and the slovenly boy ushered me up a flight of stairs into a studio built on the leads. An elderly man came forward and looked at me in a curiously frightened fashion.

"You want your likeness taken?" he asked, rubbing his hands nervously together.

"Well, no," I returned apologetically; "I wanted to introduce to you my—" but I needn't go over the formula.

His face brightened immediately; he looked immensely relieved, and we glided into conversation.

"You see," said he confidentially, "I don't know much about the portrait business yet. Pianos are more in my line, but I took this place with a chap who was going to open in the photos, and he's bolted, owing me ten months' rent, so I thought I'd have a shy at it myself. Now if you've got five minutes just to talk over things, I'd be much obliged."

"Nothing like being friendly with one's customers," was my reflection, so I asked to see some of his negatives.

"There," said he, "that's about the best."

His best was a ghost of an image surrounded by iridescent streaks and stains, and with the collodion peeling off at the corners.

"Ah!" said I, "you've began with a dirty glass. How to clean a glass properly is the first thing to learn."

"I knew there was something the matter with the glass. It couldn't be the chemicals, because I've bought the very best crystallised nitrate of silver and all that. Here, you Tom!"

Up scrambled Tom, the slovenly youth, looking very much as if he'd been taking a nap on the door mat.

"Now you listen to everything this gentleman says. Those glasses you cleaned this morning were beastly dirty," said the elderly gentleman reproachfully.

"Well, there's a couple more, and they're clean enough," said Tom in an ill-used tone.

"Ah—hum—yes, this is all right. Now, why can't you do them all like this?"

I breathed on the glass put into my hand. It was as smeary as grease could make it. I began to be interested in this pair of novices. "Let me see you clean a glass, Tom," said I.

Tom did not take at all kindly to the proposition, and shuffled about, muttering he didn't know where his duster was. At last he produced a filthy rag dipped a corner into some water, and began to rub.

"Stay, you needn't go on. You'll never be able to clean a glass with that cloth. You must have a perfectly clean wash-leather."

"Recollect that, Tom," said the elderly gentleman, warningly. "We'll have a wash-leather bought to-morrow morning. Now about the developer—How much sulphate of soda would you advise me to put in?"

"You mean sulphate of iron. You're confounding it with hyposulphite of soda, the fixing solution."

"Yes, of course. Well, what quantity of hyposulphite of iron now would be best?"

I gave him up. Chemical terminology evidently was not his strong point. However, I answered the question, replied to him on the subject of intensification, and he had my opinion in regard to varnishes. Altogether, he had one hour of my time, and said he would give me an order when business began to come in.

Again I went on my journey, bolder, certainly, than when I started, but not so hopeful. My next call was at an establishment where the studio was in the garden. It was a delapidated structure, and in wet weather would let in the rain like a sieve. The photographer was affable and chatty, but in a difficulty about his lighting.

"Now, if the house next door wasn't built out, and reflected all that yellow light into the place, I should do much better, I'm sure."

I assented, and remarked that as he couldn't very well pull down the house next door, he would have to get over the difficulty in another way. Why not pull down the paper with which he had blocked out the panes on the other side, and work with a south light?

A south light! He was horrified at the idea. I know I immediately sank in his estimation, and I am afraid I lost an order.

Then there was a gentleman who believed in nobody but himself. He also was talkative—indeed, I am bound to say that with the exception of No. 1, everybody was ready for a chat—too ready, in fact, and the hours I wasted in discussion while I was "on the road," nobody but those who have had experience would believe. Well, I happened to quote something I had read in the Photographic News to this opiniated gentleman.

"The Photographic News," said he, in a tone of infinite contempt. "I never read photographic journals. Nothing like actual experience, sir; and I'll engage to say

I could tell the photographic journals much more than they could tell me."

It occurred to me to ask why he did not give the journals the benefit of his wisdom, but I thought I might lose a customer, and refrained. I am bound to state, however, that this gentleman's specimens did not bear out his assertion of superior knowledge.

Towards the end of the day I had got quite indifferent to rebuffs. I had interviewed a number of photographers; some in velveteen coats, a few in frock coats, and one in a dressing-gown. I had been in shabby studios, I had called at well-appointed ones. In the first I found, as a rule, the proprietors anxious to learn something; in the second, also as a rule, I discovered they had learnt everything, or thought they had.

But on one point they all agreed. Each photographer firmly believed that no one in creation did better work than he did. It was a pleasant belief, and not for worlds would I have uttered a word to disturb it.

I have said I had got indifferent to rebuffs, but I certainly was taken aback towards the end of the day. In the morning I had called on a photographer, who was proof against all my eloquence. He was a hard-looking man, with every line in his face drawn with mathematical regularity.

I commenced with my formula: "Allow me to introduce——"

"No," said he, sharply. "I make everything myself—gun-cotton, collodion, nitrate of silver, and then I know what's what. No time to waste with you. Good morning.'

And he shut me up and his door simultaneously.

I was hardened by this time, and I went on my way with equanimity. Walking about all day, carrying a heavy bag and talking continually, my perceptive powers got rather deadened towards evening, in addition to which I was not very familiar with the neighbourhood, a suburb in the south-west of London.

"I will just try here," I said, stopping at a semi-private house, on the railings in front of which hung a specimen case; "and this shall be my last call."

I had been to at least half a dozen semi-private houses, all of which had specimen cases on the front railings, and there was nothing in this one to distinguish it from the others.

I knocked at the door. Somebody opened it.

"Allow me to introduce——"

"Why, con-found it! If you're not the fellow who bothered me this morning. Never saw such impudence. No!"

I had somehow called at the same place twice in one day—that was all.

HOW AN AMATEUR CAN MAKE A HIGHLY-SENSITIVE GELATINE EMULSION.

BY E. G. WALES.

I am one of those who, for a number of years, have received the greater part of my photographic experience from the Photographic News. I think it time I endeavoured to give something in return, hoping others will take a hint, and devote an hour or two to an article for the benefit of those who are struggling through the difficulties in which photography is surrounded. Many are the excellent formulæ given by those indefatigable workers, notably Eder and Abney, whose works are valued beyond price.

For amateurs who would like a simple and certain emulsion formula, I cannot do better than refer them to p. 90 of Dr. Eder's book on emulsion photography, in which full particulars are given as to its composition; but, for the benefit of those for whom this is written, I will give it with my method of working.

Preparation of a highly-sensitive emulsion:—Dissolve 24 grammes of pure air-dried potassium bromide in 300 c.c. of distilled water, 30 to 45 grammes of gelatine are introduced, and the whole, after soaking half an hour, is placed in a water bath at a temperature of 35° C. to 45° C., till the gelatine has dissolved and become clear; then take 30 grammes of silver nitrate and dissolve in 300 c.c. of water, and add ammonia drop by drop, stirring all the time till the precipitate formed is re-dissolved, and the liquid becomes perfectly clear.

The above operation can be performed in daylight. Now, by a weak ruby light, add the silver solution to the gelatine, a third at a time, and shake vigorously between each addition, and allow to cool down to 35° C.; shake again after the whole of silver has been added, and at intervals; and rinse out remains of silver with 50 c.c. of water. Then replace the bottle in the water bath, which should be at a temperature not exceeding 35° C., let it remain for one hour, allowing the water in the bath at the same time to cool down gradually. The temperature may be allowed to sink as low as 25° C. without any fear of the gelatine setting; but the quantity of water should be sufficient to prevent the temperature falling lower. In this method the chemicals used should be the best procurable.

The temperature should never exceed 40° C. in the preparation of this emulsion, or fog will be sure to follow. When it has digested the required time, it is poured out into a large dish to set and to cool for a couple of hours, or a larger dish may be partly filled with water, and the one with emulsion placed in it to hasten its setting. After it is thoroughly set, squeeze it through coarse canvas with meshes about 2 to 3 m.m. apart into a large bowl of water, and well stir. Have a box about a foot square by four inches deep covered with fine muslin or linen, so that the water may be poured out of bowl into box, which will let all water through, but retain the small particles of emulsion. Repeat the washing four or five times, for here lie the resulting rapidity of the plates. After well washing, allow to drain well, for it contains an excess of water which must be got rid of. After well draining, it is put into a bottle, dissolved, and filtered through chamois leather; it is then ready for coating the plates. I will now give a description of the articles I use for heating, filtering, coating, &c.

A zinc tray, 18 inches long by 9 broad by 5 deep, with funnel soldered in near left-hand corner, to stand half-an-inch above the level of tray, so as to prevent any water accidentally going down into jugs whilst filtering. In this zinc funnel I place a glass—one which has a chamois leather spread over. The heat of the water in tray is sufficient to cause the emulsion to filter through rapidly. I have a box let into the dark-room from outside, which has a flange four inches deep all round for the purpose of nailing it to the partition; on one side it has a hole six inches square cut out, and a small box with flange is riveted on to it, from which the heat in larger box enters. I place my jar to receive the emulsion as it passes through the filter. On the top of large box I place the tray containing the hot water and emulsion bottle, then I place a small oil stove in box from outside, which keeps the heat at any desired temperature; by this contrivance all gases are entirely shut out of the room. A support will be needed under the larger box. For coating, I use two small jugs, one for pouring, the other to receive any surplus from plates coated and returned to filter.

I use slate slabs for setting, and I find these much cooler than glass. For drying-racks, I use shelves the length of the room, with rows of oval holes cut in diagonally, or so that there shall be a space between the first row and third; the holes are cut larger and wider at the top than at the bottom, so as to prevent any part of the plate becoming damaged. I find this plan exceedingly good.

For ventilation I get two stove pipe elbows, and insert one at one end of the room near the floor, the other I connect with the chimney, thereby securing a good current of air amongst the plates.

I find one thickness of the paper supplied by most stock dealers perfectly safe; it is a good plan to have a thick plate of glass outside to keep inquisitive people from pushing a hole through the paper. I mention this through losing over nine dozen 5 by 8 plates from the attempt of a friend to rear himself up inside my dark room.

Almost any developer is good for these plates, but I prefer, for out-door work, ferrous oxalate iron solution, one to four of oxalate solution.

THE PLATINOTYPE PROCESS.

BY RICHARD KEENE.*

At the request of our Committee I have arranged to give you a demonstration of platinotype work at my rooms for the sake of convenience in manipulation; and I hope that this our first technical meeting may soon be followed by others of a similar nature, where our members may learn more in seeing the *modus operandi* of any process than by much longer study and unaided practice.

The invention or discovery of the platinotype process, in 1878, is due to Mr. Willis, and is a patent, but as the terms for working it are so extremely moderate, it comes within the reach of all. Great improvements, too, have more recently been introduced, and it now stands as one of the simplest and best of photographic processes—quick and clean in working, artistic in its results, and, beyond all other excellencies, absolutely permanent. This latter quality, the purity of the high lights in the picture, and the capability of printing with a white margin, added to its mezzo-tint-like appearance, all render platinotype the very best method of illustrating books where moderate numbers are required, such as topographical works or the journals of our various antiquarian societies. In proof of this, I lay before you some of the works I have had the pleasure of illustrating. Here is one with only a frontispiece, of which 2,000 have been printed; here is another with twelve illustrations, of which 750 have been published. Now, to have engraved these plates would have cost a large sum, not less than from £12 to £15 each, and it is a question if they would have been as good; they certainly would not have been so faithful. Besides this outlay comes the cost of printing from the plates, so that you will see what a boon this new process is, and will become, to authors and publishers of county histories and such like works. Look at this large fourth book, a local history of a little place many of you, I dare say, never heard of. Only 120 copies were printed. What would it have cost to engrave all these illustrations? Why, the book would never have been printed, or, at all events, would not have possessed half the charm it now does. You will see, too, how well the colour of the platinotype harmonizes with the accompanying type, and—though comparisons are odious—I will say better than that of any other process, for there is no enamelled surface, no meretricious glazing, but a simple black and white, highly artistic picture, such as can be produced by no other method. Please take this as my honest opinion. I know, with many, nothing can equal the charm of the warm chestnut-brown, the rich purple, or other tones which may be given to a silver print—but alas! it fades. I have printed some specimens from the same negative in both ways, so that you may compare the two; but whatever your present judgment may be, I feel sure it would alter in the future even as surely as will the silver prints.

Now let us see what this platinotype consists of, without going very deeply into the matter, as you will have to procure the ready sensitized paper from the Company, according to the terms of license. A per-salt of iron (ferric oxalate) is intimately mixed with a salt of platinum (potassic-chloro-platinite), and a sheet of suitable paper is evenly coated with the mixture. When properly dried and exposed to light behind a negative, the ferric salt only is affected or acted upon, according to the gradations of light and shade in such negative, yielding a faint dusky-grey image of ferrous oxalate. The action of light through the negative has reduced the ferric into the ferrous salt, and the ferrous salt will, in its turn, be the reducer of the platinum; but not so long as the print is kept dry. If, however, this print be now floated on a hot solution of potassic oxalate, the ferrous oxalate will be dissolved at once, and at the same instant the contiguous platinum salt will be decomposed or reduced, thus forming the image in pure precipitated platinum, one of the most stable and unalterable substances known. On cooling, the developer will show green crystals, formed by the combination of the ferric oxalate with the potassic oxalate, as you can see in this Winchester, where I store my bath when not in use, and from which I now decant the clear solution into this enamelled iron dish. The crystals remaining are useless, and are removed from time to time. I put the dish on a tripod, add a fresh supply of potassic oxalate dissolved in water (130 grains to the ounce), to keep up the normal strength, and apply a Bunsen burner till the bath is heated to 160° or 170°. In this tin case are some prints ready for developing, several of them purposely under or over-printed. On comparing them with those properly timed, you will see the difference; but after floating on the developer, it will of course be more apparent. With these other prints similarly under and over-printed, I hope to show how they may be saved by raising or lowering the temperature of the bath. The prints, as they are developed, are immersed in a dilute bath of hydrochloric acid (1 to 80), for about ten minutes; they are then removed one by one to another such bath; and if there are many prints in the batch, to a third, till all trace of yellowness has disappeared. This insures the purity of the whites. Half an hour's washing under the tap completes the operation, and the prints only want drying off in changes of blotting-paper.

A little practice is required to know how far to carry the printing, and only experience can point this out. I have never used an actinometer for the purpose, but prefer to fix upon some object of medium density in the negative, and work from that alone. By doing this I rarely spoil more than one print, and often hit the time at once, which is about one-third of that required for a silver print. As the paper varies somewhat in different batches, it is well to try a sample print before printing the full number for development, even though working from the same negatives. Experience points to plucky negatives for the best results; this you will find borne out by examining the present negatives and their respective prints, though some of the weaker negatives have yielded pictures of great softness and delicacy. Last, but not least, I must impress upon you the great importance of keeping this very sensitive paper from light and damp. Perfect dryness at every stage is indispensable. These tin cylinders, as you see, are made as nearly air-tight as possible, with the addition of an india-rubber band. There is a perforated box inside each, filled with dry calcium chloride, which absorbs any little moisture which may get in. This calcium chloride is dried from time to time over the fire in an iron dust-pan. India-rubber sheets, or oiled silk, are recommended as pads for the printing-frames: I found them inconvenient to handle, and prefer dry blotting-paper, a stock of which is kept ready for use on printing days, on a heated iron table in the changing-room. Each print, as it comes in from the printer, is put in one of these tin tubes, and there kept bone dry till wanted for development. I do not want to lead you to imagine that there is any real difficulty about keeping the paper dry, or to frighten you about its keeping qualities. It only requires ordinary care, and you can preserve it as well in winter as in summer; indeed, I do not know if there is not more danger of deterioration in summer, for heat is often accompanied by a great amount of moisture, and the two together is worst of all. I have done some of my best work in frosty weather, and to show you what can be done, here is a print from an intensely dense negative by an amateur, which took three full days to print in the damp, dark days of December! I have read of some one who got good prints from paper he had kept two years, but I should not recommend you to try this.

It may seem that I have been demonstrating backwards, but I have pursued the plan I thought best calculated to fix what I had to show and say on your memories. I have said nothing about the sepia-tinted platinotypes of which you see some among the numerous specimens submitted to you. For these you require a somewhat different paper, deeper printing, and a hotter developing bath, to which is added 130 grains of the Special Solution, supplied by the company, to each ounce. The sepia paper does not keep so well, and is a little more difficult in the working.

There is another and still newer branch of platinotype work—enlarging by the electric light. Mr. Willis has lent me the specimens on the screen; they appear to be eminently adapted for colouring or finishing in monochrome; there is no degradation of the whites, and you will notice the vignetting is clear and pure as possible; no chemical action takes place to affect the artist's colours, and the surface of the paper is agreeable to work upon.

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* Read before the Derby Photographic Society.

Besides these applications of platinotype, there is another to which I may call attention, and that is printing on textile fabrics, which may be turned to good account. See specimen on screen. The small landscapes are by Mr. Herbert Berkeley; they will show you to what perfection platinotype work has been carried. The larger views, together with copies of oil paintings, &c., are my own.

Notes.

Details as to the arrangements for the Photographic Exhibition at Oporto will be found in another column.

Mr. Hadley's "At the Wheel," which our readers will remember as having been issued with the News in December last, having been rather freely criticised by Mr. A. B. Stewart (see p. 181), we would suggest that Mr. Stewart should now add emphasis to his remarks by making a better picture out of analagous materials. We shall have pleasure in publishing it.

The Conferences on the Picturesque initiated by the Edinburgh Society are likely to do good, but more good might result if, when any member sees nothing but very obvious faults in the photograph he is about to criticise, he were to defer his remarks until he can illustrate them with a picture of his own.

The value of such Conferences must, of necessity, be almost limited to those present at the meetings, as in ordinary cases, the mere reproduction of the remarks, without a simultaneous reproduction of the picture, would be of but little value; and permission to reproduce a picture, in order that emphasis might be given to unfavourable criticisms, might be difficult to obtain.

The new Poisons Bill, now before the House of Commons, scarcely affects professional photographers, as it in no way interferes with wholesale transactions; but several of the absurdities of the old Act are retained. The non-poisonous cyanides are included with those that are poisonous, and the vendor of a penny cake of Prussian blue water-colour will still be liable to pains and penalties. Alkaloids are dealt with in a curious way: "*All poisonous vegetable alkaloids, their salts and preparations,*" are to be regarded as poisons! A curious way of answering the question, "What is a poison?"

Rumour has it that the Academy this year promises to have far more than the average number of portraits of nobodies on its walls, and that the public will have to suffer the same infliction at the Grosvenor. What would be said if the exhibitors at the Photographic Exhibition flooded the room with photographs of their sitters? Yet this is practically what the R.A.'s do, and, so far as the majority of these portraits are concerned, they are not any better in light and shade and posing than the average work of first-class photographers. Some restriction ought really to be placed on the admission of portraits of nonentities.

From Mr. Jerrard, of 107, Regent Street, we receive two exceptionally fine cabinet portraits of the Prince of Wales, and one of these was used without Mr. Jerrard's permission, in making the specimen block which appeared on page 193. Successful as Mr. Sutherland's block is, it should be mentioned that, like blocks by all processes yet invented, it falls short of reproducing all those very delicate gradations of tone which characterise a print on albumenized paper. Hence we only do Mr. Jerrard justice in calling attention to the fact that these portraits are much appreciated at Marlborough House, and that the Prince considers them the best that he has had taken, an opinion he endorses by ordering numerous copies.

The authorities at Woolwich are surprised and somewhat disappointed that so little has yet been heard of the æronautical photographic apparatus which was sent out to Suakin. The fact is, however, that so long as Captain Templar can safely ascend himself in the captive balloon, his verbal reports are to be preferred to information which the photographic camera would supply.

Some difficulty presents itself in commenting on Mr. Bird's paper read at the last meeting of the Photographic Society of great Britain, and more in criticising the reproductions which were shown, as one cannot tell how far the result was due to working up, or retouching. That the results were excellent none can doubt, but that all of them were better than the best that have been done before is questionable; and instead of comparing them with failures, they should have been compared with successes.

Our readers will remember the excellent photographs of pictures in the National Collection which were published some years ago by Messrs. Poulton and Sons, and sold for a few pence each.

Successful isochromatic photography is now a matter of nearly every-day practice in several quarters; need we do more than allude to the very striking example of Ives' chlorophyl method, issued with the current Year-Book, or the great triumphs in this direction which are due to Dr. Vogel?

An illustration of the difficulty of satisfying the critic who looks at works of art from a very narrow or technical point of view is afforded by an incident referred to in the *Artist* this week. "Well, Peter, what do you think of my picture?" said the baronet. Replied the butler—"Well, sir, I think the gentleman what painted this picture didn't know what he was about. Why, he's only put 12 tumblers for 13 gentlemen!"

Unless the *Photographic Eye* sees things with distorted vision, there are photographers in New York making cabinet portraits at one dollar per dozen. Bad as business is in the English photographic studio, we may suppose that things are worse in New York.

The electric light is to be used for illuminating the Grosvenor Gallery, so that the pictures may be fairly seen in the evening.

Photographing the University boat race now comes round year by year as certainly as the race itself, and among the best pictures of this year's race may be mentioned those which Mr. W. K. Burton sends to us. There are five 10 by 8 views showing the river before the race, the race itself, and the scenes after the race.

An excellent portrait of Mr. F. C. Beach—taken by Kurtz with the electric light—is issued with the last number of *Anthony's Bulletin.* During a period of more than twenty years Mr. Beach has been an ardent amateur photographer, and now he is doing very useful work as president of the Society of Amateur Photographers of New York.

Jersey must be the photographer's heaven. According to a paper read by the President of the Meteorological Society, the annual exhibition of which was this year devoted to sunshine recorders and solar and terrestrial radiation instruments, the pleasant little island gets more sunshine throughout the year than any other portion of the United Kingdom. The absolute maximum of brightness occurs in May (a fact long since verified by photographers), and Jersey gets sixty per cent. of possible sunshine against fifty per cent. in the south and south-west portion of England, which, in their turn, are more sunny than the northern and midland districts. It is also worthy of note that in the late autumn, Ireland is much sunnier than Great Britain, Dublin having absolutely the highest percentage of possible duration of sunshine in November and December, and being equalled only by Jersey in January.

Some time ago we suggested the desirability of the authorities of the National Portrait Gallery making a collection of permanent photographs of living celebrities. The value of such a collection in years to come cannot be over-estimated. A Chicago photographer has carried out this idea practically, and for the past five years has been collecting photographs of prominent persons connected with his native city, with the object of having them sealed up in a memorial safe, made over to the city by deed, and deposited in the courthouse vaults with the archives of the city, until the second centennial of 1976.

Apropos of the preservation of memorials, it is remarkable that it has not become a custom to deposit photographs in the cavities of foundation stones of public edifices. The usual thing for years has been to seal up a copy of the *Times* and a few coins of the realm in a bottle; but surely the collection would be made more interesting if it included—say a portrait of the founder of the institution, or photographs of any interesting landmark in the immediate neighbourhood.

Any readers who wish to compete for the awards offered by the City and Guilds Institute must enter their names on or before Monday next, the 20th inst. Captain Abney is examiner in photography, and full particulars can be had by writing to the Secretary of the Institute, Gresham College, London, E.C.

Photography is gradually coming to the front as a means of political caricaturing. The picture of Mr. Gladstone and Earl Granville as old women under an umbrella, with the legend attached, "Wait till the clouds roll by, granny," was a great success, and as much may be prophesied of the adaptation of the well-known photograph of Mr. Penley in the "Private Secretary" to the portrait of Mr. Gladstone, who is represented loaded with all his political burdens at home and abroad. In this case the photographer has anticipated the artist, for we happen to know that the cartoonist of one of the comic journals had intended to utilise the situation, and was not particularly gratified on finding he had been forestalled.

Photographers who have much to do with children's portraits should take the precaution to ascertain what portion of the darling's figure is particularly admired by the fond mamma, if they wish to be successful. A friend was extremely annoyed the other day, when a lady brought back a picture of a baby about which he had particularly prided himself. "It's not like him at all," said she; "at least, the face is all right, but the arms and legs are not a bit right. The foot in the picture is twice the size it ought to be, and *we are all so proud of his feet.*" What a pity it is not the fashion to photograph babies in sections; then every satisfaction would be given. It is only by a fluke that hands, feet, and face come out equally well. Most photographers are obliged to be content if they get the face; mammas, it would appear, are not.

Patent Intelligence.

Applications for Letters Patent.

4102. George Lowdon, Reform Street, Dundee, Forfarshire, for "Improvements in photographic cameras and shutter arrangements for same."—1st April, 1885.

4160. Llewellyn Saunderson, 10, De Vesci Terrace, Kingstown, Dublin, for "The measurement and the photographing of spectra, and called 'The new spectremeter spectroscope.'" 2nd April, 1885.

4191. John Henry Johnson, 47, Lincoln's Inn Fields, Middlesex, for "Improvements in obtaining copies of drawings, designs, writings, and the like, by the action of light."—(*Clarisse Zoé Joltrain*, France.)—2nd April, 1885.

Patents Sealed.

2981. Walter Bentley Woodbury, of South Norwood, in the county of Surrey, for "Improvements in methods of producing printing-blocks by means of photography."—Dated 8th February, 1884.

4594. Joseph Brown, of 43, Halsey Street, Cadogan Square, Chelsea, Gentleman, for "Improvements in obtaining printing surfaces by photography."—Dated 8th March, 1884.

5686. William Robert Lake, of the firm of Haseltine, Lake, and Co., Patent Agents, Southampton Buildings, Middlesex, for "Improvements in frames for stretching paper for photographic purposes."—A communication to him from abroad by L'Abbé Raboisson, Paris, France."—Dated 29th March, 1884

Patents on which the Fourth Year's Renewal Fee of £10 has been Paid.

1436. L. Warnerke.—"Photography."

1602. H. A. Steinheil.—"Photographic objectives."

Specification Published during the Week.

6885. Thomas Furnival and George Daniels, both of Wellington Terrace, Reddish, near Stockport, in the County of Chester, Machinist and Draughtsman, for "Improvements in coating paper with thin layer of varnish, size, colour, gum or like liquid material, and apparatus therefor."—Dated 23rd January, 1885.

The patentees appear to claim the "roller" method, in which a band of paper is led over a quickly running roller which revolves in a trough of the preparation. We have already recommended this as a means of coating paper with emulsion.

Patents Granted in America.

314,317. Walter Clark, New York, N.Y., "Photographic camera."—Filed August 15, 1884. (No model.)

Claim.—1. In a camera provided with a separate focussing-chamber, a lens-holder of cylindrical form fitted to rotate so as to bring its aperture in line with either the object-glass or the exposure-apertures, substantially as described.

2. In a photographic camera having a partition forming a separate focussing-chamber, a lens-holder fitted closely in an aperture in the partition, so as to exclude light, and arranged to rotate in its seat, substantially as described.

3. The rotating holder and pinion, combined with box and partition, substantially as described.

4. The lens-holder, shaft, spring, combined with camera-box, substantially as described.

5. The combination of cylindrical lens-holder and box, having partitions formed to lap upon the ends and side of the holder, substantially as described.

6. In combination with a photographic camera, the mirror, hung by pivots entering grooves in flanges on box, substantially as described.

7. The sliding weight, combined with the lens-tube holder and pinion, as and for the purpose specified.

8. The rotary shutter, combined with rotary lens-holder and box, having apertured partition, substantially as described, for operation as specified.

314,346. Thomas C. Roche, Brooklyn, assignor to E. and H. T. Anthony and Co., New York, N.Y., "Photographic paper, and sensitive emulsion therefor."—Filed March 18, 1884. (No specimens.)

Claim.—1. As a new and useful or improved article of manufacture, a photographic printing paper made with a toothed facing of gelatine and bromide of silver, as herein set forth.

2. The within-described compound for facing photographic paper, consisting of gelatine, bromide of silver, and a suitable toothing substance, such as the sulphate of baryta, prepared in the manner and proportions substantially as described.

3. The combination, with a photographic emulsion of gelatine and bromide of silver, of a toothing substance, such as the sulphate of baryta, substantially as herein described.

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GELATINO-BROMIDE PAPER FOR NEGATIVES.

BY R. L. KIDD.*

Our argentic gelatino-bromide paper for negatives. This is a fine paper prepared with an argentic gelatino-bromide coating, and is designed to act in place of glass-supported films. We all know that many efforts have been made to find a perfect substitute in the way of pellicle films made of insoluble gelatine—also in some cases of gummy substance and collodion; but of all these substitutes that have come under our notice, we have found considerable drawbacks—either the pellicles have been liable to show fracture markings in handling, or else they have been affected by atmospheric influences, and there is a difficulty in making the films of large dimensions. Many photographers think that a sensitive film capable of being transferred from a paper support would solve the difficulty of weight, &c. This is true; but we find that a film which has to be transferred shows more grain when printed from, than one which is allowed to remain on the paper support, however careful one may be to prepare a paper with a good textureless surface. This is caused by the difficulty of avoiding some of the fibre of the paper adhering to the transferred film. We believe that the risk which always attends the transferring of a delicate film from one support to another would be a serious bar to its adoption to any extent, putting on one side the time, trouble, and the delay which it must necessarily cause. The paper which we bring before your notice to-night is entirely freed from these drawbacks, and the only thing wanting to make it a perfect success is some simpler method of fixing it in existing dark slides. The method we use ourselves is to place it between two pieces of glass, or to stretch it by means of a folding piece of cardboard double the size of the negative cut half way through.

The manipulations, &c., of the paper are precisely the same as for ordinary dry plates; pyro or ferrous oxalate can be used for developing. There is, however, one slight variation we may note: it is found difficult to varnish paper negatives in the ordinary way, as they cannot be got as flat as would be necessary, but may be protected by squeezeeing down on a collodionized plate while wet, and stripped. With regard to rendering the paper translucent, this can be done with a solution of castor oil and ether, equal parts; but the only advantage we find is that it prints quicker. On looking through a paper negative treated in this manner, it appears to be very much more transparent, and the treatment appears to have wholly got rid of the grain. But this is not borne out in the print; the negative prints quicker, but the waxing certainly does not decrease the grain. This wholly depends on the quality of the paper used, and we have subdued the fault by using only the very best quality of paper obtainable. The wonderfully little grain observable in the prints we have here is partly due to the fine quality of the paper, and partly from the fact that the sensitive coating, unlike that of the old "wax-paper process," is wholly on the surface, and not sunk in the fibre of the paper. A special feature in negatives taken on paper is an entire absence of halation; even when the conditions are favourable to this defect they also lend themselves especially to "dodging," by retouching with pencil or stump. Those parts which print too dark may be lightened, and cloud effects, &c., stumped on the back.

As regards economy, the production of paper negatives will be found cheaper than glass; it also adapts itself to enlarging from transparencies, and may be printed from either side—a great advantage for many of the mechanical printing processes; also for single transfer carbon.

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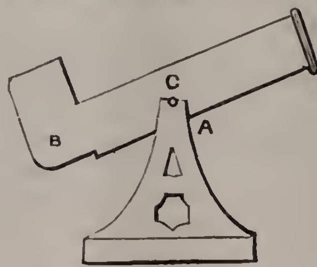
A Dictionary of Photography.

BATH.—A general term applied to any solution in which photographic plates are immersed, but more especially to the nitrate of silver solution used in sensitizing wet collodion plates.

BATHS, DISHES, AND TRAYS.—Vessels used by the photographer for containing the various solutions when in actual use. When size and circumstances allow, nothing is better than glass; but porcelain, ebonite, gutta-percha, tin-plate, and other materials are often used. The nearly vertical dipping bath—so long a characteristic feature of the collodion process—is one of the most convenient forms when a plate has to be left in a solution for some minutes without being watched, especially if the same solution is to be used for a number of plates. For dipping, the plate is supported on a slip of glass or other material turned up into a hook at the lower end.

The swing or wave bath of Mr. H. J. Burton is especially convenient when large plates are to be manipulated, and its general design is sufficiently indicated by the following sketch.



The bath is set at an inclination of about 20° with the vertical, and the plate is laid on the flat surface A, the lower edge of the plate being allowed to rest on the ledge near B. The liquid in the well or reservoir B, is now made to flow in a uniform wave over the plate by bringing the bath steadily to a horizontal position. Mr. H. J. Burton uses these baths successfully for wet collodion plates as large as 48 by 36 inches.

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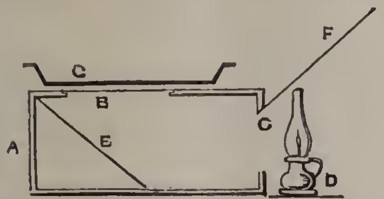
* A communication to the South London Photographic Society.

* Continued from page 164.

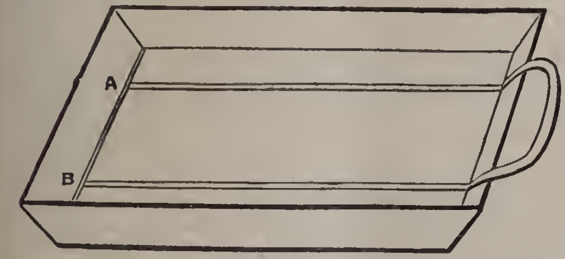
The baths are made of pine wood, the back being framed and panelled like a "flush" door. The joints are all made either by dovetailing, or by means of wooden dowels, and the whole is lined with canvas, which is laid down with marine glue or india-rubber cement, the cement being spread with a heated iron, like a surgical plaster. The canvas is applied to the back, the frame, and the well-piece separately; they are then put together with wood dowels, and the junctures made good with a fillet of cement applied hot, and finished off with a hot iron rod bent to a convenient shape. At the upper end of the bath an ebonite tube is inserted, to allow the contents to be drawn off; and a row of ebonite pegs is inserted in one of the styles, near the lower end, upon which the plates are supported when placed in the bath, and while being drained. A light frame covered with two thicknesses of leather cloth, placed so that the two unprepared sides come close together, makes a close-fitting cover, and which is supplied with lifting hinges to allow of its removal for cleansing purposes. On the sides of the bath, and a convenient place, is fixed a pair of centres, so placed that, when containing the solution, it will lie in a horizontal or nearly vertical position, by simply placing it in the position required, no support being necessary beyond the cradle, which takes the general weight of it.

When all is finished, the whole bath should be varnished with several coats of bituminous varnish, such as that sold under the name of "liquid jet or photographic black," care being taken that the volatile products are allowed to thoroughly evaporate before the bath is used for the silver solution.

Flat trays and dishes are generally used for the development of dry plates and for the various operations incidental to printing on paper, and where glass is used, it is often convenient to illuminate the dish by an arrangement similar to that suggested by Mr. Howson. The diagram almost explains itself; but it may be mentioned that E is a reflector, and B a sheet of glass of suitable colour—say, ruby or orange.

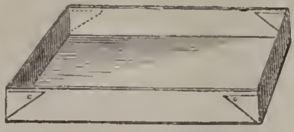


Tin dishes for developing gelatino-bromide plates have been recommended on account of their brightness and freedom from breakage risks: and Mr. W. T. Williams describes a very convenient plate-lifter to be used in conjunction with a metal dish. He says:—"A B C is a piece of wire hinged to the dish at A B, and rising from the dish in the shape of a handle at C. By lifting the wire at C, the plate is, of course, raised from the solution, and can be examined at ease, without coming in contact with the fingers.



Paraffined paper is a useful material for making dishes, and Dr. Nicol, writing in one of the Year-Books, gives directions for making them. He says:—"The paraffin paper may be readily prepared by supporting a sheet of ordinary tin plate over a spirit lamp or Bunsen's burner, laying a sheet of stout writing-paper on this, and placing a piece of paraffin on the paper. When the paraffin begins to melt, it is moved about over the surface of the paper until it is completely saturated, when it is removed, and another put in its place and treated in the same way. The sheets are then ironed between blotting-paper, which absorbs the superfluous paraffin, and the process is complete.

"The accompanying sketch will show how simply the trays can be made. A piece of the paper is taken, two inches each way larger than the intended dish; one inch of each of the four sides is turned up, the corners flattened and folded on the sides, as shown, and fastened by a touch of sealing wax, and the thing is complete, and ready for developing, sensitizing, or any other operation in which neither hot water nor ether is to be employed."



Even a sheet of glazed writing-paper, folded up as indicated, and fastened with sealing-wax or pins, will often make a serviceable dish for once using.

When large dishes are required, it is a very usual practice to make them by framing a sheet of glass with a border of wood, the glass being let into a groove cut in the wooden strips before mitring together. Putty, marine glue, or shellac varnish may be used to make the joint tight, according as the fit is good or bad. Very often, however, it is better to make a large dish entirely of wood, building it up in the manner indicated by the above description of the Burton wave bath.

Another way of making a paper dish is described by Mr. F. Whitehead, who says:—"I recently required a dish to silver some paper on, and none could be obtained near where I live. I made a dish in the following manner: First cut out a block of wood the exact size and thickness of dish required. Then take a sheet of cartridge paper, paste it with flour paste and rub in the paste well, letting the paper be thoroughly soaked with it. Then place the paper evenly on the wooden block, turn down the edges smoothly, and double the corners back, rubbing them down well. Be very particular with the first sheet, because if you get that smooth, the rest is easy. Follow with another sheet of cartridge paper, turning the surplus or slack paper at the corners, the opposite direction to the last. Follow with five or six sheets of old newspaper in the same way, and cap with another sheet of cartridge. Put the block with the paper on it into an oven, and bake till dry. Then take out the block and trim the edges. Paint the outside of the paper dish with varnish. Pour some varnish inside the dish and let it soak in, and then pour off the surplus. Bake in the oven again. After the varnish is hard and dry, warm the dish until it is hot enough to melt paraffin wax. Pour some melted paraffin into it, and tilt it about until the bottom and sides are evenly covered; pour off the surplus, and when dry you can use for toning, developing, or even silvering paper. Of course the above is only recommended as a substitute for glass or porcelain when the latter cannot be readily obtained."

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Reviews.

Die Bromsilber-Gelatine. Von Dr. Paul E. Liesegang. Fünfte Auflage. Price, 2m. 50 (2s. 6d.) (*Dusseldorf: E. Liesegang*).

The fact that a new edition of this thoroughly practical work is called for so soon, shows that its merits are thoroughly appreciated in Germany. The present edition is brought well up to date, and includes Wellington's method of making development paper and the hydroxylamine developer of Egli and Spiller.

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THE MITRAILLEUSE OIL LAMP AND PHOTOMETRY.

BY WM. LANG, JUN.*

Light is undoubtedly the photographers' *sine qua non*, and as at the present time rapid printing papers are being put forward which, when perfected, will enable the photographer to be less dependent on solar light than he has hitherto been, artificial illumination becomes to him a matter of primary importance. I trust, therefore, that the oil lamp which is brought before your notice this evening will not be without interest. It is on the argand principle, and is known as the mitrailleuse. This one you see here has sixteen strands of wick, and gives a light equal to 45 candles; a more recent form, with the same number of wicks, gives, it is said, a light of 55 candles; this is the lamp in question. A larger lamp, and having 20 strands, gives a light of 70 candles; such a lamp you have here. These oil lamps all have a very great actinic power. I may mention that I have printed out on albumenised paper a dried image by means of one of these lamps; of course the exposure was one of several hours, and the negative was but a few inches from the flame; still the fact that a print could be obtained in this manner demonstrates very forcibly the great actinic power of the light employed.

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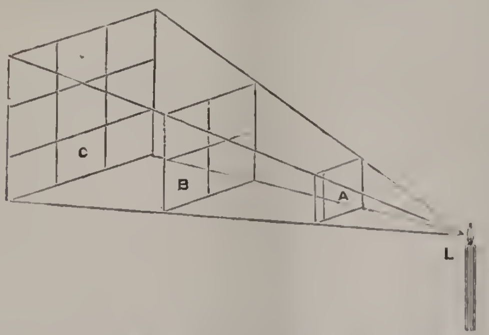
* Communicated to the Glasgow Photographic Association.

In connection with this subject I have thought that a few remarks regarding photometry, or measuring light values, along with some experiments to illustrate the principles involved, might not be without acceptance to you. We have spoken of the various lamps as being equal to so many candles. What does this mean? I will try to be as explicit as possible. The standard candle as at present defined is one of sperm (six to the pound) burning at the rate of 120 grains to the hour. All the candles that you see on the table answer to this requirement. The farther away a surface is from the source of light, the less is the intensity which the surface receives. This diagram will explain how the intensity of light diminishes according to the distance.



The three surfaces, A, B, C, are placed at the distances L A, L B, L C, from the light source L; the distance L B being twice that of L A, while L C is three times as great as L A. The same amount of light that is cast upon A will be cast upon B, a surface four times as great as A; the intensity of the light at B will therefore be a fourth of what it is at A, and in like manner at C. A surface of nine times as great as that of A, the intensity of light will be a ninth of what it is at A. In this way it is seen that the intensity of light diminishes as the square of the distance from the light source increases. The light, therefore, diverging from a luminous centre diminishes in intensity not directly as the distance, but as the square of the distance. All radiant forces obey the same law. We can put this fact in the case of light in another way, and say that the intensity of light is inversely proportional to the square of the distance.

Those of you who, perhaps, may not have given attention to these matters, may have some difficulty in getting a proper grasp of the principles involved; but they will be more evident when we come to work them out practically afterwards. It will be apparent to all that a luminous body cannot illuminate a surface with the same intensity as another luminous body placed, say, nearer that surface, unless that in the case of the more remote light there is a greater illuminating power. From what has been said regarding the diminution of light by distance, and the law that regulates it, there will not be much difficulty, I think, in your forming an adequate notion of the law that is applied in photometry—viz., when two sources of light produce equal intensities of light upon two surfaces at unequal distances, their illuminating powers are in the ratio of the squares of their distances from the illuminated surfaces. There have been various photometers devised, but we will consider only two of them—Rumford's photometer, which is perhaps the oldest form of all photometers; and that of Bunsen.

I have here a rough model of what is known as Rumford's. It consists of a vertical screen, in front of which is fixed an opaque rod. The lights to be compared—say, for instance, a lamp and candle—are placed at a certain distance in such a way that each projects on the screen a shadow of the rod close to one another. The distances of the sources are adjusted so that both shadows appear equally dark. When this is arrived at, all that is necessary is to measure the distances from the screen to each source of light, and to square these distances in order to find the ratio of the illuminating powers of the lamp and the candle. There is, however, in this mode of estimating light values, an insuperable difficulty arising from the fact that different sources of light never omit light which is of equal whiteness. A light from a candle is redder in quality than that emitted from a paraffin oil lamp, consequently the difference in the colour of the two shadows makes it very difficult to decide whether both are equally illuminated.

As these experiments necessitated the lights in the room being dispensed with, we will pass on to the consideration of the photometer that is now more generally employed—viz., Bunsen's. Taking a piece of paper, and having made a small grease spot in the centre, on holding the paper in front of a lamp, the centre spot appears light on a dark ground, due to the fact that, where the grease is, more light is transmitted. On the other hand, looking at the paper by reflected light, the spot appears dark on a light ground. Holding a piece of paper prepared in this way with its edge nearly turned to a lamp, and slightly turned to and fro, a position will be found in which the greased part and the rest of the paper will be found to be almost alike. The illumination, when such is found to be the case, is equal in intensity on both sides.

It is on this principle that Bunsen's photometer has been devised. Here is such an instrument. By placing on the one side this arrangement, carrying the four standard candles, and on the other side of the screen a single standard candle, and adjusting the distances of the two light sources till the grease spot disappears, it will be found that the distance of the four candles will be double that of the single candle, this being a proof of the law brought before you at the beginning of this communication, that the relative intensities of two sources of light are in the ratio of the squares of their distances from the two surfaces which they respectively illuminate when both surfaces are equally illuminated. When the lights are put out afterwards, you will have this fact demonstrated by means of the arrangement now on the table.

Through the kindness of a friend, I am enabled to show you the form of photometer that is used in the estimating of the light value of coal gas. The principle is the same as that we have been describing: it is virtually a Bunsen photometer, only the lights that are being compared occupy a fixed position, and the point of equal illumination is ascertained by means of this sliding arrangement in the centre, of which, as you will see, there has been placed the prepared screen, which receives the two lights that are being compared. On each side of the disc are two mirrors, so placed that the observer, standing in front of the instrument, sees in the two mirrors a reflection of each side of the prepared paper. In this case the whole of the paper has been waxed, with the exception of a small spot in the centre. The wooden rod, on which the carriage runs, as you will notice, has been so graduated, that when the point of equal illumination from the two sources has been ascertained, a direct reading is obtained at the opposite end from where the standard candle is fixed, there is placed, of course, the gas burner, and this is connected with a meter, which indicates the rate at which the gas passes per hour to the burner. The gas has to be controlled till the quantity passing registers five cubic feet per hour. I did not think it necessary for our purpose to-night to bring this part of the apparatus with me. Before closing, I would like to call your attention to the fact that all photometric experiments should be performed in an apartment where the walls have been blackened, and where there is a freedom from draughts. These conditions are not to be obtained in the Religious Institution Rooms, therefore any measurements we may make will only be approximate, but they will serve to illustrate the principle on which photometry as a branch of physical science is based.

One word as to the term standard as applied to the candle which has been brought before you this evening.

It has been proved by the committee appointed a year or two ago, to consider the question of photometric standards, that the sperm candle is very far from being a true standard. There have been various methods proposed, having for their object the production of a really reliable standard light. I should have liked very well, had time permitted, to have gone into this branch of the subject, but we must leave it over to some future occasion. It is highly probable, I think, that by the time we meet again next session we shall have placed in our hands the means of obtaining readily a standard light, more especially as the subject is engaging the attention at present of some of our best authorities.

TABLE OF VIEW ANGLES.

BY C. E. WOODMAN.

Rule—*Divide the Base of the Plate by the Equivalent Focus of the Lens.*

If the quotient is	The angle is Degrees.	If the quotient is	The angle is Degrees.	If the quotient is	The angle is Degrees.
·282	16	·748	41	1·3	66
·3	17	·768	42	1·32	67
·317	18	·788	43	1·36	68
·335	19	·808	44	1·375	69
·353	20	·828	45	1·4	70
·37	21	·849	46	1.427	71
·389	22	·87	47	1·45	72
·407	23	·89	48	1·48	73
·425	24	·911	49	1·5	74
·443	25	·933	50	1·53	75
·462	26	·954	51	1·56	76
·48	27	·975	52	1·59	77
·5	28	1·	53	1·62	78
·517	29	1·02	54	1·649	79
·536	30	1·041	55	1·678	80
·555	31	1·063	56	1·7	81
·573	32	1·086	57	1·739	82
·592	33	1·108	58	1·769	83
·611	34	1·132	59	1·8	84
·631	35	1·155	60	1·833	85
·65	36	1·178	61	1·865	86
·67	37	1·2	62	1·898	87
·689	38	1·225	63	1·931	88
·708	39	1·25	64	1·965	89
·728	40	1·274	65	2·	90

Example.—Given a lens of 13 inches equivalent focus; required the angle included by it on plates respectively $3\frac{1}{4} \times 4\frac{1}{4}$, $4\frac{1}{4} \times 6\frac{1}{2}$, $6\frac{1}{2} \times 8\frac{1}{2}$, 8 × 10, 10 × 12, and 11 × 14.

1. Dividing 4·25 by 13, we have as quotient ·327—midway between the decimals ·317 and ·335 of our table; therefore the required angle is 18 deg. 30 min. Similarly—

Degrees.
2. 6·5 divided by 13, equals ·5 ; corresponding to 28
3. 8·5 „ 13, „ ·654 ; „ „ 36
4. 10 „ 13, „ ·77 ; „ „ $42\frac{1}{2}$
5. 12 „ 13, „ ·923 ; „ „ $49\frac{1}{2}$
6. 14 „ 13, „ 1·08 ; „ „ 57

—*Photographic Times.*

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Proceedings of Societies.

Photographic Society of Great Britain.

The ordinary meeting of this Society was held on Tuesday, the 7th inst., at the Gallery, 5a, Pall Mall East, Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the previous ordinary meeting were read and duly confirmed, and

Mr. P. A. Fraser was elected a member of the Society.

The Chairman, in alluding to the proposed display of prints by the rapid gelatine printing processes, said he felt some disappointment in seeing so few; he should have preferred the members making a good show, especially of any failures likely to be encountered in working the process. He then called upon Mr. Walter S. Bird to read a paper entitled "On the Photographic Reproduction of Pictures in the National Gallery, by A. Braun et Cie," which was illustrated by a numerous display upon the walls of the Gallery of examples printed in carbon from some of the well-known works of the old masters.

Mr. Bird commenced by remarking upon the general interest recently shown when it was announced that the art treasures of our National Gallery were to be photographed, and how this interest became intensified when it became known that the important work had been placed in the hands of a foreign firm to execute. He wished to point out that 349 pictures in the collection—viz., 65 of the British school and 284 Foreign, was a gigantic undertaking to reproduce by photography; and when there were competitors, native and foreign, equally good, the choice should naturally fall to the natives. The Fine Art Company, he said, had applied for and obtained permission to photograph the pictures; but certain facilities in removing them from their positions on the walls, which were granted to Messrs. Braun, had been withheld from the English firm, who thereupon abandoned their project.

Messrs. Braun had reproduced, within the last sixteen years, nearly all the pictures in the principal galleries of Europe, and he thought their success was a strong recommendation in favour of their selection, seeing that they had circulated hundreds of copies from the negatives so made, and were able to guarantee the required promises of safety to the pictures to be entrusted to their care.

Mr. Bird then dealt with the commercial aspect. He doubted if any London house would like to be at the expense of photographing a whole collection, only a few of which might prove saleable, since the demand was limited pretty much to art students, and not the general body of photographers or the people. In fact, the one firm of Messrs. Braun was able to supply the requirements of the world. Regarding the alleged superiority of this firm's productions, he said, has a substantial advancement been achieved? He thought there was a decided advance, but the means, although not divulged to him, was not all mystery. Photographing in natural colours was, doubtless, a dream of the future; but photographing colours in relation to their true value was an accomplished fact, thanks to the exertions of Waterhouse, Vogel, Abney, and others, whose scientific experiments now rendered it possible to reproduce works of the greatest value to the art student. Mr. Bird then quoted from a letter sent by Messrs. Braun, in which they claimed to have a more perfect method of reproduction than any discussed before the societies, and denied that the negatives were elaborately retouched, or that more retouching was done than would be put on ordinary negatives. Mr. Bird then dealt with some of the subjects exhibited, pointing out what had lately been gained in detail, and the better rendering of the original colours. Summarising his own opinion, he considered the light yellows and lemon tints were impressed far more than formerly, chrome yellow rather less in proportion to the first-named. The browns were still as difficult as before; scarlet and crimson brighter than the original; green showed less modification; blues were affected as decisively as the yellows, but in the reverse direction, the lights were softer, cracks in the canvas scarcely visible. Vogel had stated that by dissolving eosine in the collodion it tended to prevent roughness. If chemical skill accounted for the superiority in the examples shown, then he thought it might be a fit subject for further enquiry. Messrs. Braun's reproductions were all printed by the Swan double transfer process, which Mr. Bird thought peculiarly suited to this kind of work.

At the conclusion the Chairman invited a discussion.

Mr. J. Werge inquired whether Mr. Bird had seen any of the negatives from which the prints had been made.

Mr. Bird had not. That was a privilege he should like.

Mr. Werge: The absence of the negatives is an important matter in discussing a question of this kind. As an old engraver, he believed the difference was not so much dependent upon the way in which the negatives were made, as it was to the after treatment. Any one accustomed to the Lambert-type process could get a better result from a negative than by the ordinary method of silver printing.

Mr. W. England, upon the occasion of copying a collection of paintings in Paris, resorted to the plan of pasting thin bank post over certain portions of the negatives before printing, and thus was able to modify defects to a considerable extent.

Mr. Valentine Blanchard, after referring to Mr. Sawyer's able paper read last year, said he detected a want of harmony in the results now shown; they were somewhat crude, and, unlike the original painting, especially the Angels' Heads, by Sir Joshua Reynolds. So far as he could remember, this print was considerably stronger than the original, and he could not help thinking that some mechanical retouching had been adopted.

Mr. F. Whiting remarked, that by means of eosine in collodion, he obtained a very presentable reproduction of a water colour drawing, which a friend had failed to make a satisfactory negative from in the ordinary way, and this made him think the credit was due to the negative, and not the after work upon it.

Mr. Blanchard meant to say that, in addition to the chemical means, mechanical had been adopted as well, and, being carried too far, had become crude in consequence.

The Chairman, in closing the discussion, said it would have been more gratifying if the negatives had been made by an English firm. To illustrate the progress made in copying paintings, he said, thirty years ago Sir J. Herschell and himself had an argument as to whether a certain speck of light, on plate, represented a nose or not, and they decided in the affirmative; but there was no longer any need of doubt. He then called for a hearty vote of thanks to Mr. Bird for his paper, which was accorded.

The next ordinary meeting will take place on Thursday, May 12th, and the next technical meeting on Tuesday, the 28th inst.

South London Photographic Society.

An ordinary meeting of this Society was held on Thursday, the 2nd inst., at the House of the Society of Arts, John Street, Adelphi, W.C., Mr. T. Bolas, F.C.S. in the chair.

The minutes of the previous meeting having received confirmation, the Chairman called upon Mr. G. M. Satchfield to give a demonstration of the "London Acme" rapid enamel paper.

Mr. Satchfield explained that the "Acme" paper was intended for direct printing, which operation took place much quicker than by means of albumenized paper. Toning and fixing occupied no more than two minutes, giving any desired tone, without loss of depth, ranging between a warm silver print and a platinum black; untoned prints yielded an agreeable colour similar to red carbon. He considered a quarter of an hour's washing ample, and showed examples which had been printed, toned, fixed, washed, and stripped from glass that afternoon. It was especially suited to weak negatives, and apparently permanent. Examples were passed round in various stages of finishing and rapidity of toning and fixing practically exemplified.

The Chairman considered the speed of toning and fixing to be a great advantage; the colour of the untoned prints was really very nice, and an effect which he thought many would prefer.

Mr. E. W. Foxlee enquired how much quicker prints could be made than by ordinary silver printing.

Mr. Satchfield said about one-third; but negatives too thin for ordinary paper would give excellent results on the paper described.

Mr. F. A. Bridge showed an acme print from a negative he was sure no one could get a silver print from. He toned and fixed it in a minute and a half. Regarding rapidity of printing, he did not think it any quicker than ordinary paper, and illustrated his contention with prints made from each process side by side from the same negative.

Mr. Foxlee expressed a doubt regarding the permanence of the prints shown, since organic compounds would be absorbed to an extent by the paper; in any case hypo would be absorbed.

The Chairman said there was no objection to washing the paper a longer time. It was interesting to note how the gelatine processes were pushing forward all over the photographic world; whether it would revolutionize printing as it had negative work, he should not say at this stage. Mr. Satchfield and others had made many experiments in that direction, and obtained promising results. One thing was evident: there was a better result obtained from thin negatives, and photographers would not be slow to recognize this feature, and regulate the density of their negatives accordingly. Speaking of gelatine prints generally, he thought they offered a better surface for working up than albumen.

A short discussion on the suitability of various papers for photographic purposes then ensued, after which the Chairman called upon Messrs. Morgan and Kidd to exhibit the capabilities of their "new paper for negatives."

Mr. Kidd commenced by reading a short paper (see page 234), upon the conclusion of which he successfully demonstrated the mode of making enlarged negatives upon bromide paper, using ferrous oxalate as the developer, the result being highly satisfactory. Several paper negatives made in the field, and prints therefrom, were passed round. Mr. Kidd explained that the paper was placed between two plates of glass for exposure in the camera, and he further said that by straining the paper over cardboard, and doubling the same outwards, two perfectly flat surfaces were obtained.

Mr. Jerrard Smith had made very many paper negatives in the manner described, and quite agreed with Mr. Kidd that it was not advantageous to render the paper transparent with castor oil or other greasy substances; if it were possible to use any other substance, it would facilitate printing.

Mr. Foxlee advocated paraffin. Had its virtues been known, he said, in the early days of paper negatives, castor oil would not have been used.

The Chairman agreed with the previous speaker, and said that a good sample of paraffin, that would melt at a high temperature, such as ozokerite, would not communicate the slightest trace of grease to the print. He then mentioned the old Talbottype plan of drawing down the sensitive sheets for exposure.

Mr. Bridge thought a more perfect method of exposing was necessary than at present.

Mr. H. Wilmer suggested packing a number of sensitive sheets into a block like a blotting pad.

Mr. C. Poirson submitted that if the backs were coated with plain gelatine, it would obviate the present tendency to curl inwards.

The Chairman referred to the great advantage to be derived by foreign correspondents and others, who could now send home their negatives by post with less risk, and, as they had just witnessed, quite as perfect as glass. Storing was another consideration. He called for a hearty vote of thanks both to Mr. Satchfield and Messrs. Morgan and Kidd, which was accorded.

The next ordinary meeting was announced to take place on Thursday, May 7th. The proceedings then terminated.

London and Provincial Photographic Association.

At the usual weekly meeting of this Society on Thursday, the 2nd inst., Mr. A. Mackie occupied the chair.

Mr. A. Cowan exhibited his combined camera and changing-box. The camera shown was made for 4 by 4 plates. Two boxes were ranged on each side, being together the same length as the case containing the camera. The two front boxes were fixed to the camera; these opened in front with spring lids, and could be used for carrying extra lenses or other pieces of apparatus that might be required in a day's outing; to these were hinged the other two boxes, one for the unexposed plates, the other for the plates after exposure being connected with a carrier running across the back of the camera, by which the plates travelled propelled by a sliding arrangement, first being brought into position for exposure, then passed into the box on the other side. To focus, the two boxes containing the exposed and unexposed plates with the connecting carrier were turned back on to the top of the two boxes in front, leaving the screen free for observation; the screen being hinged at the bottom, was let down previous to the two changing boxes being brought back to their place. The screen, by an ingenious swing arrangement, was made to turn inside the camera when packed for travelling. The focussing was done by means of a screw in front of the camera. The changing boxes in the exhibit were made to hold fifteen plates.

Mr. A. L. Henderson showed a coating machine that he had made, similar to one he had seen exhibited at the Edinburgh Photographic Society on the occasion of his recent visit. It consisted of a trough to hold the emulsion, with two india-rubber rollers, one roller resting on the other, the lower one being partly in the emulsion, the paper was wound on the upper one and drawn between the rollers.

It was found in working on Thursday evening that the rollers did not allow sufficient emulsion to remain on the paper.

Mr. Henderson explained that he had not tried the machine before bringing it down to the meeting, and that with the one he had seen at the Edinburgh Society, size was used to experiment with.

Mr. W. E. Debenham thought that the rollers were probably too heavy; he suggested suspension sockets to take off the weight of the rollers.

A letter was read from Mr. W. K. Burton, altering the date of his lecturette to the 16th inst.

Glasgow Photographic Association.

The annual business meeting of the Society was held in the Religious Institution Rooms, on Thursday evening, 2nd April; the President (Mr. A. Robertson) occupied the chair.

Mr. Wm. Lang, Junr., read a paper on "Photometry, or Testing of Light Values" (see page 235), which he illustrated by diagrams, and showed by the use of various photometers the manner in which the illuminating power of any artificial light was arrived at. He also described the new mitrailleuse oil lamp, and considered that it would be admirably suited for use in the printing of gelatino-chloride papers, as their illuminating power ranged from forty to eighty candles. Three of these lamps were shown, and thus allowed the members to form an opinion on their merits, their illuminating powers being respectively that of forty, sixty, and eighty candles.

Mr. **Bell** thought if they could be applied to the lantern, this form of oil lamp would be found greatly superior to the present two, three, or four-wick oil lamps.

Mr. **Lang** said that he was having one made to fit his lantern, and should it prove successful, he would be happy to bring it before the members. Prints from isochromatic plates (Vogel's and Ives') were handed round by Mr. Lang, along with prints of the same subjects from ordinary plates. In the former there was a decided gain in what has been considered the more non-actinic colours.

Mr. **Duthie** also handed round two prints, one from a Tailfer and Clayton's plate, and the other from Wratten's ordinary instantaneous plates; the first-named showed a marked difference in the colour shades over the latter.

A few of the members having given their opinion on the prints—the general feeling being that isochromatic plates would be found very useful in copying paintings or coloured fabrics—

A vote of thanks was given to Mr. Lang for his paper, and the trouble he had been at in preparing his experiments to illustrate it, for showing the mitrailleuse lamps; and along with Mr. Duthie for exhibiting the specimens of isochromatic photography.

The following gentlemen, nominated at the previous meeting, were declared duly elected as office-bearers for session 1885-86, viz:—

President—Mr. Wm. Lang, Junr.
Vice-Presidents—Messrs. A. Robertson and M. Dodds.
Treasurer—Mr. G. Bell.
Secretary—Mr. Daniel Robertson, 37, Glassford Street.
Council—Messrs. P. Falconer, A. Goodall, A. McTear, J. Urie, Junr., Wm. Brown, and J. J. Moran.

The **Chairman**, having delivered a short speech in vacating his office as president,

Mr. **Urie** proposed a vote of thanks to him for the interest he had shown in the Society during his term of office, and thereafter the meeting separated.

Amateur Photographic Association.

A **council** meeting of this Society was held on April the 1st, the Right Hon. the **Lord de Ros** in the chair.

The minutes of the last meeting having been read and confirmed, the following members were elected:—Messrs. Frank Griffith, Walter Wood, Henry Harben, W. Dumerque, A. C. Lyster, Maurice de Dechy, J. Howson, J. F. M. Clarke, Captain the Hon. E. Dawson, R.N., and Mr. A. C. Andros.

The prizes awarded at the annual meeting were then laid before the meeting, and approved, which were as follow:—For R. Leventhorpe, a large silver goblet; for R. B. White, a silver goblet; for W. Muller, a water colour drawing in frame; for R. O. Milne, a silver goblet; for H. E. White, a silver goblet; for W. S. Hobson, an album, elegantly bound; for C. Stephens, an album, elegantly bound; for S. Norman, a silver goblet; for W. Adcock, an album, elegantly bound; for W. D. James, a water-colour drawing in frame; and for W. Vanner, a water-colour drawing in frame.

Messrs. Walter Wood and W. S. Hobson were elected members of the council.

Derby Photographic Society.

A meeting of the Derby Photographic Society was held on Wednesday evening, April 1st, in Mr. Keene's studio, and a paper was read by Mr. **Keene** on "The Platinotype Process" (see page 231).

There was a very good attendance, and several new members were elected. The Society, which is not yet twelve months old, now consists of seventy members, and will shortly be increased by the additon of fifteen ladies who desire to join the Society, not necessarily with the intention of becoming amateur photographers, but to take part in the excursions, which will afford excellent opportunities for sketching, as well as for taking photographs.

Mr. Keene's paper was illustrated by finished pictures, showing how photography is likely to supplant engraving for the purpose of book illustrations, and also by undeveloped prints, about twenty of which were developed in the presence of the company.

The usual vote of thanks concluded a most successful and enjoyable meeting.

North Staffordshire Amateur Photographic Society.

The ordinary fortnightly meeting was held on Wednesday evening, April the 1st, M. C. **Alfieri** presiding.

Copies of the new rules were distributed among the members.

Miss E. Freeman and Mr. W. E. Leck were elected members.

It was resolved that application be made to the local railway company to extend the privileges granted to angling societies to this Society.

Dundee and East of Scotland Photographic Association.

The seventh regular meeting was held in Lamb's Hotel, Dundee, on Thursday, 2nd of April.

After the routine business had been disposed of,

Mr. **Frank W. Young**, F.C.S., gave a most interesting paper on "The Eye as a Camera," in which he explained the uses of the different parts, and showed the analogy between that organ and the photographer's instrument.

On the motion of the **Chairman** (Mr. Cox), a hearty vote of thanks was awarded to the Lecturer.

Photographers' Benevolent Association.

The monthly meeting of this Association was held on 1st inst., at 181, Aldersgate Street.

The minutes of the previous meeting were read and confirmed.

Messrs. F. K. Biddle, T. Clarke, C. Pickering, E. Stewart, and G. Musitano, were elected members of the Association.

An application for assistance was next considered by the Board, resulting in a grant being made for the amount necessary to meet the case.

The correspondence having been dealt with, the meeting adjourned until May 6th, when the adjourned annual general meeting will take place. The committee hope that all members who can will be present, and expression of opinions by post from those who cannot. Suggestions for the improvement of the Association are also respectfully solicited from non-members.

Talk in the Studio.

A Photographic Exhibition at Oporto.—On the 1st of September next, an International Exhibition of Photographs and Photographic Appliances will be opened in Oporto, and the Exhibition will remain open until the 31st of October. Applications for space must be addressed to the "*Commisao Executiva da Exposicao Internacional de Photographia,*" *Oporto*, before the 30th inst., and all goods for exhibition must be sent in (addressed as above) before the 1st of July. The following are admissible:—A, prints in gelatine, on metal, glass, or paper; B, heliographic impressions; C, Woodburytype; D, photo-litho and photo-zincography, gilotage, &c.; E, carbon photography, chromotype, photochrom. on paper, glass, wood, and porcelain; F, photography, paper, collodio chloride, gelatino bromide, gelatino chloride, platinotype, &c.; G, cyanotype and analogous processes; H, enamels, vitrified photographs, coloured photographic processes applied to pottery; I, amplifications of portraits and landscapes, special positives for the lantern; J, apparatus and photographic implements; K, photo-micography, different appliances of photography relating to micrographical studies and investigations; L, photo-mechanic processes; M, gelatine plates, paper prepared for the different processes, cardboard, chemical products, albums, passepartouts, together with whatever ornamentations may be applied to photographic proofs.

Isochromatic Photography.—On page 139 we referred to the use of white glass coated with a coloured collodion film as a cover for the original, this being found by Dr. Vogel to be more convenient than a commercial coloured glass. Dr. Vogel then recommended the colour known as methyl-orange for staining the collodion. He now finds that the colour sold by the Berlin

Aniline Company (Actien-Gesellshaft fur Anilinfarben-Fabrication zu Berlin) is to be preferred. Half-a-gramme of aurautia is shaken with 100 cubic centimetres of plain collodion, and after the insoluble matter has settled down, the glass (patent plate) is coated. The plate may be placed inside the camera, or may be used as a cover to the object to be copied.

INFLUENCE OF LIGHT ON THE GERMINATION OF SEEDS. By A. Cieslar.—The author finds that many seeds hitherto thought to germinate in light only, will do so equally well in darkness. Small seeds with poor reserve of material germinate better in light, whilst those with a large reserve do so equally well in darkness; he did not find any seeds which grew better in darkness than in light. Yellow light accelerated, violet retarded germination, and the latter at a low temperature almost rendered growth impossible. In white light there was greater energy of growth, a higher percentage of buds, and generally more activity than with coloured lights; the author thinks this due in part to the transformation of light into heat.—*Journal of the Chemical Society.*

STANDARD OF ILLUMINATION.—By W. H. PREECE (*Proc. Roy Soc.*, 36, 270—275).—After alluding to the unsatisfactory methods in vogue for measuring the intensity of illumination. the author suggests as a standard the space illuminated by a standard candle at 12·7 inches distant. For a comparison of the relative illumination of surfaces, use is made of a Swan's incandescent lamp, giving a light of 2½ candles with a current of 5 volts, enclosed within a box with blackened walls, over the end of which is stretched a diaphragm of paper; the latter has a grease spot at its centre. At about 12 inches from the tube is a screen of paper as a reflecting surface. The current is supplied from a secondary battery. From experiments detailed in the paper, it appears that the illuminating power of the glow lamp increases in the ratio of the sixth power of the current: hence a determination of its strength gives the necessary equivalent for ascertaining the degree of illumination. Though there are certain difficulties arising from alteration of the glass envelope of the lamp, deterioration of the carbon fibres, and failure of vacuum, yet the light emitted from the passage of a given current is more easily reproducible, and probably more uniform than any other artificial standard.—*Journal of the Chemical Society.*

PHOTOGRAPHIC CLUB.—The subject for discussion on April 15th will be on "Reducing and Intensifying of Gelatine Negatives."

To Correspondents.

*** We cannot undertake to return rejected communications.

WILLIAM GOODE.—1. We have found those by all the leading makers to be excellent as a rule, but of course there is nothing to be surprised at in an occasional failure to quite reach the standard. 2. Get a few of each, and judge for yourself.

M. D.—Within anything like reasonable limits the larger the better, and we would suggest that you should try and get a second-hand cast iron "imposing slab" such as is used by printers. A slab about two feet square would not only do well for the size you mention, but also for larger plates. You may perhaps get one by writing to Taylor, printer's broker, Little Parker Street, Drury Lane.

A. R.—1. The plates have probably been damaged by fumes which the packing material did not effectually exclude, or by some emanations from the packing material itself. 2. It is less likely to happen if you use a non-ammoniacal developer.

BROAD ARROW.—Husnik's "Lichtdruck;" it is published by Hartleben, of Vienna, and can be obtained through any foreign bookseller—Trubuer, of Ludgate Hill, for example.

ALFRED DANDO.—Not many weeks; your best way will be to advertise for an instructor.

TROMBONE.—Try Beach's soda and potash developer, and do not under-expose. The formula is to be found on page 19t of the YEAR-BOOK.

X. M. N.—They are due to minute metallic particles in the original paper, and the only thing you can do is to obtain another sample.

H. P.—If you want to take out a weight of 100 lbs. on rough and hilly roads, you had better get one of the specially-made parcel carrying tricycles, and at the same time prepare yourself for hard work.

W. NORTH.—It is not a very convenient operation to carry out when on a journey. Clean some glass plates, and rub one side over with powdered French chalk, taking care to dust off the excess; after which coat the chalked side with collodion, and when this is dry, all is ready for mounting the prints on the glass. Allow the prints to remain for a few minutes in a warm solution of one part of gelatine in twenty or thirty parts of water, and after having flooded the collodionised surface of the glass with the same solution, place one of the prints face downwards upon it. Now expel all excess of gelatinous solution by gently stroking the back of the print with a squeezee. When quite dry, the print can be stripped from the glass. See p. 173 of the YEAR-BOOK.

J. H. B.—The process you mention, if not the best, is so good that we cannot suggest anything that is more likely to suit you.

H. S.—1. There is not any apparatus of the kind which gives accurate results, but the minute variations may be disregarded in actual practice. 2. Certainly not for every-day work, but possibly it might prove of value in certain scientific investigations. 3. That described on page 163 of the YEAR-BOOK is equally good for prints or for negatives, while if you want one for plates only, get a tinman to make one according to the directions of Mr. McKellen, who writes on page 60 of the same volume. If you have not a copy of the YEAR-BOOK, send us a post card, and we will forward one to you. 4. Most likely—indeed, almost certainly—the result of insufficient washing. 4. Thank you for your promise: we shall write to you.

AMATEUR.—You have been misinformed; nothing of the kind is being done. Your informant should make further enquiries, and he will find that he is mistaken.

TYPOGRAPHER.—1. Work from a transparency instead of from a negative, but take care that the transparency is not too dense. 2. One part of gelatine and ten of water. When dissolved, allow the mixture to cool to about 100° Fahrenheit, and then stir in one-fourth part of ammonium bichromate. 3. Your account is not quite clear, but we imagine you refer to the old process of etching with a solution of perchloride of iron.

W G. S.—Hardly a matter for discussion in the NEWS; or, if discussed, the matter should be made less personal.

SIGMA.—Only by very hard rolling.

D. CUNNINGHAM.—See article on the subject in the "Dictionary" this week.

A YOUNG BEGINNER.—You do not make an ordinary etching ground sensitive, but use sensitive materials to make an etching ground. See the first article in the present number.

ED. WHEELER.—Your failure is probably due to the use of impure cyanide of silver. Monckhoven's proportions, given in answer to "Forrester," in the NEWS of last week, answer well.

MORRISON.—1. It is the most remarkable case of reversal which we have seen, and we will make some experiments with the view of throwing light upon it. 2. We do not think it has been patented in this country; but, at any rate, you would be safe in making one for your experimental purposes. 3. That described in our first leader of this week.

J. P.—From Law, Sons, and Co., Windsor Court, Monkwell Street, E.C.

J. E. FORD.—An article on the subject shortly; but in the meantime, read the account of the direct method, described in our present issue.

LITHO.—The collodion process is usually employed.

AMATEUR.—Perhaps you have under-exposed, or used a developer containing too large a proportion of bromide.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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CAPTAIN ABNEY'S CANTOR LECTURES

On Monday evening next, the 20th inst., at eight o'clock, Captain Abney will deliver the first of a course of two lectures on "Photography and the Spectroscope," the date fixed for the remaining lecture being the following Monday, the 27th inst. The following is the syllabus of the lectures:—

Lecture I. *April 20th.*—The prismatic spectrum and influence of the material on the spectrum. Dispersion and resolving power. Uses of the slit and collimator. The spectroscopic camera. Application of photography for investigating the spectrum, and of the spectrum for investigating photography.

Lecture II. *April 27th.*—The diffracture spectrum. The ordinary grating. Influence of the number of lines on resolving power. The reflection grating. The flat reflection grating. Absorption of radiation and atomic motion, and the formation of the photographic image.

Although these lectures are primarily intended for the members of the Society of Arts and their friends, the Society of Arts has always been liberal in admitting outsiders who are likely to profit by the instruction offered, so we may hope that any reader of the News who may wish to attend, will be able to gain admission by writing to the Secretary, Mr. H. Trueman Wood.

◆

THE EDINBURGH CONFERENCES ON THE PICTURESQUE.

In our "Notes" of last week, we alluded to some of the advantages resulting from the system initiated by the Edinburgh Society. It is very difficult for our readers to thoroughly realize the great interest taken in the discussion by those present at the conferences, and it is only the fact that it is not practicable to reproduce the pictures themselves that prevents us from reproducing the discussions in full.

The following extracts from remarks made by Mr. Macbeth are interesting in themselves, and carry instruction, even although the subjects criticised are not present to the reader:—

"*Photographic Portrait of an Elderly Gentleman, seated, a Table with some Large Books on it at his Back, close to his Chair. A Three-quarter Length down to the Knee, most likely from a Wet-Plate Negative.*

"I do not imagine that the photographer could claim the merit of arrangement here. It seems so natural, and so consistent throughout with the feeling expressed. I think it is most likely this position was taken by the person himself. Only the operator has shown not a little skill in the choice of point of sight, and the particular point to which the sitter should turn his eyes. There is perhaps no more important matter than for the sitter to be well directed where to look. The eyes here are a little off the plane of face. This gives a slight feeling of reserve, not staring, not forward, but retiring and reticent. Very possibly this also came direct from the person's own act, but whatever be the cause, it is extremely good, and in beautiful harmony with the subject.

"What leads me to suspect that the operator had not much hand in the arrangement of his subject, is the 'do no better' of placing the table and books behind the back of the sitter. This should not be. The subject having been placed so much in the centre (this being thought to be necessary), the operator was obliged to fill up the space behind the chair. In my opinion it would have been better to have placed the sitter nearer to the boundary line, and filled up the gap on the other side by the same accompaniments. As it is, the line of the leg is not sufficiently extended.

"Another thing which leads me to suppose the operator did not interfere with the person's own action is the beautiful unconscious position of the hands. Fortunately, by their being so little seen and so quiet, great prominence is given to the head. There is nothing so perplexing at times, either to the operator or the sitter, as to know how to place the hands. One is always safe when the sitter naturally places them together. They should either be thus, or very widely apart; in either case they are less distracting to the spectator. If apart, and within a foot from each other, the effect is bad, and generally this is the result of not knowing where and how to place them. It is important also to notice that when the figure is sitting in a three-quarter point of view, the hands (where they come in) should not be directly below the head. This gives repose to the more important part—the seat of intellect.

"*En Reconnaisance by Edouard Detaille. From a Photo-Gravure by Goupil and Co.*

"This street scene during the Franco-Prussian war affords, as a piece of composition, many valuable examples of careful study, both in spirit and design. We feel at once in the presence of some very awful and stirring incidents. I have no doubt the elements of the composition were all carefully gathered, not from one scene, but from several, and compiled so as to embrace all that was dramatic, and thoroughly telling the story of the conflict.

"I do not know the name of the street. It bears the impress of being some of those lanes in the suburbs of Paris. In the distance is seen a French officer on horseback and his regiment making their appearance. A little farther on towards us are seen two bodies of men—French soldiers, coming into the street from both sides. The French at this moment are evidently masters of the situation. At the window, in the white house, we see its inmate on his guard looking out. Near him are two men looking over the wall, and cheering those entering on the scene. A little to the right are two boys dreadfully frightened, creeping along by the wall. Towards or near the centre is the principal group of eight soldiers and a boy. They have passed on their left a wounded German sitting up holding his wounded arm, and approach on their left, probably an Uhlan apparently dead, lying over his wounded and dying horse. To the right of the principal group a most touching incident is depicted. A poor fellow, a German, has fallen, and is attended by old people who have come out of the adjoining house. If you notice, the street takes a bend in the foreground, giving beautiful form, and producing variety in the ground plan of the picture.

"In a good design where there is much variety, the artist need not actually divide the surface of field with so many odd numbers of lines. Still, by analysis it will be found that the intersections of odd numbered cross lines will very frequently fall over the most of the important points of the subject. I submitted this work to the test of seven divisions both in length and breadth of the field, and was struck with the frequency with which the intersections fell on the points of interest. The horse is a most important object for the foreground. The lance of the Uhlan with the flag at the end of it is very valuable. Also, what by an ordinary observer would be considered accidental, because they appear so, are the hats, sword, and pistol lying in different places. The boy guide is very natural, indeed every figure is so varied in his form and position, that every one appears in his action to be quite casual. No instantaneous photograph could have realized more than is here so skilfully drawn and represented. The feet of the principal group form a great study. We often see, in instantaneous street views, some ludicrous action in the feet of those walking, so much so that we are apt to question the correctness of it. This shows that instantaneous work does not convey the impressions conveyed to us when we see people walking. Now here, as in the action of the young soldier to the right in the principal group, you see how carefully the artist placed the feet. It is one of the most difficult things to notice when one foot touches the ground, where the other is, and what position it takes. Few are aware that the moment we begin to move, the head takes the lead, and no sooner is it bent out, than either foot is put out to support it. You will always find that when a person leans on one foot, the head is plumb above it; when a person stands on both feet equally, the head is then right above between the two. These facts are more or less according to the action beautifully illustrated in this picture, more especially the head always supported in the action of every figure here presented."

Other societies might well imitate the Edinburgh Association, and organise discussions upon the merits of pictures selected for criticism. The plan of projecting them upon the screen by means of the optical lantern is an excellent one, as under the circumstances all can see the subject under consideration.

THE DEATH OF GEORGE SWAN NOTTAGE, LORD MAYOR OF LONDON.

As most of our readers have already heard from the newspapers, the Lord Mayor passed away at about half past seven on Saturday morning; the immediate cause of death being extreme exhaustion resulting from pleurisy and diabetes. He took cold at Brighton while present at the review of Easter Monday; but during the middle of the past week he recovered from the resulting illness sufficiently to enable him to distribute the Easter gifts to the boys of Christ's Hospital. Still, he did this contrary to the advice of his medical attendants. Immediately afterwards he became worse, and he expired at the time mentioned.

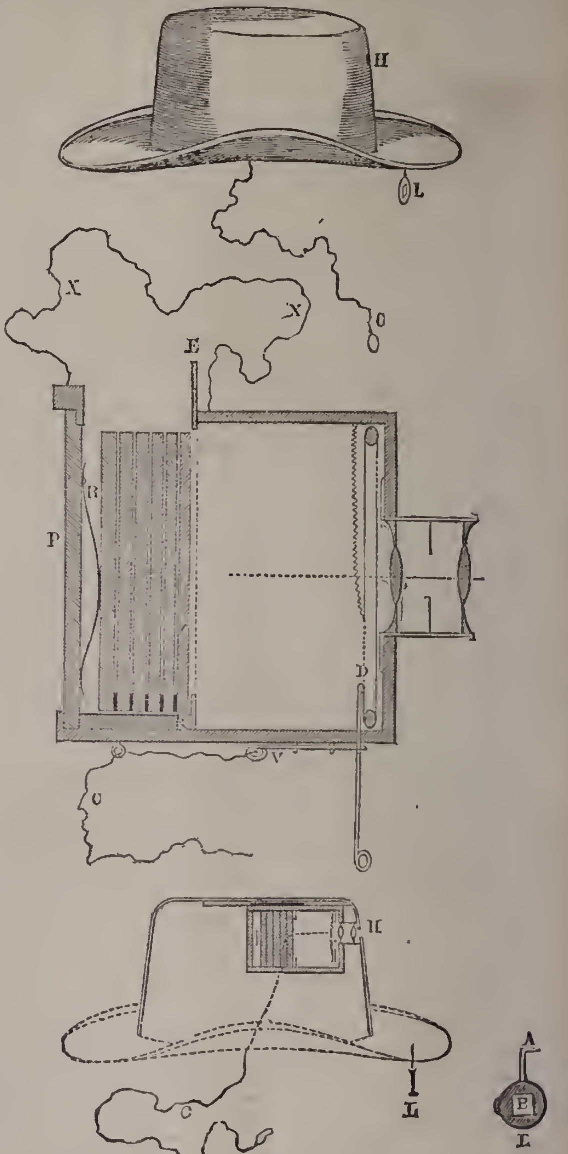
The late Lord Mayor was born in 1823, and from his early youth he evinced tastes which led him into scientific and artistic circles. He was associated with Sir David Brewster in much of his work relating to the stereoscope, and the commercial outcome of this association was the establishment of the London Stereoscopic Company. The wonder and delight with which the public received this invention will be remembered by our readers. Notwithstanding the strange circumstance that the realistically solid views of the stereoscope are no longer very much appreciated by the general public, the firm has retained its name, and has done a very extensive publishing trade. Mr. Nottage leaves a son and daughter; the former, Mr. Charles G. Nottage, was called to the bar not long ago, and the latter is married to Mr. S. E. Palmer, of the well-known biscuit firm in Reading.

It has been arranged that the funeral shall take place in St. Paul's Cathedral on Saturday next at noon.

DE NECK'S HAT-CAMERA.

Several hat-cameras have been invented of late, and one of the best we have seen is that designed by Mr. J. De Neck, a well known amateur residing in Brussels.

The subjoined drawing is taken from the *Bulletin Belge*, and does not require very much explanation. The hanging-piece, L, is a kind of finder provided with a square opening corresponding to the field covered by the lens, and the double-blind shutter, D, is made to act by the cord C. There is no focussing screen to the apparatus, as the objective is set to a distance which fairly covers all objects at any distance beyond a known minimum, so no focussing is required.



The plates, each of which is enclosed in a very light frame of brass, are introduced into the apparatus by the door P, and the front one is kept always in focus by the action of the spring R.

After exposure, the front plate, together with its frame, is lifted by means of the extractor E, into the pocket X, and introduced into the camera again, immediately in front of the spring R. The camera slides into grooves attached inside the crown of the hat, and may be readily removed for changing the plates.

PHOTOGRAPHIC COMPOSITES.

BY FRANCIS GALTON, F.R.S.

Your request to send specimens of photographic composites as illustrations for the Photographic News happened to reach me at an appropriate time. It had just been arranged by the Council of the Anthropological Institute to assign an evening to two memoirs on the race characteristics of the Jews, and to the discussion that might arise upon them, and I had already sorted out for exhibition at that meeting a few composites of Jewish faces that I made some time ago. They are, I think, the best specimens of composites I have ever produced; they were made at the suggestion of Mr. Jacobs, the author of the more important of the two valuable memoirs then about to be read at the Institute. I therefore had them in hand, and am now able to send them to you with pleasure, understanding that Mr. Jacobs will furnish you with his own views as to how far these composites succeed, in his opinion, in presenting the typical features of the modern Jewish face. On this point I will consequently abstain from saying anything, though I may mention that the individual photographs were taken with hardly any selection from among Jewish boys in the Jews' Free School, Bell Lane, which, by the way, I am informed is the largest school of any, other than Board Schools, in the United Kingdom; and to the courtesy of whose Head Master, Mr. M. Angil, I am much indebted. They were children of poor parents, dirty little fellows individually, but wonderfully beautiful, as I think, in these composites. The feature that struck me the most, as I drove through the adjacent Jewish quarter, was the cold scanning gaze of man, woman, and child, and this was no less conspicuous among the schoolboys. There was no sign of diffidence in any of their looks, nor of surprise at the unwonted intrusion. I felt, rightly or wrongly, that every one of them was coolly appraising me at market value, without the slightest interest of any other kind.

Plate I., that accompanies this article, contains full-face portraits and composites therefrom. Plate II. will follow next week, and will contain profiles. As regards Plate I., the four large ovals, A, B, C, D, are composites, and all the rest are individual portraits. A is the composite of the five individuals a_1 to a_5. It bears strong evidence of the very dark and sharply-defined curl on the forehead of a_5, although the intensity of the original has been reduced five times by the process. B is the composite of the five individuals b_1 to b_5; C is the co-composite of A and B, with the addition of three other individual portraits to increase its sharpness. The black curl of a_5 is still traceable on the open forehead of the composite, though its original intensity has now been decreased thirteen times; but it would be probably overlooked, or mistaken for some chance shade or stain, if it were not for the abruptness of its outline. Lastly, D is a composite of five adult faces, which are not given individually for want of space.

It is unnecessary to speak at length here on the principle of the process of making composites, or about the apparatus I use, as all this has been published in full in many places, and re-published in my last work.* It will probably be remembered by many of your readers that the principle consists in throwing faint images of a succession of accurately adjusted prints (or negatives) on the same part of a single sensitized plate, so that the resultant image is an aggregate of all its components, and a pictorial average of them. Also, that the apparatus I employ (made for me by Meagher) consists of the front of a camera fixed firmly on a solid board, with its back screwing out or in for purposes of focussing, and that in front of the lens there is a carriage which can be moved to and fro on a tramway along the board, and which supports a stage provided with many adjustments, to which the print is fixed. The print can be raised or lowered, it can be moved from side to side, and it can be rotated. Consequently (within moderate limits), whatever sized print is mounted on the stage, and in whatever position it may originally have been placed there, I can produce an image of it in the camera, of any required size, and can cause that image to fall in any required position on the sensitized plate.

The required position is defined by fixed fiducial lines, to which I adapt the image by the requisite adjustments of scale and position. I cannot briefly describe the somewhat complicated and delicate arrangement that I adopt for my fiducial lines, which is fully explained in the work above referred to. Suffice it to say, that when making full-face composites, I look through an eye-hole, down upon a piece of horizontal ground glass let into the roof of the camera, and there I see two images. The one is that of delicate and bright fiducial lines, similar in shape to those in fig. 1, and the other is the image of the portrait which has been thrown upwards by a hinged mirror that lies inside the body of the camera. While my eye is applied to the eye-hole, I have my hands free for making the adjustments. These are complete (1) when the pupils of the two eyes in the image of the print are exactly bisected by the upper of the two horizontal fiducial lines; (2) when the pupils of the eyes are equidistant laterally from the vertical line, for determining which the little cross lines give great assistance; and (3) when the parting of the lips in the image coincides with the lower of the horizontal fiducial lines. I adjust each portrait in turn in this way, and then, after capping the lens and turning the hinged mirror out of the way, I raise the dark slide. Then I withdraw the cap, give a brief exposure, and re-cap. Immediately afterwards, I close the dark slide, turn back the mirror, and remove the cap; then I am free to set to work with the next of the series of portraits, in the same way as that just described.

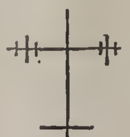


Fig. 1.

In taking profile portraits, I use a sloping line with two horizontal ones, as in fig. 2, and adjust the image of the print, so that its forehead shall be touched by the upper end of the sloping line, and that what I estimate to be the position of the front of the gums of the middle teeth in the upper jaw of the image shall be touched by the lower end of the sloping line. The line through the centre of the pupil of the eye in the profile image, and that through the parting between the lips, are then made, as before, to correspond with the upper and the lower of the two horizontal fiducial lines.

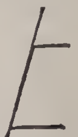


Fig. 2.

I will take this opportunity of emphasizing the value of a very simple precaution that vastly facilitates the process of reduction to a given scale, not only in making these composites, but also in other cases where reductions to scale and to position have to be made. I have not seen the plan to which I refer spoken of by others, and as I made it out for myself, I suppose it to have been hitherto overlooked, notwithstanding its simplicity. Speaking in the most general way, in every case of reduction to scale and position there are some two points (A, B) in the image of the picture, that must be made to fit two points (A′, B′) in a fiducial line. If the precaution, of which I am about to speak, has not been taken, the process of making the fit will consist of a set of separate and tedious attempts, until the fit proves satisfactory. At the beginning of each attempt, the picture has to be removed a step further off, or nearer, as the case may be, and there must be a fresh focussing and a fresh adjustment for position. In my plan, I arrange the fiducial line A′ B′ so that one or other of its two ends—say A′—corresponds exactly with the optical axis of the camera. Then, however much the portrait may be moved to or fro parallel to the optical axis, and however large may be the corresponding focussing change in the length of the body of the camera, the point A in the image of the print will remain glued, as it were, to A′ in the fiducial line. After the line A B has been once superimposed on A′ B′ there will remain only the position of B to be attended to. In my apparatus I simultaneously work the carriage with one hand, and the focussing arrangements with the other, and the image, while retaining its sharpness, continuously waxes or wanes, as the case may be, in its size. The horizontal line that bisected the pupils at first, always continues to do so, and the vertical line still continues to stand exactly half-way between the pupils. I go on steadily screwing until the parting of the lips in the image coincides with the lower horizontal fiducial line, and then the adjustment is complete. In a solidly-made camera, it is easy to find, and mark once for all on its ground glass screen, the exact position of the intersection of the screen with the optical axis of the lens.

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* "Inquiries into Human Faculty." F. Galton, F.R.S.—Macmillan and Co., 1883. See also Photographic News, 1881, pp. 316 and 332.

If we adjust the camera so that the image shall be of about the same size as the original picture, a little subsequent enlargement or reduction of the image will not require any sensible change of distance between the object and the ground glass screen. The lens can be moved to and fro a short distance, with the effect of altering the size of the image without sensibly affecting its definition. I therefore tested the position of the optical axis of my camera under these conditions. The camera and the portrait were both fixed, and as I screwed the lens in or out, the image grew smaller or larger without varying materially in sharpness, and expanded and contracted from a central radiant point, whose exact position I very soon ascertained. This being fixed, the parallelism of the tramway of the carriage to the optical axis was rectified until the to and fro movement of the carriage had no effect in causing the image A to separate from the fiducial A′. When all was satisfactorily arranged, the process of reduction to scale became swift, and very interesting to perform.

Beautiful as the adjustments of my camera are, I must honestly confess that if I had to begin quite afresh, I should employ a much more disconnected process. It would be an improvement on that which I first tried, which was merely to take prints that happened to be nearly of the same size, to adjust them under fiducial marks scratched on glass, and then to press down upon them a hinged flap, which carried two points that pricked two "register" marks in the margin of the print. The prints were successively suspended on two pins driven into the wall opposite the camera, the pins being passed through the register holes.

What I should do now would be to deal chiefly with group portraits. I formerly disparaged them for the purpose of composite portraiture as being too small and ill-defined, but they are now so frequently made on a large scale, and with good definition, and they form such useful collections of persons of the same family, profession, or race, that I should be inclined, when I have next to occupy myself with composites, to make much use of them, and to make the composites of the same size as they. Having selected portraits differing little in size, I should cut them out and paste them severally on cards, I should carefully measure the distance in each from eye line to lip line, under a lens in good light, and I should write the measurement on the card. I should also carefully estimate and write down the proper number of units of exposure, having regard to the vigour of the portrait. Then I should adjust and attach the cards to similar frames, guided by fixed fiducial lines, regarding only the upper horizontal line in fig. 1, with its short cross marks, and its intersection, the vertical line, and disregarding the mouth line. Lastly, I should prop these frames in succession in front of the camera. The points to be attended to would be, first, that the frames should be accurately propped. This would best be done by two notches, like inverted V's (Λ——Λ) cut in their lower edge, each notch straddling over a stout round peg firmly fixed at right angles to the wall. The adjustment to scale would be greatly facilitated by making the composites of the same average size as the prints, because in that case, as already remarked, a slight screwing to and fro of the lens will change the size of the image without sensibly affecting its definition. I should then carefully graduate by trial the head of the focussing screw in such a way that I need only turn it until the figure that came opposite to a fixed index was the same as that of the measurement written on the card, to ensure that the image should be correct to scale. As the point of intersection of the horizontal and vertical fiducial lines would lie in the optical axis of the camera, the image would always fall into its right place. I should use a common lens for the camera, one that did not define too sharply; but I should be very particular about the goodness of its mounting and focussing screw. These hints will suffice; the details must be filled in by the reader. The fault I find with my present camera is loss of light, due to the reflection of the image upwards from an enclosed mirror, and to the necessity of viewing it through a piece of (thin plane) glass inclined at 45°, the upper surface of which reflects the illuminated fiducial lines scratched on a blackened plate that is mounted at its side with a light behind it. I also think that my camera is too much of a jack-of-all-trades, and that I should get on much better if the portraits were successively prepared at leisure, making the actual photography of them a quick and simple process. In the plan I have just mentioned, all the preparations would be gone through in good light, and without any hurry. Then the photography would be swift, and it would become feasible to make many trials, leaving out one or other of the more doubtful portraits. As it is, I find the production of even a single composite to be an anxious and fatiguing work, and if any part of the complicated process goes wrong, all has to be repeated. There is no reason why this anxiety and fatigue should not be avoided.

There is nothing respecting composites that I should more gladly hail than the invention of a simple optical method of combining many images into one, so as to judge of the effect of a photographic composite before making it. Nothing can be better for optically combining two portraits than the prism of doubly refracting spar that I have used; but I cannot make a satisfactory and simple combination of as many as six or even of four pictures. I have described most of the plans that have occurred to me, but they all fail in some respect. The last I tried was a mosaic of pieces cut in the form of equilateral triangles, vertex outwards, from the rim of a large lens, and turned and brought close together with their vertices inwards. I then viewed the properly adjusted pictures through a small fixed telescope, in front of whose object-glass the mosaic was fixed. The method fails because the outer edges of the pictures are less bright than the inner ones; consequently the images are not equally mixed up.

In conclusion, I can only express a wish that photographers will try to make ethnological or family composites. I have been much pleased to find that both Dr. Billings, Surgeon-General of the War Department of the United States, and Mr. Thompson, lately attached to the Medical Department of the University of Edinburgh, and now to that of Cambridge, have used the method (as I also did, to illustrate a paper read at the York meeting of the British Association) to elicit the typical characteristics of the skulls of different races. It is, however, in ethnological inquiries, and in studies of hereditary and family characteristics, that I think the process would be most generally interesting.

It must be borne in mind by those who attempt to practise it, that off-hand methods will not avail. The adjustments must be made with judgment and extreme care to produce good effects. The difference between a very carefully-made composite, and one that has been combined with only moderate care, is great.

Explanation of Plate.

In the plate published this week the composites are on the left, their respective components on the right. E is the composite of the five portraits marked with small *e*; opposite it, and similarly, F is the composite of the *f's* opposite it. G is a co-composite of E and F reversed in position, and thus represents all the ten components on the right. H is a composite of five other older faces, which are omitted for want of room.

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POSITIVES ON GELATINO-CHLORIDE OF SILVER.

BY W. M. ASHMAN AND R. OFFORD.

Third Article.

In the previous article, we directed attention mainly towards a clear understanding of the simple acid chloride emulsion, and its uses for certain purposes.

Those who found an opportunity to follow us by actual experiment, have doubtless felt ere this that their exertions were rewarded; we should be glad to know that such was the case, since it would bear independent testimony as to the value of our remarks, besides inciting others to test some of the capabilities of the process.

Upon the present occasion, we intend showing how a compound emulsion may be successfully prepared from materials to be found in every laboratory.

After numerous experiments with the various salts enumerated in our last article, together with others not included in that series, we have decided in favour of two compound emulsions as being satisfactory. In each case the proportions of three-fourths of a chloride emulsion to one-fourth of an organic or other emulsion, was found to yield the best result.

Mixed emulsions being always slightly washed, no very particular care need be exercised with regard to an excess of haloid, the washing waters readily adjusting the balance. As before suggested for the plain chloride emulsion, we prefer employing two chloride salts, and thus avoid crystallization or deliquescence in the finished emulsion, as instanced by the following formula :—

Gelatine	= 7	grms. diss. in	70	c. c. of dist. water.
Ammo chloride	124	,,	20	,, ,,
Potass. ,,	·88	,,		
Silver nitrate	6	,,	20	,, ,,

Here we have a combination by means of which the two extremes are avoided. We prefer making the silver decidedly acid, before mixing with the chlorized gelatine, and for this purpose make an addition of about ten per cent. of citric acid. The solution should be effected, and the temperature slightly raised in each case before mixing takes place.

If the quantities above given be employed, the colour-test before mentioned will not indicate the presence of uncombined silver. To mix with the above, we take either a citrate or an oxalate emulsion; the former produces a film readily toned in the ordinary gold toning bath, but possessing indifferent keeping qualities; the latter necessitates a special gold bath of the thio-cyanate form, and has the property of retaining its whiteness for a long period. Perhaps we should rather say that it is quite possible to tone an oxalate prepared emulsion film with the ordinary borax bath, provided it be treated either before or after toning with a dilute solution of ammonium thio-cyanate.

In the first instance the following formula will form a proper proportion to blend with the above :—

Gelatine	2·	gram. dis. in	30	c.c.s of dist. water
Amm. cit.	1·8	,, ,,	6	,, ,, ,,
Silver nitrate	2	,, ,,	10	,, ,, ,,
Acid cit.	·3	,, ,,		

The presence of citric acid helps to prevent the formation of a compound of gelatine and silver; it also hinders coagulation of the gelatine by the ammonium salt—an event which always takes place sooner or later with gelatine when citrate and some other salts are present, unless there has been so much washing that the resulting pictures are poor and thin. The colour test applied to this formula will be somewhat disappointing, notwithstanding the excess of silver salt used; nor is it really possible, when dealing with such organic compounds, to define the chemical changes that take place. On the application of potassium bichromate solution to a drop of this emulsion, no change may be apparent for a few seconds, but after a minute or so the red chromate of silver almost invariably appears. The argentuous citrate is a soluble salt, but, as stated by both Roscoe and Fownes, the argentic citrate is insoluble. Besides this, there are most probably two or three salts, acid and neutral, and we are inclined to think that it is either the accidental formation of an argentous or a neutral argentic soluble salt that the colour test really indicates. This most probably only takes place upon the introduction of the chromic acid, because the addition of a chloride salt to the emulsion will not prevent the exhibition of free silver upon testing. Another argument in favour of this theory is found in the suggestion of a chemical authority to use argentous citrate as a means of getting argentous chloride by the addition of sodium-chloride. Any attempt to meet the case by successive additions of ammonium citrate will end in the apparent increase of free silver, and the ultimate separation of the gelatine from the precipitate and coagulation thereof.

Thus it appears evident that the citrate group are somewhat unstable in their behaviour when in combination with silver and its haloids, bringing about a train of complications which can only be unravelled by further experiment when the precise reactions may be chemically defined.

Having the mixed chloride and the citrate emulsions prepared, a mixture may be effected by adding one part of the latter to three parts of the former, and melting—if solidified—at as low a temperature as practicable. When the citrate emulsion is thoroughly incorporated with the chloride they should be rapidly set, thus reducing the evil effects of temperature to a minimum. Although three parts of chloride to one of citrate emulsion has been mentioned, the proportions must always remain a matter of individual taste, since printing colour is thereby affected; thus, the larger the proportion of citrate employed, the redder or browner will the printing colour be; and the less the proportion of citrate used, so will the colour tend towards the purples. When four-fifths of a chloride emulsion to one of citrate is employed, a rich violet printing colour is obtained.

After an interval has elapsed sufficiently long to ensure a firm jelly, the compound emulsion may be broken up by squeezing it through coarse wire mesh or mosquito netting into a vessel of cold water, where the thready emulsion may remain five minutes; the whole should then be thrown on a filter or fine hair sieve, and a second washing in clean water be given, the duration of each washing being five minutes only. As a general rule, the more the washing is prolonged, the better the emulsion will keep, but the resulting image will be less vigorous; for this reason we would rather impress upon those who prefer this formula, to confine each successive washing to the length of time mentioned.

It is necessary, as in all washed emulsions, to extract some of the superfluous water, otherwise it would be found to lack body in coating; and half an hour's draining on a filter is sufficient to effect the purpose. The usual methods adopted for melting, filtering, coating, and drying, follow; the details of which are too familiar to require repetition.

A suitable oxalate emulsion to mix with the chloride spoken of at the commencement of this article may be formed as follows:—

Gelatine	2 grammes	in 30 c.c.	of distilled water
Potassium oxalate	1 ,,	6 ,,	,,
Silver nitrate	2 ,,	10 ,,	,,

Dissolve separately, and mix, then add to the chloride emulsion in the same proportion, and in a similar manner to that recommended in the case of the citrate. The method of washing differs in no way from that already mentioned; but previous to melting, half a gramme of citric acid dissolved in ten c.c. of water should be added.

The compound emulsion with potassium oxalate is both white and slow, and is especially useful in making transparencies for the lantern, enlarging, &c. Almost any colour may be obtained, from warm brown to black, provided sufficient toning be given. This operation, as previously stated, is not a rapid one; still, it can be somewhat accelerated by the use of two baths, the first an ordinary borax, such as given in the Photographic News Formulary, and the second either before or after fixing the thiocyanate toning bath given in page 43 of the current Year-Book.

An especial feature in a compound emulsion is the facility afforded for printing negatives of a black-and-white character, for, as a rule, very much more harmonious results will be obtained by this means than in any other way. And it is remarkable to how far this effect may be carried in practice by a slight modification of the formula. Thus, by increasing the amount of haloid, and decreasing the proportion of acid, we obtain harmony; and by decreasing the haloid and increasing the acid or organic compound, we obtain brilliancy—nay, hardness; in a word, a reliable formula is a necessity; but having such, judicious modifications are allowable.

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THAT DREADFUL FOCUSSING CLOTH !

(A Moan of One who has Suffered).

I cannot understand why the ingenuity of photographic apparatus makers has not yet devised an efficient substitute for the focussing cloth. There is nothing more harrassing in the whole range of a photographic outfit.

Take it in its out-of-door aspect. If there is the least wind blowing, is it not the most tiresome thing to manage possible? Hasn't it got the habit of falling over the focussing screen, after you have put the latter on the ground, and of hiding it, and you only find out what you've done when you've put your foot down and you hear a smash? Have a camera with a folding screen, you say. Yes, that's all very well, but suppose you haven't got one? Besides, allow that you *have* a camera with a screen of this kind: hasn't the focussing cloth been known to catch in some part of the camera, and when you drag it off you throw the whole arrangement out of balance, and you have to begin again? Nay, is it altogether out of knowledge that an attachment of this kind has more than once upset the camera and legs altogether?

Take the appearance of the photographer out of doors, when his head is under the cloth. Doesn't it give a horrible uncanny look, which makes him at once the object of ridicule to the unthinking and unscientific masses? When his head is thus concealed, has not the ubiquitous boy a desire to meddle with his dark slide? Hasn't he been represented in comic journals times out of number, assaulted in the rear by innumerable bulls? Not that I ever heard of a photographer in real life so troubled; but it shows the weakness of the focussing cloth when it is thus pitched upon as the mark for the caricaturist.

Out of doors bad, indoors the focussing cloth is worse. It ruffles the photographer's hair, and towzles his beard. It forces him to wear skull, smoking, and other unhealthy head-coverings which bring on premature baldness, and impart a flashy aspect to his bearing which does not properly belong to him.

If the weather is hot, putting one's head under the focussing cloth is an abomination and a terror. If the focussing cloth be too small, words cannot picture the irritation caused by straining one's eyes, and the slipping of the tormenting piece of stuff at the very moment when you think you have focussed correctly, but are not quite sure. If it be too large, the perspiration pours down the face, and you emerge hot, flushed, and fatigued from the trial of supporting its weight.

Let the focussing cloth be mislaid, and you are crushed. In despair, you seize the first thing that comes to hand. You have a rush of sitters, and they must not be kept waiting while you hunt for the missing article. You rush wildly at the camera with some black calico which you discover thrust behind the fixed background. It is as thin as gauze, and on putting your head underneath, you find the daylight streaming through the interstices. Another dart at the store behind the background. Ah! this is much thicker. You use it, focus, and re-appear with your eyes, mouth, and nose, filled with dust. The sitter smiles, and you don't know why. You accidentally catch sight of your reflection in the mirror, and then you discover. The black calico has been used in some remote period to stop out light in the studio roof, and your perspiring face is well peppered with smuts. Eventually you find that the friend of the sitter has been sitting on the missing focussing cloth all the time.

It is very easy to say that one ought to have a studio dark at one end, and move about one's screens to shut off the light, but what is a man to do if his studio refuses to be managed that way? Besides, why shouldn't we do away with the focussing cloth? Has anybody any vested interest in a focussing-cloth? Has a focussing-cloth any interest in itself? Why then should it be held sacred?

I read some time ago in an American paper, this:—"Our Chicago amateurs are trying to do away with focussing-cloths." Now, what I want to know is, *have* they done away with them? If not, why should not our English amateurs try their hands and abolish the hateful thing?

In this hope I live.

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FRENCH CORRESPONDENCE.

Gelatino-Chloride of Silver Paper—Photo-Tracing Process — Phototypes — Gelatine Plate-Making Machine.

Morgan's Gelatino-Chloride of Silver Paper.—The process of obtaining positive prints by developing takes a long time in becoming popular. Photographers are slow in adopting new methods requiring learning on their part. The firm of Morgan and Co. have, however, facilitated matters by offering an excellent gelatino-chloride of silver paper. I have been trying it, and with complete success, not without hesitating the first three or four times as to either the length of exposure, or the right time at which to stop developing. But the thing is so speedily accomplished; and what great advantages such a process offers by allowing of printing at any time, day or night, under absolutely regular conditions! It is easy to obtain a light of practically equal luminosity after making a trial beforehand to find out the requisite length of exposure, and placing the paper always at the same distance away. It is better to under-expose rather than over, as in the latter case the prints are not brilliant. The same developing bath, composed as follows, is sufficient for a good number of prints. These formulæ are given by Mr. Morgan himself:—

Developer.

No. 1.—Neutral oxalate of potash	250 grammes
Bromide of ammonium	15 ,,
Hot water	1,600 ,,
No. 2.—Sulphate of iron	40 ,,
Hot water	1,600 ,,
Citric acid	15 ,,

Filter, and mix in equal parts, adding No. 2 to No. 1.

No. 3.—Alum	125 grammes
Water	2500 ,,

Toning Bath.

No. 4.—Acetate of soda	160 grammes
Chloride of lime	8 ,,
Water	2,500 ,,
No. 5.—Chloride of gold	1 gramme
Water	125 grammes

Fixing.

No. 6.—Hyposulphite of soda	150 grammes
Water	1,000 ,,

Daylight may be used as well as any artificial light. About five centimetres of magnesium ribbon are sufficient to print from a normal negative. After exposure, the print ought to appear fainter rather than too deep in tone; in toning it comes out in very agreeable warm colouring. To preserve a brilliant surface, it is recommended, after the final washing, to press it against a plate coated with talc, and rub with blotting-paper to squeeze out the excess of moisture. When dry, a finely-glazed image is obtained without the application of anything else, as in the so-called enamelled prints. Thanks to Mr. Morgan, we are able to print quickly and with excellent results, with this gelatino-chloride paper, while, under ordinary circumstances, in this dull weather, we should have to spend a whole day to get a single print from the same negative. The one little remaining question is that of the cost of this paper; but no doubt, when in general use, it will be reduced to that of chloride of silver albumenised paper.

Photo-Tracing Process.—I have already stated that the process known as *photocalque* consists in directly tracing by hand with a pen over photographic prints without interposing tracing paper. However transparent the tracing paper, it always hides certain details in the shadows, and it is troublesome work in that case. This process is very useful at times, as the photograph can be entirely effaced, leaving only the tracing in absolutely black lines, which may be made thicker in the shadows, and a reduced negative taken from the tracing can be employed for typographic or other purposes. By this means one has not to contend with the inability of a draughtsman, as he has only to be supplied with a silver print on salted paper, fixed in hypo, but not toned. If it is the case of an autographic transfer, the print is sized on the under surface with a solution of tapioca in hot water, and the tracing is done in lithographic ink. No reducing is permissible in such a case; the transfer is direct, and of the same size as the original. If it is required to be reduced, the tracing is made in Indian ink. To cause the image to disappear the print has only to be immersed in a solution of—

Bichloride of copper	15 grammes
Water	100 ,,

If after reproducing the tracing in the camera, it is desired to bring back the photograph after previously wetting, dip it in a bath of neutral oxalate of potash in saturated aqueous solution of sulphite of iron. About one part of iron to five or six of the potash will be required, the image reappears immediately, and after washing, it is finished. It may also be made to disappear in a saturated solution of bichloride of mercury in 20 c.c. of hydrochloric acid to 300 or 400 c.c. of water. In this case an eight per cent. solution of hyposulphite of soda will bring the image back. If it is desired to completely destroy it, one has only to use a three per cent. aqueous solution of cyanide of potassium; to one-twentieth of the bulk add enough iodine to colour it, and mix the whole together. The process by bichloride of mercury has been used in making the prints by which the image is made to appear by dipping in water as in the so-called "magic photography" when it is pressed between blotting-paper impregnated with hypo. I think in certain cases, to see the work better, it would be preferable to use ferro-prussiate prints, as on the blue image the black tracing would be more easily seen.

MM. Boussod, Valadon, and Co.'s Phototypes.—This firm is now practising on a large scale the preparation of phototype blocks. The coming Salon number of *L'Illustration* will be printed entirely from phototype negatives by the Manzi process. The same publishers have just issued a splendid album from Detaille's military drawings. Our friend Mr. Woodbury, to whom I showed these results, declared that as yet nothing had been produced in England to come up to them. I am directing my attention at present in the application of new methods of phototypography to ceramics, and my first trials have met with perfect success.

Gelatine Plate Machine.—My colleague, M. Stebbing, has just organised a gelatine plate making machine of the kind specified on page 199 of this year's Photographic News. It works capitally, and with such speed, that 600 plates of medium size can be easily prepared in an hour with perfect regularity; and with these plates I have obtained the finest results. The emulsion is free from all defects, and the apparatus works so regularly that the film is quite uniformly spread.

Leon Vidal.

Patent Intelligence.

Applications for Letters Patent.

4234. William Middlemiss, Holmefield Mill, Thornton Road, Bradford, Yorkshire, for "Improvements in photographic cameras."—7th April, 1885.

4288. Scotto Clark Nash, 33, Chancery Lane, London, for "Improvements in portable photographic cameras."—7th April, 1885.

4378. Edward Marlow and Henry Bishop, 4 and 5, Arcade Chambers, Corporation Street, Birmingham, for "Improvements in the construction of dark-room lamps or lanterns for photographers' use."—9th April, 1885.

4528. William Ford Stanley, 4 and 5, Great Turnstile, Holborn, Middlesex, for "Improvements in photographic cameras."—(*Complete specification*).—13th April, 1885.

4529. William Ford Stanley, 4 and 5, Great Turnstile, Holborn, Middlesex, for "Actinometer for photography."—13th April, 1885.

4531. William Low Sarjeant, 19, Enmore Park, South Norwood, Surrey, for "Spring shutter for camera."—13th April, 1885.

Patents Void through Non-payment of Duty

10. A. M. Clark (*Corbassiere*).—Photographic printing.

27. A. M. Khotinsky.—Lime light lamps.

Specification Published during the Week.

7201. Thomas Samuels, of Monken Hadley, in the County of Middlesex, Gentleman, for "An improvement in photographic cameras."—Dated 3rd May, 1884.

The patentee appears to claim the use of a double swing-front.

Patent Granted in America.

314,811. Benjamin J. Edwards, London, County of Middlesex, England. "Apparatus for coating photographic plates."—Filed October 22nd, 1884. (No model) Patented in England June 5, 1884, No. 8613.

This apparatus is described and figured on page 541 of our volume for 1884.

Notes.

A supplement illustrative of the remarkable results obtained by Mr. Francis Galton's method of composite portraiture is given with the present issue of the News, and another illustration of the same subject will follow next week.

In Mr. Galton's article on page 243 will be found much detailed information; and it is to be hoped that opticians will endeavour to supply Mr. Galton with the instrument he requires—an apparatus for immediately presenting to the eye a composite of any reasonable number of components.

From an artistic point of view, much might be said, the composites recalling the ideal pictures of the great masters. Perhaps the most real difference between a photographic portrait and a good painting is that the former is merely an exact representation of one phase of the sitter's individuality, while the latter may be a composite of an indefinite number of phases.

A feeling of universal sorrow has been experienced in photographic circles in consequence of the sudden death of the Lord Mayor.

A chill, taken at the Brighton Review, developed into pleurisy, but on Wednesday he was so much better that he took part in some ceremonies connected with the Bluecoat School. He, however, did this against the doctor's advice; and was, no doubt, prompted by a kindly feeling, which made him feel that the boys would be disappointed at his absence.

In the photographic department of the Inventions Exhibition things seem rather more forward than in other departments. A good show may be expected.

The historical collection of photographic mementos which is to be exhibited under the auspices of the Photographic Society promises to be one of considerable interest, and the committee have been well supported by those who possess relics of the past having photographic interest. Still there are phases in photographic history not represented, and any of our readers who have old stock they may be willing to lend, would facilitate the work of the committee by immediately forwarding a list to Prof. W. F. Donkin, Honorary Secretary of the Photographic Society, 5a, Pall Mall East. We are informed that some of the early lenses would be very acceptable.

(Scene — *A Photographic Studio near St. Thomas's Hospital*). *Photographer*—"I can't take your portrait, sir, if you hold your head so low down. I just get the bald part, and the rims of your glasses." *Medical Student*—"Capital; just what I want. This portrait's for my father, and I want him to see that I'm working so hard it's affecting my health. *I've asked him for the cash to go out of town for a fortnight!*"

The prospects of a supply of platinum from New South Wales seem to be encouraging, this metal existing to a very notable extent in the sand of the sea shore near Richmond River; while a nugget weighing over half-an-ounce was recently found near Wiseman's Creek. Should the platinotype process of photographic printing become general, fresh sources of the metal will be needed.

One of the oddest suggestions made for a long time is that of Mr. T. Kay, of Stockport, who, the other day, in a paper read before the Manchester Literary and Philosophical Society, proposed to make sea water drinkable by treating it with citrate of silver! Mr. Kay gravely sets forth the chemical changes which would take place—namely, the displacement of the chlorides by combining with the silver, and the formation of the harmless citrates of sodium, potassium, magnesium, &c. He observes that sea water thus treated would be slightly aperient and diuretic if taken in large quantities, but would be suitable for moistening the parched throats of shipwrecked mariners. No doubt. But setting aside the cost, are we to imagine a shipwrecked crew rushing to the medicine chest for citrate of silver, before betaking themselves to the boats, and subsequently performing a delicate chemical experiment in the open sea? We have also doubts as to the usefulness of citrate of silver, supposing more be put in than the equivalent of chlorides. And with the constant rocking of the boat, how is the chloride of silver to settle, or is a filtering arrangement to be taken? The idea of drinking turbid chloride of silver is not pleasant. Mr. Kay's notion savours too much of the quasi-scientific romances of M. Jules Verne to be thoroughly acceptable.

To make sea water potable by distillation is a tolerably easy process, and the ingenuity of shipwrecked sailors has now and then rendered it possible to carry on a rough process of distillation in an open boat at sea; the condensing arrangement being a piece of waterproof sail, folded so as to form a bag which can hold some pints of sea water.

The *Chicago Times* has a curious story of a painting of the "Deathbed of Lincoln," executed by an artist named Lichfield. President Lincoln, it will be remembered, was shot in the theatre. An army surgeon, Dr. C. S. Taft, happened to be present, and he it was who went to the assistance of the wounded man and remained with him until he died. When the picture was painted, Dr. Taft naturally supposed he would be represented, and so he was; but the picture now appears, not with the portrait of Taft as the medical attendant, but with the portrait of Surgeon-General Crane. No one would have been any the wiser, had not the picture been photographed when first painted. It seems that Surgeon-General Crane had the head of Taft scratched out and his own portrait inserted.

The Beauty Competition at Paris, which had to be decided by judging the photographs of the candidates, and not the candidates themselves, is over. The prize has been carried off by a young Parisian lady, twenty years old, named Mathilde Corlin. Whether Madlle. Corlin is as beautiful as her photograph, and whether the judges are right in their opinion of her beauty, the public will have an opportunity of seeing, as the prize-winner has promised her assistance at a *soiree*, when copies of her portrait will be sold, and the proceeds given to the wounded of the French army in China.

The age of a lady is always a delicate subject. We admire the cautiousness of a San Francisco photographer, who labels two photographs of Madame Adelina Patti respectively thus: "Madame Patti at eighteen—" "Madame Patti at—present."

Funny Folks pictures the advent of the camera into the domestic circle. First we have the smiling father under the lens, but after having had an experience extending over six hours, he smiles no more. The difficulty with the cook having been arranged amicably, and sole possession of the kitchen obtained, Pa and Ma step in and spoil all by opening the door.

Boxwood is becoming rapidly scarce, according to Mr. J. R. Jackson, of Kew Gardens; and notwithstanding the extent to which the various "process blocks" are used for journalistic illustration, the demand does not slacken.

Paper, as the basis on which by far the greater number of photographs are made, must always be a subject of study to the photographer, and it is interesting to note a batch of suggestions as to the progress in this branch of manufactures which are to be found in the current number of the *Journal of Chemical Industry*.

Herré adds soluble salts of zinc, calcium, or aluminium to the pulp, and afterwards mixes in soap, so that insoluble metallic soaps are precipitated; these serving to make the resulting paper both partially waterproof, and far more fire-resisting, than the ordinary article.

The treatment and manufacture of wood-pulp have been studied by Coethen, and some advantage appears to result from subjecting the wood which is to be pulped, to a preliminary baking in a hot air bath; this being more especially the case with coniferous woods rich in turpentine.

In working the sulphite process of bleaching wood pulp, Flodquist uses a steel boiler lined with lead; the lining being fixed by screws provided with lead-covered heads, so that no iron comes in contact with the contents of the boiler.

Dulfus makes an uninflammable pulp by incorporating eighty parts of asbestos, five of silicious earth, five of silicate of soda, and one and a-half of silk fibre. It is proposed to use this material not only for making paper, but also for insulating electric wires.

A photographer who wants gold for making chloride of gold, obtains exactly twenty shillings' worth by dissolving a new sovereign; but in doing this he puts the country to an expense of about three-halfpence—the actual cost of manufacturing the sovereign. Still, one would be a considerable loser by dissolving silver money, as the metallic value of an English silver coin is not equal to the nominal value of the piece. In America, this difference is so great that spurious half-dollars are manufactured; weight, style, and fineness of the false coin being equal to the genuine article, and the illicit manufacture yields a profit of about twenty-five per cent.

The dodges of the itinerant photographer are not to be despised, and we must confess we admired the dexterity of a couple of the fraternity who, a few evenings ago, we saw photographing a horse and its rider near Battersea Park. The horse is a somewhat difficult subject to take, and this particular quadruped was so restive that its rider was some time before he got him in front of the camera. But this done, all the rest was easy. While one operator focussed and made ready with the cap, the other, taking up the focussing screen, walked in front of the horse about ten feet away and tapped sharply on the glass; instantly the head was turned, the ears pricked up, and every muscle on the alert, and yet motionless for a sufficient time for the exposure to be made. Really a capital picture, considering the surroundings, was obtained. Horses are like children; they must be taken at once, or not at all.

Photographs of the old school may sometimes be improved by artistic retouching; it is the reverse with the paintings of the old masters. An odd story has just come to our knowledge, which, if its truthfulness were not vouched for by good authority, would scarcely be credible. A gentleman of means, by profession a painter of heraldry, had a fancy for collecting pictures, and, investing judiciously, got together a good number of valuable works, including a Gainsborough, several Morlands, a Cuyp, and a Rembrandt, though we have doubts as to the genuineness of the latter. Anyway, his gallery was valued at several thousands of pounds. On his death, some two years ago, the pictures were sold, and realised £200! The reason for this was, that they were put up for auction in a suburb of London, the chief auctioneers for works of art refusing to have anything to do with them because they had been "touched up" by the owner. The fact was that the latter had a fancy for "improving" the old masters, and especially their skies, and where he thought a picture might be benefited, he applied a dab of colour, no matter whether the artist was Gainsborough, Smith, Rembrandt or Jones.

Reviews.

Conference sur la Decoration Ceramique par Impression. Par Léon Vidal (*Paris: A. Quantin*).

We have here a work which, if not large, is of very exceptional interest, as it brings the whole question of decorating ceramic ware by means of photographic blocks well up to date. A photo-typographic block (Meisenbach) is given, after which are printed the various dissections of the same block, which will, when each is printed in its proper colour, give a polychrome image. We hope to present our readers with a translation of portions of the work before long.

A Practical Treatise on the Fabrication of Glue, Gelatine, &c. By F. Davidowsky. Demy octavo, 297 pages and thirty-five engravings in the text. (*London: Sampson Low, Marston and Co. Philadelphia: Baird and Co.*)

A handbook treating of gelatine and glue could not come at a more opportune time than the present, as gelatine has practically replaced collodion as a vehicle for the sensitive salts of silver in making negatives, and it threatens to oust albumen from its long held tenure in connection with positive prints.

The subject is introduced in some fifteen pages, after which about sixty pages are devoted to describing the routine work and ordinary fixtures of a glue factory. The finer gelatines are afterwards treated of, and numerous uses and applications of gelatine are considered. The directions for making gelatine foils and coloured veneers are specially interesting.

We cannot find space for extracts this week, but hope to give our readers a sample of the book shortly.

A Practical Guide to Photography. (*London: Marion and Co., 22 and 23, Soho Square. 1885.*)

This is a very clearly written and neatly got up handbook, and we have no doubt that any intelligent person might become a photographer by a careful study of it.

HARDWICH ON THE ETHOXO LIME-LIGHT; WITH A SAFETY JET TO PREVENT EXPLOSION.

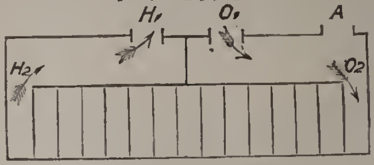
BY T. FREDERICK HARDWICH.*

The "Ethoxo," or, as I prefer to term it, the "Oxy-ether light," is the invention of Mr. W. Broughton, of Manchester, but I do not think sufficient credit has been given him for it. Much fault has been found by critics who either have not tried the process, or have used it in a way contrary to the instructions. My own experience is that it is a very efficient substitute for the oxy-hydrogen, when coal-gas cannot be obtained, and that it is quite safe in the hands of experienced persons, with proper precautions.

Presuming that the members of your Society are familiar with the general outlines of the process, I proceed to speak of what I have found to be the best form of tank for holding the ether. The oxygen gas in this form does not pass through the liquid, but over its surface; the advantage of which is, that there is less fear of ether being forced back into the bag, and also the light is steadier. In the old form of tank, when granules of pumice or other substances are used for safety, the flame at the jet mouth will be seen to rise and fall as each bubble of gas passes through the ether; but when the gas passes merely over its surface, the resistance offered by the granules is overcome. In the former case, also, the pressure of the gas is reduced at least one-third, whereas in the latter it not only suffers no reduction, but is sometimes even increased by the elastic force of the ether vapour.

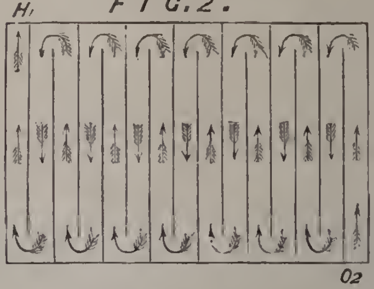
An inspection of the following diagrams, which are drawn to a scale of one-fourth, will at once show the construction. Fig. 1 is a vertical, and Fig. 2 a horizontal section. The tank, 7½-inches long, is divided into two floors by a septum passing across, at a height of 1½ inches (inside measurement), the lower division being used for generating the vapour, and the upper forming two reserve chambers; so that, if any overflow of ether should accidentally take place, it would not be driven into the pipes. The oxygen enters at the point marked O_1 and O_2, and after saturating itself with ether by passing in the direction indicated by the arrows in Fig. 2, escapes at H_2 and H_1. A T-piece, with tap, is screwed in at O_1, and a simple exit pipe, with tap, at H_2. There is also a cap screwing down upon a leather washer at A, to secure the orifice used for filling and emptying the tank.

FIG. 1.



VERTICAL SECTION OF THE TANK.

FIG. 2.



HORIZONTAL SECTION OF THE TANK.

The quantity of ether required will be about a pint; it should be poured into the tank until it reaches to a quarter of an inch, or a little more, from the horizontal septum. If it be then returned into a bottle, and a label placed on the bottle at the surface of the liquid, the exact measure required for the future will be indicated.

In making this tank, great care must be taken in the soldering, or a portion of the oxygen will travel by a shorter route than is intended, and there will be a danger of an explosive mixture being formed. The bottom must be put on last, resting on the edges of the vertical septa, but not attached to them, and notched here and there to allow the ether to flow underneath.

To test the tank, fill it with ether, and place it for two hours in melting ice. Now connect it with the safety jet of the lantern and pass oxygen through it. The flame should be long and blue slightly tipped with yellow. If, on the other hand, it burns with a small flame of a pale violet colour, and renders the lime incandescent without any further admixture of oxygen from the O tube of the jet, the tank is improperly made, and the oxygen not sufficiently saturated with ether vapour.

The Ether.—I find a great advantage from the employment of the lightest and best methylated ether. Being comparatively free from alcohol, and water, it can be used over and over again by simply filling up to the original bulk with fresh ether. It is sold in commerce as ether of ·720; but if my specific gravity bottle is reliable, it is very little more than ·710 at 60° Fahr. After having been once used, the specific gravity was ·715, and after three times ·725 at 60°. Unless a really light and good ether can be obtained, I do not advise that the ethoxo lime-light should be attempted. Store the ether in a cool, and especially in a dark place, as the action of light causes it to absorb oxygen, and become less volatile. See, also, that no flame is near at hand when you are pouring it out to fill the tank.

The Jet.—Any jet, of the oxyhydrogen kind, which answers for coal gas may be used with ether; but to obtain the best results it must be well made, as the ether vapour is more liable to what we term "roaring" or "hissing," than either coal gas or hydrogen. The orifice should be somewhat smaller than the $\frac{1}{20}$ inch usually recommended, or the flame will be liable to pass back in dissolving, when the bye-pass is low. One twenty-fifth will be sufficient, and I do not find the light sensibly lessened by reducing the orifice to this point. To secure as strong a pressure of gas as possible during emission, the bore should expand from $\frac{1}{25}$ to $\frac{1}{10}$ inch after passing a tenth or an eighth of an inch inwards. I have known jets in which the narrow part of the bore was $\frac{1}{4}$ or $\frac{3}{4}$ inch long, but these jets do not burn as much gas nor give as much light, unless the bag is more heavily loaded.

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* Communication to the Newcastle-on-Tyne and Northern Counties Photographic Association.

With the most careful instructions for the manufacture, you will find that scarcely two jets will agree in the amount of pressure which can be put on without producing hissing. You must, therefore, blow through the jets beforehand with the breath, and pick out the noisy ones. On taking off the nipples, and looking through them against a strong light, you will, probably, find that with those which work silently the small bore of $\frac{1}{25}$ inch is exactly in the middle of the larger $\frac{1}{10}$ inch bore, whilst with the roaring nipples, it is one side. Failing this, all that you can do with the noisy ones will be to select a needle of the right size and polish the bore with it, after dipping it in a cream of oil and knife-polishing powder. The same may be done with good effect in the case of an old jet which has become corroded or choked up with lime dust.

The Granule Safety Chamber.—I do not consider that anything of this kind ought to be necessary; but as I usually lecture in crowded rooms and often to children, I have used the safety chambers since the Chadderton accident. They may be applied in the form of tubes attached to the taps of an ordinary jet, or the jet may be made purposely with the safety chamber in front, immediately below the nipple. The biunial which I show to-night has a safety jet in the top lantern packed with granules of binoxide of manganese, and safety tubes in the lower lantern with granules of pumice.

The safety chamber must be circular in form, $\frac{1}{2}$-inch wide and $\frac{1}{2}$-inch deep, interior measurement, with a disc of wire gauze of sixty meshes to the inch next to the granules, and a second of thirty meshes to strengthen it, both resting on the top of the chamber. These two disc must be five-eighths of an inch across, and be kept in position by a ring of wire fitting into a groove in the brass. Two other similar discs are to be pressed or screwed tightly upwards against the bottom of the chambers, but in such a way as to be easily removable for cleaning or renewal.

Below the chamber thus formed, there should be an empty space holding half a fluid drachm, to serve as a mixing chamber for the gases before they enter the granules. Above the chamber is no cavity of any kind, but the cap screws down nearly close, leaving only sufficient room for the gases to pass freely to the nipple.

The difficulty with this jet will be not so much in extinguishing the exploding gases, as in getting enough pressure with one hundredweight on the bag. Therefore no attempt must be made to economise space by contracting the diameter of the granule chamber at the top; the upper discs of wire gauze must be as large as the lower, and all the discs must be changed if they become rusty or choked up. I have seldom had occasion to change them, but a few minutes will suffice for the operation.

The safety tubes ought to be a little longer than the chamber in the safety jet, about three-quarters of an inch instead of half-an-inch, but they need not be quite so wide, say half-an-inch exterior measurement instead of interior, with discs of wire gauze, exactly as before, in the screw caps at the ends; the whole to be made air-tight by springing a piece of vulcanised rubber over the tube and shoulders of the caps, until it is flush with the milled heads at the ends, and then securing it by tying with red silk.

The Safety Granules.—I know of none superior to the pumice, originally proposed by Mr. Broughton, in its power of extinguishing flame; but it is inclined to be dusty, and is easily disintegrated by the action of the gases. When this happens, a flickering will be seen from small particles of pumice projected into the flame, and eventually the tubes, on being opened, will be found not to be quite full. The flickering is very slight after the tubes have been a little time in use, and some persons do not observe it; but if you wish to avoid it, granules of *black oxide of manganese* may be substituted. These granules are not entirely equal to the pumice in power of arresting flame, but they are strong enough for use in the jet or tubes now described. The hardest and purest variety of the mineral should be selected, and it may be crushed in a steel mortar. This operation is somewhat troublesome, but a little goes a long way and lasts a long time.

In reference to the size of the granules, wire gauze sieves of forty and fifty meshes to the inch are the best for screening;* all that passes through the former and rests upon the latter being retained. Granules screened by Nos. 50 and 60 are too small to allow of a free passage for the gases, and 30 and 40 are too large to stop the flame. I succeeded with this size when *crushed slate* was used, but on trying *pulverized glass* the flame passed easily through them.

The granules of binoxide of manganese are in appearance like coarse grains of gunpowder, and being very heavy they sink by their own weight and keep the chamber closed. In filling the chamber, it should be tapped gently, and the granules scraped to a level surface; but they must not be pressed tight together, or the flow of gas will be impeded.

As regards the relative merits of the safety-jet and safety-tubes, the jet is a neater and more compact arrangement, the granules being readily accessible, and well secured in position; it also has an advantage in the chamber being upright. On the other hand, the tubes are available for a jet already in use, and although the volume of the exploding gases is larger, the granules, being in a cool place outside the lantern, are better able to withstand the shock of an explosion. The upper jet in a biunial becomes strongly heated by the hot air from the lower lantern, and it is well known that heat facilitates the passage of flame through fine tubes and orifices. What you gain in one direction, therefore, by using the jet, you lose in another, and it is hard to say to which side the balance of advantages belongs; practically, either jet for tubes will answer the purpose, if kept in working order.

Supposing the safety-tubes to be used, with pumice, they must be opened from time to time to see that they are full; for, not being vertical in position, the granules, in wasting away, and sinking down, will eventually leave an empty space, along which the flame might travel.

The India-rubber Tubing.—I must repeat the caution given in a previous paper, not to use any but the best and thickest quality of tubing. The ether softens the thin kinds, and speedily makes them rotten.

Red rubber is very elastic, but I have found it sticky, and apt to cut with the string used in tying. The pure grey vulcanised rubber is far tougher, and will last a long time. Half-an-inch outside diameter, and a quarter of an inch in the bore, is a good size for carrying the ether vapour.

I object to putting the ether-tank on the floor, because it involves the use of a long tube between it and the lantern; and this tube absorbs a quantity of ether, as you may prove by drawing air through it when the lecture is over. With the tank on the table close to the lantern, you have only a short piece of tubing, of nine inches or so, to look after, or two pieces if you use a biunial.

These pieces of rubber must be examined from time to time, because if they were to give way, there would be a rush of vapour, liable to ignite at the nearest flame, and to run down the tubing, burning fiercely. I consider this danger more real and obvious than that of ether passing back into the bag, or forming an explosive mixture in the tank, neither of which could easily happen with good ether and a tank properly constructed.

Setting up the Apparatus.—The lime cylinder ought, undoubtedly, to be a little further off from the tip of the jet with ether than with hydroden gas, because ether, being rich in carbon, deposits it on the lime if you bring it too near. A quarter of an inch from the orifice to the point where the burning gases impinge upon the face of the cylinder is an average distance; but all depends upon the angle of incidence of the flame. Mr. Lewis Wright mentions 35° as the nearest to a right angle obtainable without risk of throwing a shadow on the screen, and this agrees with my own experience; but if the angle is less than 35°, then the lime may be brought nearer. You can tell when it is right by looking at the lime itself; it should be worn away into a depression of an oval or elongated form; if *a small round hole* is drilled by the flame, then the cylinder is too near.

The weight on the oxygen-bag should be about a quarter more than you are in the habit of using with an ordinary jet. I seldom find it necessary to exceed a hundred-weight, unless with a very large bag and a biunial lantern, in which case a hundred-weight and a-quarter may be put on. Turn the taps in a regular order, beginning with the bag, and ending with the taps of the jet. In the old form of ether-tank, it was recommended to relieve the pressure of ether by opening the H tap of the tank first; but in the tank described in this paper, it is comparatively immaterial which tap you open first, provided that you open them both at the same time. You must not, however, open the oxygen-tap of the tank, and leave it for a long time with the

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* Wire gauze of any size can be obtained of Messrs. Bedford & Steer, wire-workers, of Long Lane, Bermondsey, London.

H tap closed, or some diffusion of ether vapour backwards might gradually take place, in spite of the pressure from the bag. In the ordinary way, nothing of this kind happens, and I have often smelt the residue of oxygen in the bag at the close of the lecture, without detecting any trace of ether.

When the jets are lighted, put on as much pressure as you can without producing hissing. After a little while, when the lantern warms up to its work, you will be able to turn the taps a little more, and then they will need no further touching for at least an hour and a half, if the ether be light and good. Rotate the lime about once every ten minutes.

To preserve the granules from disintegration and dust, the following mode of putting out the light at the close of the lecture may be adopted. The H tap of the jet to be turned off slowly, and the oxygen from the O tap allowed to blow out the flame. If you turn off both taps at once a "snap" will pass back, and the inside of the jet will gradually be coated with fine pumice dust. Then the next time you light up you will see quite a little shower of scintillations in the flame; whereas when small explosions of that kind are prevented by proceeding in the way described, the surface of the brass in the safety-chamber remains bright and clean. My impression at first was that the oxygen left blowing in this way would make the lime cylinder crack and "fly," but I have not found such to be the case.

When you have completed your lecture, leave all the jet taps open, and draw air through them to suck out the ether vapour, which, if allowed to remain, would turn acid and corrode the metal.

My experience of the safety-jet exhibited this evening has been principally with ether vapour. I have, however, used pure hydrogen gas, carefully freed from air, with good effect. This pure hydrogen explodes more strongly, when mixed with oxygen, than that prepared in the common way by dilute sulphuric acid and iron turnings, but it is extinguished without any difficulty in the granule chamber of the safety-jet.

In regard to ether, the treatment to which I have subjected the jet may, I think, be considered exhaustive, for the chemicals were of the best quality, the gases mixed in various proportions, and the jet heated by a spirit lamp until the india-rubber washers showed signs of melting. The result, however, was invariably the same, a faint snap at the orifice, but the flame could not pass the granules to the chamber beneath. The jet would be more perfect if this mixing chamber beneath could be dispensed with, but I have not been able so far to do more than reduce it in size.

In the numerous experiments I have had occasion to make, one point has struck me forcibly, viz., the very moderate amount of pressure which suffices to keep even the most explosive gases burning quietly at the mouth of the jet without passing back. The exhibitor at the Chadderton Town Hall, although he allowed ether to enter his oxygen bag from a wrong construction of the tank, would, I believe, have escaped any accident if the bag or tubing had not been touched. Hence, whilst recommending a safety-jet, I recommend also that the ordinary precautions for keeping up the pressure should be observed. The whole of the gas used in maintaining the light in this process passes from the bag through a single tube, and it is therefore obvious that if this tube was stepped upon, the pressure would at once be taken off.

A Letter from A. S. Herschell, Esq., M.A., F.R.A.S.,

Professor of Physics and Experimental Philosophy in the Durham College of Physical Science.

Dear Sir,—I can now confidently vouch for your jet's perfect safety under all conditions of burning with explosive oxyhydrogen gas, as I have put it to as severe a test as can possibly be applied in its normal state, and it gives way to none of them.

Taking off the fine nozzle of the jet, I placed over the chamber instead of it, the tin lid of a round vesta match-box, which just fitted on the outside, so that it could slide up and down and cover the wire gauze exit of the chamber with a gas measure of variable volume between it and the escape orifice, which was a small hole pricked with an auger point in the middle of the match-box lid. A short riband of paper had to be gummed round the outside of the cylinder to make this tin cap fit it and slide on to it quite tightly. The greatest capacity of the cap above the wire gauze was about half a cubic inch (or a trifle less), and it could, when necessary, be pressed down close upon the chamber top.

In no position of this cap could I make the gas flash back, though in order to strengthen the violence of its explosion, I narrowed the touch-hole orifice by forcing a taper glass tube into it, with a very small opening at its point, and lit the gas at the large open end of the tube, so that its flame blew back into the cap. Even with this assistance, I could not get a violent enough explosion in the tin cap to throw it off its fitting on the chamber (although it was *just* knocked off once or twice), and on pressing the balloon nearly empty with the hand, I could feel the *puff* of the tin cap explosion quite strongly, making it probable that backward escape through the pumice was at least a considerable cause of the weakness of the explosions.

Feeling satisfied that half a cubic inch of gas on the front side of the wire gauze was insufficient to drive back the flame through the pumice, I then proceeded to use the body instead of the lid of the tin match-box. This held about one cubic inch, and could not be slid down to less than that, but was easily packed and tied down tightly to the top of the chamber. It had also a small pin-hole pricked through the lid. The "puff" of this, as before, did not injure or move the box, but the very first ignition passed through the pumice and inflamed the balloon, bursting it with a pistol sound.

Finding that the large box of one cubic inch always blew up the balloon, I next tried the effect of varying the rate of egress of the gas by holding the short india-rubber tube, leading from the balloon to the jet, between the finger and thumb, and pinching it. In this way, with the small $\frac{1}{12}$ inch cap, I was able to burn the explosive gas either at the mouth or inside the cap, on the surface of the wire gauze with a fizzing sound.

The tin cap being raised to $\frac{1}{8}$ inch above the chamber, and the chamber filled with copper filings instead of pumice, the simple snap-explosions were not effective in driving back the flame, but left it kindled on the gauze inside, making a rushing noise from escaping steam, and after a little while, as the copper became heated, firing through into the balloon.

I then took out the copper filings, and tried the same experiment with pumice sand in the chamber. Here neither "puff" nor "fizz" would take any effect, although the steam formed and rushed out copiously. On looking at the wire gauze after it was over, I found that it had fused into pinholes in places, and had melted itself up with the pumice, which actually formed a semi-vitrified cap of $\frac{1}{16}$ or $\frac{1}{12}$ inch deep on the top of the sand; and this sand came out whole, and was partly solid and consistent. Yet, in all this violent heating, the gas did not fire back through into the balloon, so that the pumice appears to be a safer material to use than the copper filings.

The tin-box experiments were preliminary to a concluding trial with the jet itself; and, therefore, putting in new pumice sand, I proceeded to raise the nozzle to a good height from the gauze by means of a thick leather washer round the screw. The "fizzing" and "snapping" phenomena could then be got at pleasure, in turns, by varying the rate of gas flow. But, as I expected, no continuation of this process would make the gas fire back into the balloon, and the gauze and sand, after a trial of some time, were quite unharmed.

Of course, with the nozzle screwed close down on to its thin washer, as in the jet you sent me, the security against ignition will be still greater, and I do not see how it could, by any possibility, be made in that state to burn injuriously. The pumice sand is evidently *sanspariel*—an intercepting material of first-rate excellence.

ON PLATINOTYPE.

BY J. S. POLLITT.*

The platinotype process, though of comparatively recent origin, is by no means a stranger amongst us, as it has been rather extensively practised in various parts of the country, and very successfully by some members of this Society. It is a process which, for many kinds of work, has much to recommend it, the results being characterised by a quiet beauty which invariably pleases an artistic taste; and its freedom from the meretricious glaze of albumenised paper affords a sensation of repose to the eyes; but the great value of the process is still further enhanced by the supposed permanent nature of the printed proofs.

It is now, I believe, a matter of history that the late Roger Fenton, who went out to the Crimea during the Russian war about 1854, and took a large series of fine photographs, which were afterwards exhibited in the Exchange of this city, gave up photography because, as he said, there was no future before him, so many of his photographs having faded. Such a complaint, however, cannot be made against platinotype, and the knowledge that in working the process we are obtaining results which, according to present experience, will be as perfect one hundred years hence as now, is not the least encouraging feature in the printing manipulations of this beautiful process. As regards the chemistry of platinotype, the subject is a somewhat complex one. The image, as the name implies, is formed of chloride of platinum reduced to the metallic state.

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* Abstract of a communication to the Manchester Photographic Society.

In sensitizing, the paper is brushed over by a mixture of chloride of platinum and sesquioxalate of iron, or, as it is more generally called, ferric-oxalate, this ferric-oxalate having the peculiar property of changing, by exposure to light, into ferrous-oxalate, and as ferrous-oxalate in combination with potassic oxalate (or the neutral oxalate of potash used in developing the prints) is a powerful reducer of chloride of platinum to the metallic state, it follows that, on the application of the plain hot solution of oxalate of potash, a combination is formed in the paper itself, which immediately develops the image by reducing the platinum to the metallic state. It will thus be seen that the faint impression which is distinctly *visible* before development is really formed by the darkening of the ferric-oxalate, used in combination with the platinum, by the action of light converting it into ferrous-oxalate, and that hitherto the chloride of platinum has taken no part whatever in forming the image; and further, that it is only when the hot solution of potassic oxalate is applied to the surface of the print, that the union of the two salts takes place and forms a reducing agent on the platinum, varying in intensity precisely in proportion to the different strengths of light passing through the negative, and representing the light and shade or gradation of tone in the picture.

It may be that the commercial paper supplied by the Platinotype Company is prepared in some way different from the above description—no doubt the large experience they have had in the working details of the process may have suggested many alterations and improvements—but, broadly speaking, the principles will be much the same.

Correspondence.

A NEW DANGER.

Sir,—The following will, I think, surprise your readers, and, at the same time, put them on their guard.

About a fortnight since, I received an application (addressed to 49, King William Street, E.C.) from a party in Northampton, wishing to become a canvasser, and naming someone as recommending him. As I do no club work, and employ no canvassers, I thought there must be some mistake; but, about a week later, another application came from another person residing in Northampton, on the same business, and my suspicions were aroused. Soon after this letter came a gentleman from Northampton, to enquire if I employed canvassers in Northampton, explaining that his niece had paid some 8s. as deposit on a photograph. I immediately put myself in telegraphic communication with the victim, and this resulted in my making tracks for Northampton. My first visit was to the police. The sergeant received me civilly, telling me that the party spoken about by the victim had recently been released from prison, having been convicted for embezzlement, and that he was powerless to act, as his superior was absent.

I made my way to an address of one of the candidates, who explained to me that he had been induced to subscribe some 20s. on account of two photographs, believing that they were to be done at my address, and while I was talking to this gentleman, who should pass the door but the canvasser in question. He was called in, and I taxed him with obtaining money under false pretences. He denied this, and when I asked him to accompany me to the police station, he refused; but, by dint of a *little gentle persuasion*, I got him there. The inspector had not returned, so the sergeant and I went in quest of him. On our getting back to the office, we found he had returned. I was met with a rather indifferent remark, "that it was no business of theirs." "What," I said, "not when a man is obtaining money under false pretences all over the town?" He advised me to take out a warrant, and that I could get one at the Town Hall at three o'clock—an hour and a-half to wait! I thought it better to put the matter in the hands of a solicitor, who will place the facts before the magistrate with the view of a police prosecution.

I was almost forgetting to say that the explanation given about my address being on the card was, that the printer had put it on without his (the canvasser's) knowledge or permission.—Yours, &c., A. L. Henderson.

49, *King William Street, E.C., April* 11*th*.

THE PRESERVATION OF MEMORIALS.

Dear Sir,—In reference to your note on the "Preservation of Memorials," in last week's News, allow me to state that two photographs were deposited in the cavity of the foundation stone of St. Catherine's Church, Pontypridd, some twenty years ago. The photographs—which represented the exterior and interior of the old room in which church services had been held—I prepared as follows:—Made reduced collodion transparencies, which I cemented with Canadian balsam in contact with opal glass. I see no reason to doubt the absolute permanence of the pictures, especially as they were sealed in a glass jar with the usual papers, coins, &c.; and I venture to think that if ever that jar is opened, those little photographs will be considered the most valuable and interesting of its contents.—Yours truly, Thos. Forrest.

Pontypridd, April 11*th*.

[Now that photographs in vitrified enamel may be so readily made, they should certainly be used in preference to any other kind of photograph.—Ed. P.N.]

INTERNATIONAL LANTERN SLIDE EXCHANGE.

Sir,—You will be interested in knowing that the Lantern Slide Exchange that I started in the autumn has been carried to completion, and that it has now ceased for the season. All the members have seen the slides contributed by others, and the only mishap has been the breakage of eight of the slides in my own set. On the whole, the matter has gone off in the most satisfactory manner, and has had the effect intended of giving each member the use of a large number of slides during the winter. Next winter matters will probably be managed in a slightly different manner, and instead of an "Ever-Circulation" of slides weekly, a list of members, with the slides they have, will be supplied, so that those in the Club can make direct borrowings and lendings.

My chief object in addressing you now is to call for members willing to take part in an "International" Exchange which I propose to arrange, in conjunction with Mr. Dresser and with Mr. Beach, the President of the Society of Amateur Photographers of New York. The object of the Exchange will be to place in the hands of members in England a number of lantern slides taken in different parts of the United States and other parts of America this year These slides will be so made up as to be readily taken apart, so that members may take copies of those they may take a fancy to by contract. This can be done by binding the two glasses together by thin metal strips.

The general conditions would be that each member should contribute ten approved slides either quarter-plate size, or the ordinary three-and-a-quarter square, and pay a season's subscription of 5s. to pay costs of working the Exchange; the ten slides to be sent to me by the first week in September next, with a description of the subject, which must be some view of general interest, either in England or the Continent. Suitable metal strips will be supplied to each member to bind his slides with. As soon as all are collected together, they will be sent in bulk to Mr. Beach, of New York, and will remain the property of the American section of the Exchange. In like manner Mr. Beach will ship the slides he gets in, corresponding in number with those I send to him, and upon arrival they will be divided into batches, and distributed in turn to each English member of the Exchange, who will keep them a certain time, and take copies if he feel so disposed.

This is the general idea, and I shall be glad to have the names of British photographers who will undertake to carry out the arrangement sketched out. We shall thus get modern views, and many of them at a very small outlay.—Yours truly, H. Smith.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 9th inst., Mr. A. Cowan in the chair.

A series of chloride transparencies from negatives made by the Chairman at the outdoor meeting of the Photographic Club, on Bank Holiday, was shown to illustrate the absolute safety of his new combined camera and changing-box when in the field.

The Chairman also exhibited Mr. Matthew Whiting's new lantern slide carrier. The chief characteristic was the attachment of two portable chambers, one on either side of the opening, capable of containing a number of slides retained in position by means of a spiral spring. Each time the shutter was actuated one slide was released from the feeder, and so travelled along the platform, and through the lantern. By means of a spring the slide was then thrown out of the square sufficiently to be underlapped by the succeeding slide, and from thence into the chamber provided for its receptacle. The Chairman illustrated the practical utility of the arrangement by rapidly passing about thirty slides from one chamber to the other.

The following question was then read:—"Why does the precipitate formed upon the addition of iodic acid to nitrate of silver dissolve in ammonia?"

A discussion ensued, but no direct evidence was brought forward bearing upon the question. The general opinion was, however, that as the majority of the silver salts are soluble in ammonia, it might fairly be expected that silver iodate was among them.

Mr. H. S. Starnes then spoke of certain plates giving green fog when developed with ammonia or carbonate of potash containing restraining bromide, but not so when the bromide was omitted from the latter; he used 3 drops of a 250-grain solution of the latter alkali, with 2 grains of pyro, and the exposure was only half that required with the ammonia developer.

The Chairman said that Mr. Newton did not advise the use of a restrainer, and his proportion of alkali was much greater—about 12½ grains of each carbonate per ounce of developer.

Several members said they were enabled to reduce their exposures materially by employing the carbonate of soda or potash developers.

Mr. C. Heinrick Trinks stated that he had received a communication from a friend on the Continent, who desired to know how far the splitting up of combination or doublet lenses might be carried to advantage, and which were the most suitable for the purpose.

The Chairman remarked that any of the rectilinear forms might be so treated.

Mr. Trinks then asked Mr. Debenham what the effect would be if the stop were not placed in the optical centre. From recent observations he believed he obtained better results in some cases by varying the distance of the stop.

Mr. Debenham did not consider it right to assume that because the position of the stop had been varied in the cases alluded to, it was not in the centre. There was only one correct place in a properly constructed lens.

Mr. Trinks noticed that when using a single lens it was necessary to put the stop nearer than when using one of the doublet form.

Mr. J. Barker: When only part of a doublet is used the focus is too long, and therefore the lens is slower in action.

Mr. A. Mackie's experience was, that the rectilinear form would not work with so large an aperture as the single. In the best lenses the place for the stop was found by practice, and not mathematical calculation.

Mr. A. L. Henderson: Are we to understand that the insertion of a stop lengthens the focus?

Mr. Debenham replied that in a properly-constructed lens the central rays would not be altered in any way. He then illustrated, by means of the black-board, the effect likely to be produced both by varying the position of the stop, and covering up the margin of the lens.

Glossop Dale Photographic Society.

The members of the above Society had their first "turn out" for the season 1885 on Good Friday, and the muster was the largest out-door meeting since the Society was established. The "meet" was at the Society's rooms at 10 o'clock. The morning was very fine, with nice diffused sunlight, though the distance was somewhat obscured by mist, which, however, soon disappeared, and for a short time the prospect seemed all that could be desired. Unfortunately, this state of things was of brief duration, for about 11.30 an exceedingly dense fog was seen to be approaching, and very shortly the whole neighbourhood was encircled with gloom, entirely frustrating any attempts at photography. After a while, however, the fog gradually disappeared, and advantage was taken to secure a few groups, &c. The remainder of the day was bright, with a slight mist, and some good work was accomplished, most of the plates exposed subsequently turning out very fair negatives.

The ordinary monthly meeting was held at the Society's Room on Tuesday, the 7th inst., the chair being occupied by Mr. J. Merry. The minutes of the last meeting were read and confirmed, and the Secretary then reported communications from the London Stereoscopic Company, Messrs. Fry, and the Woodbury Fund Committee.

Mr. Hardman exhibited a patent camera.

It was incidentally mentioned that one of the members had received two letters from a firm of solicitors, threatening him with proceedings for *indecent behaviour* in a churchyard, the alleged offence being that he had "carried a photographic apparatus into consecrated ground," and, horrible to relate, had actually taken a photograph of the exterior of the church! The announcement was received with roars of laughter. It must be understood that the gentleman in question was not acting (contemptuously or otherwise) in opposition to the expressed wishes of anyone in authority. On the contrary, he had the full permission of the vicar's churchwarden, who was then and there present.

Hyde Amateur Photographic Society.

This Society had its first ramble of the season on Good Friday, the route being through Bottoms Hall Wood and on to Mellor, through the Willows (Marple), and on to Compstall, where they had tea in the Gardens.

On Monday, the 6th inst., a few of the members availed themselves of a trip to Liverpool, and several really good pictures were taken of docks, shipping, and other views.

On the 1st inst. the Society held its meeting in the Mechanics Institution, there being a crowded room, Mr. F. W. Cheetham, President, in the chair.

After confirming the minutes of the previous meeting, and nominating several new members, the Chairman called upon Mr. John Pollitt to read a paper on "The Influence of Photography on Popular Taste and the Graphic Arts."

Mr. Cheetham here vacated the chair, and Mr. John H. Brooks was voted to preside. Whilst Mr. Cheetham and Dr. Sidebotham got ready for the lantern entertainment, the secretary, Mr. John Crowther, exhibited several prints from America, received from Mr. J. E. Dumont, of Rochester, N.Y., amongst them being "Niagara Falls in Winter," "Harper's Ferry," showing three States, Maryland, Western Va., and Virginia, "By the Quiet River," "A Hudson River Steamer in Rapid Motion," "View of Steamboat Landing in Albany," the two latter views being taken from on board a rapidly moving steamer. Mr. Crowther had mounted these views. Mr. Pollitt exhibited many of the old style of photographs which were truly works of art. The views shown through the lantern were from various districts both in and around Hyde, also many views from Devonshire. The Solgraph Company, Guisborough, had forwarded a few slides and negatives of various subjects, which had been developed with zixtol, which were greatly admired, especially one of "A Mill House in Cleveland." One of Mr. McLean's lantern views was shown, and received its due share of praise. Mr. Cheetham presented a view from "Bettws-y-Coed, North Wales," and a copy was given to each ordinary and honorary member; the picture was taken by himself, and was beautifully got up and mounted. Other specimens were placed on the table from the following firms:—Messrs. Fry and Co., Mr. J. Martin, and others.

At the close of the entertainment a vote of thanks was passed to the exhibitors.

Edinburgh Photographic Society.

The sixth meeting of the current session was held in Queen Street Hall, on the evening of Wednesday, 1st inst., Mr. Norman Macbeth, R.S.A., in the chair.

After the minutes of last meeting had been read and approved, Messrs. Wm. Moir, Stuart Fowler, C. J. Burton, Henry Murray, Alexander Asher, and A. L. Henderson, were admitted ordinary members of the Society.

A "Conference on the Picturesque" then took place, when a number of works were submitted and fully criticised.

Newcastle-on-Tyne and Northern Counties Photographic Association.

The ordinary meeting was held in the committee room of the Literary and Philosophical Society's Institute, Newcastle, on Monday evening, 13th inst., Mr. Payne in the chair.

Mr. Herbert Spargo and Mr. John Jackson were nominated.

The Secretary reported that Prof. Herschel had very kindly presented to the Society a case for holding such lantern slides as the Association might from time to time accumulate, and he had also sent a few slides by way of making a commencement.

The members then adjourned to the lecture theatre of the Institute, where the Rev. T. F. Hardwich, M.A., read a short abstract of his paper on the "Ethoxo Light" (see page 250), and gave, in conjunction with Mr. Allison, a lantern demonstration; the slides consisted of a series of microscopical, followed by a collection of Egyptian, slides by the collodion and Woodburytype processes. The audience was very large and appreciative.

Lochee Amateur Photographic Club.

The annual meeting of this young but flourishing Club was held in the studio belonging to the Club on Tuesday, 7th April, Bailie Ogilvie in the chair.

The Treasurer's report showed a balance in favour of the Club.

The Secretary, in his report, congratulated the members upon the very successful year just passed, and attributed the enthusiasm and *esprit de corps* of the members to the fact of their having a studio of their own to meet and work in. The studio has now been in use for a year. It is fully equipped with a splendid studio camera (suitable for either cartes or cabinets), three backgrounds (plain, interior, and exterior), a very convenient dark-room, and other accessories. It is very largely used by the members, and has been the cause of great improvement in the work of the members generally.

The Club now numbers forty-one members, and several gentlemen were proposed for membership.

The following were elected office-bearers for the ensuing year:—

President—Bailie Ogilvie.
Vice-President—Mr. D. C. Watson.
Secretary—Mr. W. G. Weatherall.
Treasurer—Mr. D. Henderson.
Committee—Messrs. R. B. Keir, G. Bell, W. Ogilvie, jun.

Manchester Amateur Photographic Society.

The first meeting was held on Tuesday, the 14th inst., in the Technical School, the Rev. H. J. Palmer presiding; and there were present thirty-six gentlemen.

For some time the want of such a Society had been felt, and it transpiring as the result of an announcement in the Photographic News of the 13th ult., and other publications, that a fair number of gentlemen were willing to join, the meeting was called to constitute one. The meeting was of a purely business character, rules being considered and adopted, and the following Council elected, viz.:—

President—Rev. H. J. Palmer.
Vice-Presidents—Prof. Gamgee and Dr. Tatham.
Committee—Messrs. Bathe, Champ, Dawson, Duncan, Flowers, Harrison, Hay, Lane, Widdop, and Williamson.
Hon. Treasurer—Mr. J. G. Jones.
Hon. Librarian—Mr. R. Graham.
Hon. Secretary—Mr. W. Stanley, 21, Howard Street, Eccles New Road, Salford.

The Society will hold its meetings on the second Tuesday in each month throughout the year. The subscription is 5s. per annum.

Sheffield Photographic Society.

The above Society held their monthly meeting in the Masonic Hall on Tuesday, the 7th inst., Mr. W. B. Hatfield in the chair.

Mr. W. Askwith was elected a member.

A resolution was unanimously passed to resume monthly subject competitions for the next six months, commencing with "Interiors" for May, the subject for the remaining five months to be selected by the President.

A committee was elected to arrange and conduct Saturday afternoon excursions.

The members then rigged up the screen and lantern, as this night had been fixed to try the one they had just received from the Sciopticon Company; one hour on slides of members' own making, and the remainder on a number of Woodbury slides kindly lent by Mr. F. Barber. The lantern, after some little delay, worked very well, and a good disc was got with camphorated paraffin.

The subject of the May meeting will be judgment of competition pictures of "Interiors," and the work on our first trip of the season to Syam and Froggat, which takes place on Monday, the 20th inst., by coach from the Masonic Hall at 8.30.

Photographic Society of Ireland.

The annual lantern meeting open to members and their friends was held on Friday evening in the Lecture Theatre of the Royal College of Science, Dublin, when, notwithstanding the counter attractions connected with the Royal visit, there was a fairly good attendance.

The lanterns were manipulated by Messrs. T. A. Bewley and Woodworth, while the description of the slides was undertaken by Mr. Greenwood Pim. A new feature was introduced on this occasion, many of the transparencies being the work of members of the Society; whereas, on former occasions, all had been made professionally from members' negatives. The principal contributors were Dr. Scott (whose beautiful instantaneous views of the arrival of the Prince of Wales elicited hearty applause), Messrs. J. L. Robinson, Samuel Baker, Roberts, T. A. Mansfield, and Bewley.

Bristol and West of England Amateur Photographic Association.

The ordinary monthly meeting was held at the usual room at the Queen's Hotel, on Wednesday, 25th March, one of the Vice-Presidents, Colonel Playfair, in the chair.

The minutes of the previous meeting having been confirmed,

The Hon. Secretary brought before the meeting the matter of the Woodbury Fund, with reference to which a feeling was expressed by some of those present that it would interest many who admired Mr. Woodbury to know what misfortunes had followed his great successes, thereby rendering such an appeal necessary.

Mr. W. B. Wright, of Brislington, near Bristol, was elected an ordinary member of the Association.

A few formal matters having occupied the attention of the meeting, the Chairman called upon Mr. H. A. Hood Daniel to give a few of his experiences with the soda and potash developers.

Mr. Daniel said: Now, on former occasions, others and myself have stated that we had a strong suspicion that sulphite of soda had a great tendency to produce green fog, or, at least, that the plates upon which it was used showed such defect, while others of the same batch were perfectly free from it. Somewhat supporting such suspicion, it is a strange circumstance that the only plate exhibiting green fog (amongst those I have shown you) was the only one treated with sulphite of soda. I have little more to add, as my chief object was to open a discussion on the interesting subject of the more novel developers, and I wish it to be most clearly understood that that object—and certainly not an exhaustive comparison of a reliable nature, and which would have taken far more time than I have to devote to it—has been what I have kept in view in carrying out these few simple experiments.

The **Chairman** invited discussion on the subject. He (the speaker) said that many had an impression that the carbonate-potash developer was quite a new discovery, whereas it was by no means so; he had himself used it some years ago with advantage.

Mr. E. **Brightman** agreed with Mr. Daniel, that to make such comparisons at all definitely conclusive, would occupy months of one's spare time; it being of course necessary in such case to carefully arrive at the relative restraining powers of the different salts when in combination; and remarked that it would have been interesting to have heard the results similarly compared in the development of under-exposed plates.

Mr. **Daniel** had intended making such a part of his experiments, but he had been too much otherwise engaged, and now hoped that some other member would supply the deficiency at a future meeting.

Mr. W. B. **Wright** remarked that, although the potash-developed negative exhibited appeared thin, Mr. Daniel would find that it would print far more vigorously than he expected, as there was a colour with negatives so developed which made them far denser than they appeared. This speaker handed round some prints in support of this, from negatives which he at first feared were much too weak.

The **Chairman** stated that he had tried sulphurous acid in the developer, and found that it kept it clear and prevented discolouration.

Mr. **Wright** exhibited some prints on Morgan's and "Alpha" papers, and stated that he found the chief difficulty was in the tones of different prints to agree.

After a considerable amount of further discussion, the meeting (which was well attended) terminated with a vote of thanks to Mr. Daniel.

Talk in the Studio.

Influence of the Electric Light on the Development of Plants.—In the *Journal of the Society of Chemical Industry* is described the results of experiments carried out by P. P. Dehérain on the influence of the electric light on vegetation. Experiments in this direction had been previously made by Siemens, but not for such extended periods. The effects of the naked rays noted by Dehérain were very curious; some of the plants lost their leaves, some became spotted, weak, and unhealthy, others turned black, while in the case of some elder shrubs, leaves directly exposed to the electric rays were blackened, although the more protected leaves retained their green colour. The outlines of the upper leaves were found in many instances depicted on those underneath with the distinctness of photography. The influence on vegetation of electric rays which had passed through transparent glass globes was not so prejudicial, although complete development was greatly interfered with The following conclusions were arrived at by the author:—(1) the electric light contains rays which are injurious to vegetation; (2) the greater part of these rays are kept back by transparent glass; (3) the electric light contains, on the other hand, sufficient rays useful to vegetation to maintain the life of plants entirely under its influence for 2½ months; (4) this amount of useful rays is, however, insufficient to bring on young germinating plants, or to bring full-grown plants to maturity.

Photographic Club.—The subject for discussion at the next meeting, on April 22nd, will be "Platinotype Printing."

To Correspondents.

*** We cannot undertake to return rejected communications.

Samuel.—Any dealer in lamps will obtain it to order.

An Amateur.—1. The former is best done with a good sable brush, worked to a fine point, and charged with Prussian blue water-colour; while for the latter a rather hard black-lead pencil is most suitable. If, owing to the smoothness of the film, the pencil does not bite, dip the negative in a solution of silicate of sodium, and let it dry—one part of the thick syrupy silicate and twenty-five parts of water. 2. Over-exposure and rapid development both tend to cause it.

S. G.—After having sensitized in the usual way, and thoroughly drained, float the sheet, back downwards, on the following bath:—

Citrate of potash	1 part
Water	30 parts

Three or four minutes is a sufficient time for floating the paper on the citrate bath, and the paper should be once rapidly washed in clean rain water before drying.

H. S.—1. There is no better shutter for general work than that you mention. 2. All depends on the hardness of the gelatine—or, rather, on the facility with which it swells and allows the free circulation of the fluids; but the time in the bath should never be less than ten minutes. Many persons make it a practice to always allow twice or thrice the time required for the disappearance of the last trace of bromide. Sometimes a sample of gelatine is naturally opalescent when in the hypo solution, and occasionally this is mistaken for undissolved bromide. 2. For plates of "average rapidity," a term as indefinite as most of those used in estimating exposures. If one looks at the whole matter boldly in the face, the only way is to confess that these matters are not yet quite reduced to accurate measurements; but something has been done in this direction.

W. F.—It does not appear to us in any sense a matter for the police as you seem to think, but is merely an instance of a person failing to discharge his liabilities. At any rate, he is responsible to you either for the goods or the money, and if he cannot supply you with the former in a reasonable time, he ought to return you the latter. If you wish to expedite matters, your course is to obtain a summons from the County Court.

J. J. S. C.—1. You will do better if you make it up with only about four-fifths of the quantity of water recommended. 2. It means nitrate of silver to which sufficient ammonia has been added to dissolve the precipitate first formed.

H. B.—1. There is, as far as we know, not any English patent covering the process, but we do not know how the matter stands in America. 2. According to the English usage, the patent you mention would certainly not cover the process; but the case may be altogether different in America.

E. H. M.—1. In the first place, you must use an emulsion containing far more than the usual proportion of silver bromide; and in the second, you must wash the film (after treating with the bichromate bath) until the yellow colour disappears. 2. To make a suitable emulsion, double everything but the amount of water and the dose of gelatine. Should you meet with other difficulties, let us know.

*** Several answers are unavoidably postponed until next week.

The Photographic News.

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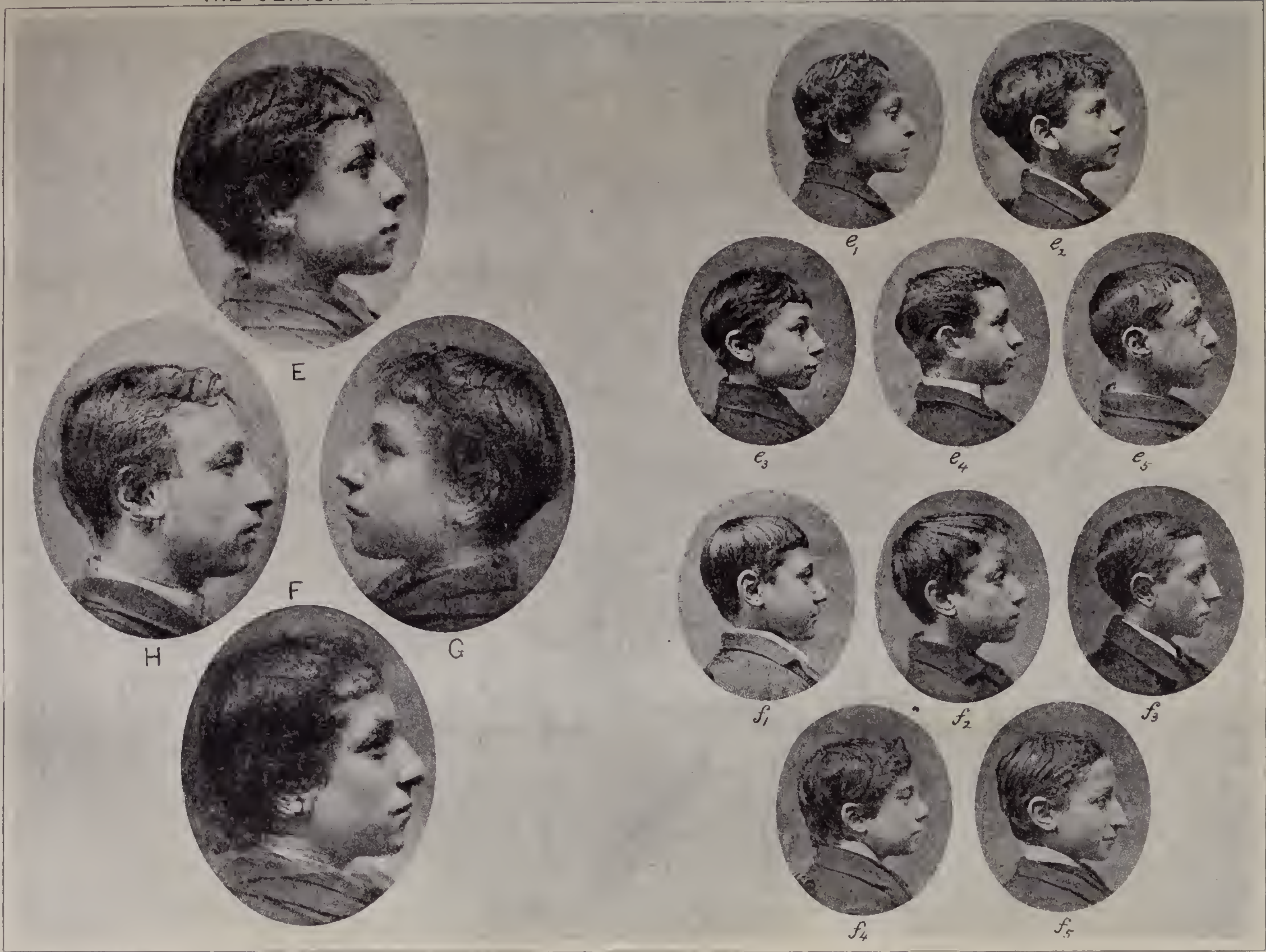

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1390.—*April* 24, 1885.

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CAPTAIN ABNEY LECTURING AT THE SOCIETY OF ARTS.

It is only now and then that one sees the Lecture Room of the Society of Arts so full as it was on Monday last, when Captain Abney spoke of photography and the spectroscope.

"My text is the spectrum," said the lecturer, "and you see it on the focussing screen of this camera." The source of light was an electric arc sustained by the battery of accumulators belonging to the Institution, and Captain Abney made the whole arrangement of apparatus (arc, collimator, slit, two prisms, objective, and camera) clear to his audience, so that the text was well impressed upon them, after which he exposed a plate to the spectral image, and very successfully developed it upon the lecture table.

"Before telling you anything of the nature of the influence exerted by the spectrum upon the sensitive plate," resumed the lecturer, "let me tell you something about matter itself."

Captain Abney then gave an exposition of the atomic doctrine, and pointed out that although this doctrine is based entirely on indirect evidence, it is one well worthy of consideration and study. He told his audience that they must try to form a mental picture of matter, and he would try and assist them in doing so. First, as regards molecules. The molecules of which physicists suppose matter to be built up are similar, insomuch that they all occupy the same amount of space, but their weights differ considerably. A molecule may be—indeed, generally is—built up of several atoms; but the atom is the ultimate and undivisable constituent of matter. Sir William Thompson tells us something as to the probable size of molecules, but he does this with caution and reserve; his figures are "less in diameter than one two-hundred-and-fifty-thousandth of an inch, and greater in diameter than one twenty-five-thousandth of an inch." and we may accept this estimate without more reserve than is usual in matters of scientific speculation.

If we can imagine a globe of water the size of a foot-ball, magnified to the size of the earth, its molecular structure would become visible, and we should find—according to Sir William Thompson's view—the molecules to be larger than small shot, and smaller than cricket balls. One more aid to the imagination. Let us suppose matter to be magnified to the utmost limit which is possible by the use of our best microscopes, and the magnified image to be again magnified to the same extent, then would the molecular structure become visible.

Every atom is charged with energy, but it is doubtful whether we ought to call this energy electricity, although, as in the case of electricity, we may recognise two equal and opposite forms of the molecular force. These we may call plus and minus, or positive and negative variations of the atomic energy, and when chemical combination occurs, the liberated energy takes the forms of heat and light.

"See," said the lecturer, "I dust a little powdered antimony into this jar filled with chlorine gas: now note how energetic the combination is, the bright white light showing the degree of heat generated by the combination, and the intensity of the reaction. Next I will sprinkle some finely-divided silver into a similar jar of chlorine gas, and you will see that the reaction is not nearly so intense, only a dullish red heat being the result. In one case the pentachloride of antimony is formed by the combination of the antimony and the chlorine; while in the other case, chloride of silver is formed by the combination of silver with the same halogen. The constituents of the former combination are held together with far more force than the constituents of the latter combination: the difficulty of separating the constituents of a compound being (with certain qualifications) proportionate to the energy manifested during their combination.

Still, one must not suppose that attraction is the sole force which governs the molecular or atomic constitution of matter, as in reality there are also repulsive forces, and the contrary forces are oftentimes to be regarded as contending for the mastery.

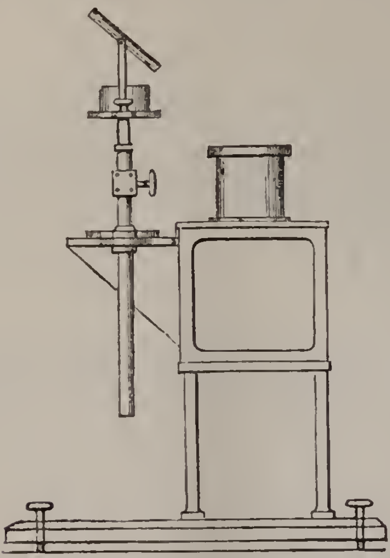
A striking experiment was shown to enable the audience to form some kind of a mental picture of this condition of things. In a glass cup placed on the stage of a vertical lantern, a number of small magnetic needles, each having a cork float at one end, were placed, and as the floating ends were all of similar polarity, they mutually repelled each other; but when a coil through which a strong electric current was passed was brought over the top of the glass, the floating poles were so strongly repelled towards the middle of the field as to be held in this position, in spite of these mutual repulsions.

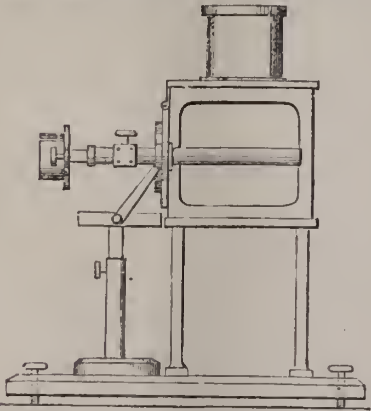
By shifting the governing coil into positions where its action became less intense, the mutual repellant property of the similar poles became once more apparent, but was again overcome by including them in the intense magnetic field of the coil.

It should be mentioned that Captain Abney used a demonstrating lantern of the form designed by Professor Morton, and we need do no more than give the diagrams on the next page to enable our readers to understand how —easy it is to use the apparatus either for horizontal objects as, for example, the magnets floating in a glass of water—or for vertical subjects.

The audience were cautioned against taking a too realistic view of the possible movements of molecules or atoms, and to remember that in the case of the magnets used to illustrate the matter, the movement could only take place in one plane.

A spectrum was now projected on the screen, and its action on the plate was again referred to. It was explained how it may be expected that when any molecule is acted upon by a ray of light having a rate of vibration synchronous with its own, the extent of the swing is increased; but a ray which is not synchronous with the vibration of the atom may be expected to diminish the range of the swing. This was illustrated by blowing periodically upon a pendulum. It was next pointed out that it is quite conceivable that in some cases not only the extent of swing, but also the rate of swing, might be modified by the impact of light vibrations; and to enable those present to form some kind of a mental picture of the way in which this may happen, a pendulum consisting of a weight suspended by an elastic thread was shown; this vibrating more slowly as the swing becomes greater, owing to the stretching of the thread. So it may be that light rays may act on the atoms, even though the rate of swing may not be identical.





The action of light on the sensitive plate may be increased by assisting it with the motion of heat; the increased swing due to the action of heat is taken up and still more extended by the action of light, and to illustrate this a plate was warmed by placing a slightly heated flat iron outside the dark slide containing it; after which the plate was exposed to light and developed. The increased action on the heated part was shown by the appearance of the outline of the warm iron.

The use of the thermopile in searching out and mapping the distribution of heat in the spectrum was then illustrated and explained; and it was pointed out that only one-hundredth of the total radiant energy of the spectrum exercises any photographic action, except so far as the heat rays may help indirectly. Now it is easy to understand how it is that the eye of the camera does not see the colours of the spectrum just as the human eye sees them.

An interesting experiment was now made. The colours of the spectrum were first united by means of a lens, and it was shown that white light results. Afterwards, those rays which are of little or no photographic value were cut out, and the essentially "photographic light" was exhibited on the screen, when it appeared as a beautiful rich blue, with a tint recalling (but differing from) sea-green. Other experiments were made on the combination of colours, and the lecturer pointed out that an apparatus such as he was using could be used with advantage in experimenting on the best light for the dark-room.

The results obtained by varying the form of the slit-aperture were then exhibited, the much-overlapping spectrum obtained by the use of a mere round hole being first shown, then the results with zig-zag slits and ring slits.

The second lecture, which will take place next Monday evening, will deal with the diffraction spectrum, and the formation of the photographic image.

◆

PLATINOTYPE PRINTING.

The paper by Mr. Richard Keene on the "Platinotype Process," which appeared in a recent issue of the Photographic News, will have been read with interest by many, as it describes the practical details of working the process on a considerable scale. It is probable that, when the platinotype process of printing becomes the property of photographers in general, and may be worked by them free of all restrictions, it will be one of the most popular of all printing processes.

Probably all photographers are sufficiently familiar with the platinotype process to know that in it the paper is coated with certain salts of platinum and of iron; that in the printing frame a faint image in the iron salt is obtained; and that subsequently, by a development which may be called one of "substitution," metallic platinum is reduced from the salt and is deposited on the paper in a very fine state of division, forming the image.

The greatest advantage of the process is that the results are regarded as permanent. This is a matter which is certainly not so much considered by photographers as it should be. This ought to be the first question asked of a printing process, "Are the results permanent or not?" We fear it is generally the last. Witness, for example, the manner in which the printing process which gives probably the most fleeting results of any—namely, that of silver printing on albumenized paper—has held its own against all others.

In talking of the permanency of prints, it should always be borne in mind that *permanency* does not mean *indestructibility*. We think that a print on paper might fairly be called permanent if it can be said of it that, subject to ordinary atmospheric conditions, the image will last as long as the paper on which it is supported. There can be little doubt that this can be said of the platinotype process, and likewise of the carbon process.

The appearance of a platinotype print must be known to all. The surface is without gloss, and the colour is either an engraving-black or an approach to sepia. Comparisons are proverbially odious, so we shall avoid comparing the appearance of platinotype and silver prints. The question as to which kind of print is the most pleasing must remain one of opinion. There can be no doubt, however, that the decision of artists of the brush is, as a rule, decidedly in favour of platinotype prints.

The facility of working the platinotype process as compared with any other printing process that we know of—except, perhaps, the "blue process" for copying drawings—is very considerable. After very little practice it is quite as easy to judge whether a print has had sufficient exposure in the frame as it is in the case of albumenized paper; whilst the time taken for printing is considerably less. This latter quality is, of course, specially advantageous in dull weather. The manipulations of the print after exposure in the frame are of the simplest nature. We have more than once taken several prints from one negative, and have had them finished and mounted within an hour of the time when the first piece of prepared paper was placed in the frame.

When the platinotype process was first laid before the public it was undoubtedly the case that the contrast obtainable in prints by it was very considerably less than that obtainable in those on albumenized paper. In fact, if the best results were to be obtained it was necessary to have specially prepared negatives which would have given hard silver prints. This drawback has been to a great extent removed of late. With batches of paper which we have recently had we have got prints giving very nearly as much contrast as could be got on albumenized paper. The contrast has certainly not been quite as great; but, on the other hand, the *gradation* appears to be truer.

The most troublesome part of the working of the process is to be found in the necessity which exists in keeping the paper absolutely dry up till the moment of development. This difficulty does not by any means counterbalance the saving of labour in other parts of the process, but it is one which must not be entirely lost sight of. The paper must be kept in a "chloride of calcium tube" both before and after printing, and during printing must have a sheet of rubber placed on the back of it. The rubber must be of very good quality, or it will soon become hard. It is therefore somewhat expensive. We may mention that in our own practice we use a very cheap substitute for the rubber sheets, and that it appears to answer admirably. We make use of the waterproof sheets intended to be placed between the leaves of the copying book in press copying of letters.

The expense of working a process ought within limits to be entirely disregarded by the photographer; that is to say, it should be considered a matter of no importance as compared with final results. It is, however, to be feared that it is considered a matter of very great importance indeed. It cannot of course be expected that prints in platinum should be obtained as cheaply as those in silver. The difference is, however, not very great, and it has lately been made somewhat less than it was by the fact that the sheets of platinotype paper are now turned out of dimensions which allow them to be cut up into the regular photographic sizes with much less waste than can the usual albumenized sheet.

THUMB-NAIL NOTES.

(Society of British Artists, Suffolk Street.)

Being a photographer, I naturally regard pictures through a photographic eye, and strolling the other day through the Suffolk Street Galleries, the first to open of the Annual Spring Exhibitions, I made a few notes from my own photographic point of view.

Suffolk Street is the home of the "Impressionist." The artist who endeavours to seize with his brush the scene as it strikes him, who is content with all the crudities which he may perpetrate, and who refuses to elaborate or embellish, is an "Impressionist," and to some extent he corresponds to the photographer who revels in instantaneous snap-shots. Of the two I prefer the photographer. Take Mr. Whistler's "bits" in Suffolk Street. There are some half a dozen of them, "a note in grey," "grey and brown," "green and silver," and so on. They are all vague, indistinct, and like nothing in nature.

Perhaps, considered as "arrangements" in colour, they may have merit, but as "drawings" they are beneath notice. What can a photographer learn from them? Absolutely nothing. The contrary may be said of the same artist's portrait of Signor Sarasate. This is masterly in pose and drawing, and the violin is a wonderful bit of colour. But why does a kind of smoke tinge the whole picture? It is called an "arrangement in black," but it is such an arrangement as every photographer is familiar with. In plain words, it is under-exposed, the development is forced, and fog has made its appearance. Mr. Whistler's followers are very particular in copying his favourite fog. Mr. Sidney Starr's "In the Lobby of a Theatre" is a capital example of this. An ugly young lady is sitting all alone, possibly waiting for some one, though there is nothing in the treatment, pose, or expression to show this. She wears a dingy dress, she is stuck against a sombre background, and this is all. Her face is seen through a veil of smoke, and, were the picture a negative, it would be put aside as a failure. Mr. Harper Penington gives us smoke of a different kind. It is cold and slaty in tone, and altogether cleaner than Mr. Whistler's variety, but it is still smoke. It is especially marked in a picture of what he calls "A Little White Girl." This picture is notable, by the way, for the extraordinary chair on which the child is seated. The back leg, though farther away from the eye than the front one, is much longer, and if really drawn from nature would tilt the seat downward three or four inches. Photography has an awkward habit of finding out faulty perspective, and had Mr. Penington photographed the chair he would have discovered this.

The same sad tone which appears as smoke in so many figure-subjects takes the aspect of sunlessness in landscapes. Walberswick, in Suffolk, has lately become the artist's happy hunting ground, and there are no less than seven views in the Suffolk Street Rooms, but nearly all show a grey, sad sky, and an absence of shadow. Is there less sun at Walberswick than anywhere else, and does this endear it to the "Impressionist" school?" I should have thought so had I not by a lucky accident seen, after my visit to Suffolk Street, a number of photographs of Walberswick taken by Mr. Valentine Blanchard. Here there was no lack of sun nor of picturesqueness. To the painter's eye, Walberswick consists of level, monotonous dykes, long stretches of muddy water, desolate patches of grass, and dreary skies. To the photographer, Walberswick abounds in sunlight effects, in quaint pictures of weather-beaten fishing boats full of suggestivenesss, and in odd bits of river scenery, not flat and tame, but vivid with human interest. The pictures of the painter are fragments; the photographs are complete, and the eye is satisfied.

In Mr. T. H. Potter's "A Blue Jar," we get a very patent example of the modern school. The subject is a young lady with a muddy face and dark maroon dress, holding a piece of blue china. I have no doubt the sample of pottery is rare and valuable, but why should everything else in the picture be subservient to it? Why should the young lady's face be dirty—shadow does not express the peculiar tone—in order that the blue jar may be brilliant? Modern art is certainly eccentric, if nothing else.

There were many other pictures which present a mark for the foeman, but I pass them on. The predilection for smoke tints seems to be the most salient feature from my point of view, and I have confined myself to that alone.

Wide Angle.

GALTON'S COMPOSITE PORTRAITS.

BY W. E. DEBENHAM.

Mr. Galton's paper on "Composite Portraits," and the exceedingly interesting illustrations which accompany it, recall an experiment which I occasionally made many years since. At the time of which I speak, about five and-twenty years ago, stereoscopic pictures were much in vogue, and many photographers acquired the knack of combining the images without the use of any instrument. This was accomplished in two different ways: one by squinting, so that the right hand picture was sufficiently displaced in the image as perceived by the observer to the left, and the left-hand picture to the right, for the two to coincide. This method, however, was not a proper one, but gave rather what is called a pseudoscopic effect. The other, and better plan, was to preserve the axes of the eyes parallel, as if looking at a distant object, whilst the focus was brought to bear at the distance at which the slide was actually held.

The method of acquiring the ability to see stereo slides in this manner with a stereoscope is the following. Two pictures, which may either be identical, or as nearly so as the two halves of a stereoscopic picture, are mounted on separate cards, and cut so narrow as to allow them to be placed much nearer together than the two halves of a slide are generally mounted. These pictures are laid upon a plain surface where no disturbing bright object comes near them, and where they will be equally illuminated. A slip of blackened card is then placed in such a position as to resemble the partition in a stereoscope—that is to say, so that each eye sees only one picture. If the pictures are placed square to one another, and at an even height, and very near together, so that the same point in each is not more than an inch or an inch and a-half apart, the eyes will generally easily combine them into one, and they may then be gradually separated without their union being destroyed. When by practice they combine at a distance of from two and a-half to three inches, the ability to see a stereo slide stereoscopically without an instrument has been acquired.

As stereo slides were commonly mounted at a distance (between some fixed point in each) greater than that which exists between the two eyes, it was necessary that the ability to use the axes of the eyes rather divergent than parallel, whilst preserving the focus for near objects, should be gained. I therefore considered that it should be practicable, where objects to be combined might be viewed from a distance of a few feet, that such objects should be capable of being combined in the observer's brain when they are further apart from each other than three inches or so, which was their separation when viewed from a distance of a few inches only. Acting upon this idea, I placed two persons in a similar position, and succeeded in combining their features into what is now called a composite portrait. This I did on several occasions, and perhaps Mr. Galton may be interested in repeating the experiment.

As to a method of directly combining several images without necessarily photographing, there are two plans which I would suggest. One plan is to place a series of plates of flat polished glass (which should be as thin as possible, so as to reduce the effect of double reflection from the two surfaces to a minimum) at such an angle as each to reflect an image of one of the subjects it is desired to compound. Let fig. 1 represent a stand with an eye-piece at the top, and glass plates, *a*, *b*, *c*, placed at the angles indicated. The cards, *a′*, *b′*, *c′*, will then be reflected in the glass plates, and if they are placed at such distances from the plates that the total distance—from the eye-piece to the plate, and plate to card—be the same, they will all be in the focus of the eye at the same time. One card may be laid on the base of the stand, and it will be seen through the glasses and unite with the others.

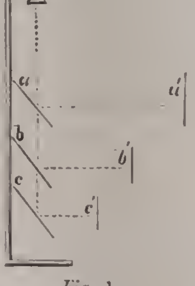


Fig. 1.

Another plan, and one which will serve both for viewing combined images and for photographing them, is to have two or more lenses mounted as close together as possible. The lenses should not be large in proportion to their focal length. An illustration of two lenses will suffice to show the effect, whether that number, or three or four, or even more, are employed. When studying or copying photographs is in question, it is obvious that the pictures (*a a*, fig. 2) should be placed at just a distance that their images shall fall upon the same point, *b*, of the plate. A final exact adjustment, close to the operator's hand, could be obtained by vertical and horizontal rack movements to the part of the camera front upon which one of the lenses is mounted. Several may be thus united simultaneously; but it would probably be convenient, in photographing a series, to keep the one which was used as the first always in place, opposite one lens, and arrange the others as they are placed in position opposite a second lens, so that the two images coincide as much as possible. In viewing the images of two individuals, the lenses might be slightly separated, if in the particular case the sitters would otherwise be inconveniently close.

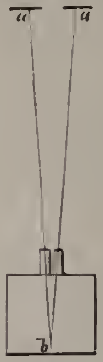


Fig. 2.

More than two persons might be brought to the same place on the plate by the use of additional lenses, but the number would be more limited than in the case of combining photographs, as the latter can be arranged vertically as well as horizontally, an arrangement which would not be convenient with living subjects unless some had larger features than others, when they could stand behind at such a distance as to come to one size in the camera.

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REMARKS ON PHOTOGRAPHING PAINTINGS, AND ISOCHROMATIC PHOTOGRAPHY.

BY W. M. ASHMAN.

Photographing paintings is not by any means an easy operation, unless they are freshly painted. Even then, certain colours in the original do not render up their true value to the photographer.

There may have been two reasons at work in the mind of the Hon. Treasurer of the Parent Society when he determined on reading his recent paper at Pall Mall.

The first, we may assume, was to elucidate an interesting discussion which might enable experiments of recent date to be shown the light, and thus pave the way for the future enquiry suggested by the author of the paper; or, as an authority upon the subject, Mr. Bird might have felt that British photographers awaited his opinion concerning the action of the authorities who went out of their way so far as Messrs. Braun and Co.'s establishment at Dornach, in order to have the pictures in our National collection properly photographed. It is probable that both these reasons influenced the decision, for a discussion took place; albeit, no new points fell from the speakers who were engaged therein, and the author, in that portion of his paper which dealt with the cosmopolitan nature of art, gave certain reasons tending to justify the selection.

Those who had the opportunity of examining some of the examples with which the paper was illustrated, were by no means agreed as to how far the results were due to skilful retouching beyond the legitimate limit, and how far to chemical and other means; neither were they assisted in their deliberations by any information as to Messrs. Braun's *modus operandi*, beyond a claim by the said firm that their process of reproducing paintings was a secret one, and better than any one else's.

It is pretty generally understood by English copyists how to photograph a painting; some manipulators prefer to make the negative in direct light, at the same time carefully providing against all possible reflection from the surface of the painting, beyond that which is necessary to obtain an image; others give preference to an equally diffused light, such as may be obtained in the open air. Sunlight, too, has its adherents. Then, again, we find that many successful results are obtained by the use of the reversing mirror. Whichever of these methods of illuminating be adopted, it is usual to make a preliminary negative somewhat smaller than the original, and for this purpose the gelatino-bromide process is, for several reasons, peculiarly suited. Putting aside for the moment the gain in rapidity, and the absence of many defects met with in the wet collodion process, we find that bromide of silver in gelatine tends to the direction of rendering detail not easily obtained with collodion containing a large proportion of one or more iodides; this result, added to the more harmonious rendering of the strong lights, enables the photographer to make a negative in which he has a truer representation of the painting, and one in which harshness, cracks, and fissures are less obtrusive. Upon a preliminary negative of this kind, a considerable amount of modification can be worked, both sides being utilizable for this purpose; here it is that the method mentioned by Mr. W. England, in the discussion referred to, proves of especial value, always provided the truth is not sacrificed.

Another power of no less magnitude is the skilful manipulation of a transparency from this dodged preliminary negative. Such a transparent positive may be either from collodion, gelatino-bromide, chloride, or carbon tissue, the two former processes allowing for enlargement; the latter not so. As a rule, the first or last named is generally preferred; in skilled hands such positives are amenable to an immense amount of alteration, and frequently of improvement, the final negative, which is usually by the wet collodion process, requiring nothing beyond the merest touches for the removal of ordinary defects. There are other methods of producing photographic copies of paintings, wherein the artist's brush is more or less brought into requisition. These methods are doubtless familiar to all practical photographers, and need not be dwelt upon now, since sufficient has already been mentioned to illustrate the value of mechanical contrivances artistically pursued.

That certain modifications of the sensitive film assists us towards successfully photographing colours, in accordance with their true value as regards luminosity, is a fact which has been proved beyond question. Sir J. Herschel's and Mr. R. Hunt's experiments in this direction were valuable, but they have only been considered practical since the researches of Major-General Waterhouse, Drs. Vogel, Lohse, Captain Abney, Mr. F. E. Ives, and others, have been recorded. It will be remembered that the particular influence exerted —and it is a marked one—in the recent experiments is effected by staining the sensitive film with a substance which exalts the sensitiveness of the rays of lower refrangibility, without increasing the blue and the violet materially, in some cases, and decreasing their energy in others. Working upon the same lines as the earlier experimenters—namely, photographing through coloured mediums—it is found that the refrangibility of blue and violet rays can be greatly lowered in this way without exercising any corresponding disadvantage upon the yellows, greens, and reds. Thus, if we photograph two bands of colours—say, one of them yellow, and the other blue—under ordinary circumstances, with wet collodion, we should obtain a dark band in the first instance, and a light band in the second; but if we had repeated the operation, having first taken the precaution to stain the film, and interpose a suitable medium between the object and the objective, a totally different result would have been obtained—the luminosity of the yellow would have asserted its supremacy. Captain Abney's "canary stained glass" forms a suitable medium for the purpose; but it must be borne in mind that the interposition of this medium necessitates a prolonged exposure.

Among the recent experiments published by Dr. Vogel, we find that in addition to interposing a medium similar to the above, he obtains the most decided advantages by incorporating eosine with his sensitive film; the results were exhibited before the German Societies, and much appreciated. The treatment of collodio-bromide plates with chlorophyll recommended for a similar purpose by Mr. F. E. Ives, an illustration of the capabilities of which is published in the current Year-Book, shows conclusively how much can be done by chemical means alone. Another familiar substance, recommended by Dr. Lohse, "Turmeric," has special qualities which recommend its employment, not the least advantage being that it may be used without an interposing medium or extra trouble beyond soaking a gelatino-bromide plate for the space of a few minutes in an alcoholic extract of turmeric root immediately before exposure. It does not appreciably increase the exposure, and much of the colour leaves the film during fixing. Doubtless many plants would yield alcoholic extracts presenting similar qualities if the subject were investigated in the manner its importance deserves.

I have before me two negatives representing twenty-six squares of coloured ribbons, mounted to form five distinct bands, containing in the aggregate all the colours ordinarily met with by the photographer. Thus, in the first band we start with pale buff, and terminate with a deep and rich orange; and in like manner bands containing varied shades of red, blue, and green are made up. These negatives, together with the tablet of mounted ribbons, was sent to me by Mr. Offord nearly a year ago; one of the negatives having been exposed on the tablet in the ordinary way, and the other had been previously soaked, as recommended by Dr. Lohse, in a solution of turmeric. The difference between these two negatives was so remarkable that I considered the matter of sufficient importance to repeat the experiment with the view to its mention at the photographic societies. My results being similar, led me to try other substances, among them being an alcoholic extract of the petals of the French marigold, which exercised a similar, though more marked influence, than the turmeric; but like Mr. F. E. Ives' chlorophyll, its value depends very much on its freshness.

Upon the occasion of mentioning these experiments at the August technical meeting of the Photographic Society of Great Britain, I advocated the formation of a committee whose duty it should be to make a series of comparative experiments with the substances already published, as well as with the isochromatic plates of foreign manufacture. So far as known to me, no such series of experiments have yet been officially carried out, therefore I heartily second the Hon. Treasurer's request that the Parent Society of photographers shall give this subject their attention.

TO THE CAPE.

BY C. RAY WOODS.

Ding dong! "Any more for the shore?" Ting-a-ling is heard from the little bell that warns the engineers to "Stand by!" Splash, splash goes the screw as it is first put in motion, and the vessel is steaming slowly down the harbour. The rain is coming swiftly down, almost drenching us; the wind is blowing a bit, and the whole appearance of things bids in favour of dirty weather. And we get it.

As soon as the Needles were passed, the vessel began to roll, the roll steadily increased, and from the moment we left the shores of England to the moment Madeira appeared in sight, the ship rolled heavily, and the masts appeared to swing from side to side like stalks of corn in a fitful breeze. For six days only a mere handful of passengers took a walk on deck, and these few, mostly old sea-goers, were heartily glad when those six weary, monotonous days were over. The forward part of the vessel was one wet bath, and aft, on the quarter deck, the slippery timbers and the blinding spray rendered exercise a somewhat difficult thing to get, and only the exertion of keeping upright and accommodating the body to the motion of the vessel was available for keeping some of the muscles in order when one sat down. The sight of what seemed like a huge wall of water, the top of which was the horizon rising suddenly up before the eyes, remaining for a second suspended above, then lowered as rapidly as it rose quickly, made one dazed and giddy, so that, good sailor as I have found myself to be, I was never without a fear lest I might eventually succumb to that to me unknown, but to many less fortunate individuals familiar, sensation known as *mal-de-mer*. I like a little rough weather occasionally—but on this occasion the long monotony of it tired me out, and I shall not only be content with, but even grateful for, a little smoother water in any future journey I may have occasion to take. Only one incident of any moment occurred during the first week of our passage: a great wave sweeping over the fo'c'stle snapped the fastenings of a few of the articles on deck, and carried them away. A hencoop or two were seen, and a poor dog struggling bravely but vainly with the waves; but it was a yellow dog, and, being a yellow dog, it failed to strike a chord of pity in the hearts of the spectators.

What is there about a yellow dog that carries with it a touch of the ludicrous? Is it because yellow will not harmonize with, but contrasts, the *blues?* Is it because——

We only stopped for two hours at Madeira, but that two hours gave me sufficient time to take a few views. I got a tar from the ship to carry my camera, which I put in its leather case, for the landing is bad at Funchal, and both passengers and their effects are apt to get a damping as the boat is run through the surf; slides might get the salt water into them if carried in a canvas satchel. Safe on shore, we walked through the town in the direction of an old fort, which stands on a little eminence commanding the harbour.

My first plate was exposed on the fort as it appeared between the houses of a short and narrow street; but not feeling satisfied that I had hit the right or a workable exposure, I exposed another plate on it from a slightly different point of view. Fifty yards farther on, and just outside the town, I came on a fairly attractive view from a bridge, under which ran a little stream which came down the valley in front of me. The road above the stream, the hills in the distance, and the vine-grower mending his trellis, made a view characteristic of Madeira; but the clothes drying by the side of the stream, though perhaps equally characteristic of the place, did not add to the picture. But it does not do to be too finicking when you have not much over an hour to spare, and so I took the view with its drawbacks as well.

Another view from a bridge, in the midst of the town, showing one of the churches and some of the houses built, as it were, on the river's embankment, then a view of a quiet street a little further on, and five plates have been exposed. I had one more left, but the time of the steamer's departure was approaching, and besides, two policemen were watching me with very suspicious eyes, and policemen may make themselves disagreeable when a man is taking anything. I made my way towards the quay, therefore, and just before going for the boat I made a busy street the subject of my last shot, and humoured the vanity of a few of my fellow-passengers by placing them in a conspicuous position. Thus I occupied the brief time I had at my disposal in Madeira, and if my results are only what are usually termed "shots," I must console myself with the reflection that that is all one usually gets during a brief stoppage of an hour or two in an unfamiliar place.

After leaving Madeira our passage was smooth enough, and it was quite refreshing to be able to take a meal without pouring your soup into your lap, without having to clutch your plate, knife, and fork with your hands, and the table with your elbows, and without being bombarded by saltcellars and other missiles which, scorning to be kept within bounds, bounced over the fiddles which ineffectually tried to keep the tables in something like order. And then, too, our fellow-passengers suddenly recovered their health and spirits, and friendship-making, quizzing, flirting, scandal-spreading, and all the other usual accompaniments of ship life asserted their sway. There was one passenger, a colonial genius, who tackled me on astronomy, and imparted to me an original and somewhat startling theory on comets.

"Look here," said he; "this is my theory. You know some scientific chaps; suppose that this earth of ours is like a bombshell, filled with melted stuff. Now, I say that these here comets arn't exactly like our earth, but only something like it. They're just filled up with water, and when they get near the sun the water boils, and out come jets of steam, and that's just what makes the tail."

"But some comets have more than one tail."

"Well, can't these shells have more than one hole for the steam to come out of? Hasn't this earth got more than one volcano?"

"Then some comets have curved tails."

"Perhaps that's because there's a wind blowing."

"But how do you account for the tails pointing away from the sun?"

"Look here! If these shells have blown out any steam, they can't be full now, can they? And the less water that's in them the nearer will the centre of gravity be towards the outside of the shell. Now the centre of gravity, which will be where the water is, will be nearest the sun, and therefore the steam will blow out of the other side."

"But what about the fact that the planets exercise so little disturbing influence on comets? How can that be if they are great globes of water?

"They needn't be *great* globes. A little water makes a lot of steam, doesn't it?"

"But what about the rapid motion of the tail as the comet sweeps round the sun, and how do you account for the ——

"Look here! I'm just going to ask you a question before you go on. If the tail isn't steam blowing out of something, what is it now, eh?"

I confessed that I did not know.

"That's just what I thought! You haven't got a theory! None of you have got a theory! Now I *have*, and when you fellows have got a better one, then it will be quite time enough for you to pooh-pooh mine!" and he walked away triumphantly.

On the 5th of February we passed the far famed Peak of Teneriffe, and had the satisfaction of seeing it free from cloud, although there was a fair amount of haze about. I took a shot at it with a lens of about 13 inches focus, but the result was very poor, and not worth keeping. I felt no very great regret, for I could not go into enthusiasm over the Peak as so many people do.

Compared with most glimpses of land that one gets from the sea, it is tall and imposing, but then one always estimates a spectacle by comparing it with something he has seen before. Teneriffe, though high and steep, is not so steep nor so rugged as the mountains of Switzerland, and one sight of the Matterhorn is worth fifty of Teneriffe.

St. Helena was reached in the early morning of February 14th, and our stay there was again very short, as we had to make up for the time lost between Plymouth and Madeira. This time I did not take my camera on shore, and the one photographer there who sold views was able to show his customers little more than mere transcripts of the scenery, and no photographs that presented any attraction as specimens of the art. Of all places of desolation, St. Helena must carry off the palm.

The opportunities for photographic work that I had on this voyage were few—fewer, in fact, than on any sea trip I have yet made. One little experience that I had on board, though scarcely photographic, is perhaps worth recording. I brought out my lantern with me, as my stay here is likely to be a long one, and by way of a variety in our shipboard amusements I exhibited a few slides. Paraffin or kerosine is not allowed on board, but they had some mineral sperm oil, which is rather heavier than kerosine. It gave a good light and emitted no smell. I had no standard to compare it with, but I am under the impression that my lantern did not at least emit a worse light, if not a better one, than it has done with the lighter mineral oils I have used at home. I purpose giving the mineral sperm a further trial, for I am under the impression that it is well worth adopting.

We arrived safely at the Cape on the appointed day of arrival, February 19th, and since then I have been making rapid progress in preparing for the work. Preliminary experiments in photographing the stars have turned out better than might have been expected, and almost as well as one might wish.

A few days after my arrival, I ascended with some friends belonging to the Meteorological Department here, to the top of Table Mountain, where some thermometers and rain guages are placed and examined at certain intervals. I succeeded in obtaining photographs of their apparatus, one of which is given above.

CARBON PRINTING.

BY W. LANG, JUN.*

It seems to me that the three main considerations which stand in the way of the amateur adopting the carbon process are the following :—

1. The necessity of having reversed negatives where the single transfer method is made use of.

2. When the ordinary negative is employed, the troublesome operation of double transfer.

3. The fact that the exposure, as in silver printing, cannot be judged by seeing the actual progress of the picture. Perhaps I should add a

4th. The trouble of sensitizing the tissue.

If, however, we develop our carbon picture on a glass support and leave it there, we have the image in optical contact with the glass, and all that is needed is a backing of white paper to bring out the details of the picture. It is this method of finishing a carbon picture I bring before you to-night. It does away with the necessity of the reversed negative, and no transferring operations are required. The only precaution to be taken with the negative is to provide what is known in carbon printing as the "safe edge," which is easily formed by running a black margin all round the negative with black varnish. Instead of black varnish, strips of orange paper may be pasted down on the negative. These margins, as you will see from the specimens lying on the table, in no way interfere with the negative being used for ordinary silver printing.

The third consideration is the one that perhaps will weigh most with amateurs.

From the nature of the processs no visible image can be discerned, and the exposure has to be determined by means of the photometer; but the method of employing this instrument is soon arrived at, and when once the printing density of a particular negative known, there is no further trouble to be apprehended in this direction. As it is with the developing of the carbon image we are mainly concerned to-night, it will be unnecessary to go further into details. You will see that it is a very simple affair—no turning, no fixing; all that is required is a fair amount of tepid water. There is no necessity to work in the dark; a subdued light is all that is demanded. The plates on which I propose developing the prints have been coated with a gelatine substratum made as follows :—80 grains gelatine dissolved in 5 ounces of water, and 1 ounce of water in which 3 grains chrome-alum have been dissolved, added to warm gelatine solution. The coating that is thus given to the plate is practically invisible.

To develop on a plate thus prepared, all that is required is to take it, plunge it into cold water, and bring the exposed tissue, which also has to be put into cold water, on to the prepared surface, squeeze them into contact, and let them stand for a little with a weight super-imposed, and finally immerse the whole in the developing bath of hot water—say at a temperature of about 100° F. Do not disturb the plate for a little, but wait till the paper of the original tissue begins to show signs of coming away of its own accord. It may then be gradually lifted off, leaving the image, which is still hidden under a layer of unacted-on gelatine, fixed to the glass. By gentle washing, the soluble portions are by degrees removed, and very soon the image comes into view. When the development is considered complete, the picture is to be washed in a bath of cold water, and to render it insoluble it is immersed in a solution of alum. All that remains is to soak a piece of transfer paper in hot water and squeeze it on to the picture, and allow the whole to dry. If all the foregoing operations be properly carried out we should have a picture which it would be difficult to tell from a silver print, provided, of course, that the tissue used in the first instance has been of that particular shade. As you are doubtless aware, tissue can be obtained in almost any colour, brown, black, purple, but the colour which comes closest to the silver print tone is that known as chocolate red. For transparencies, a tissue in which Indian ink forms the colouring matter is the one most generally employed. I have exposed several prints to-day, using the two kinds of tissue specified, and these I will now proceed to develop.

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* Communicated to the Glasgow Photographic Association.

I have said nothing about the sensitizing of the tissue, but there is no difficulty here. The bath employed is a five per cent. solution of bichromate of potass, and the time of immersion varies from one to four minutes, all depending on the temperature of the bath. As a general rule, it may be stated that the tissue should remain in the bath till it begins to feel soft. It is removed by one of the corners and allowed to drain, and afterwards fixed to a clip and allowed to dry spontaneously in a darkened apartment. The drying may be hastened by squeezeeing the excess of the bichromate solution out of the tissue before hanging it up.

Notes.

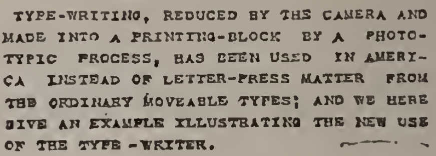
The illustration of Galton's composite portraiture which is given with the News this week shows four composites in the large ovals (A, B, C, and D). A is the composite of the five individuals a to a_5, while B is a composite of b to b_5, C is a co-composite of A and B, and D is a composite of five adult faces. The influence of the black curl of a_1 is very noticable in A and C.

The atmosphere is as a dark glass through which we see the sun, according to Professor Langley, who lectured at the Royal Institution on Friday last.

In order to eliminate as much of the atmospheric effect as possible, Professor Langley studied the solar spectrum from the top of one of the peaks of the Alleghany Mountain in California, and he found that the heat spectrum extends far beyond what has been looked on as the limit, while the blue rays are over ten times more intense at the top of the mountain than at the bottom. Were it not for the protective action of the aqueous vapour in the earth's atmosphere, mercury would freeze in the direct rays of the sun.

Every now and then a patent is obtained for a new method or process of making or obtaining gold, the alchemist of the present day evidently preferring the prospect of a close monopoly for fourteen years, rather than taking the chance of preserving his secret during a longer period; but of all the ancient and modern schemes for gold making, the most extraordinary process we have yet heard of is that originating with Mr. Harry Fell, Mercantile Clerk, of "Fairlight," Avenue Road, South Norwood Park. The patent specification of this gentleman (New method for getting gold from wheat; No. 14,204, 1884) may be obtained for twopence at the Patent Sale Office in Cursitor Street; but we give our readers the essential features of it.

The material (whole-wheat straw) is steeped in slightly warm water for ten hours, and strained off into a shallow pan; the pan being allowed to stand in a moderately-warm place for twenty-four hours, a scum appears on the surface of the liquid, and this is caught on a cylinder of some cool substance, as china or earthenware. "Then let this skin dry," says the alchemist, "so getting some results of films of gold."



TYPE-WRITING, REDUCED BY THE CAMERA AND MADE INTO A PRINTING-BLOCK BY A PHOTO-TYPIC PROCESS, HAS BEEN USED IN AMERICA INSTEAD OF LETTER-PRESS MATTER FROM THE ORDINARY MOVEABLE TYPES; AND WE HERE GIVE AN EXAMPLE ILLUSTRATING THE NEW USE OF THE TYPE-WRITER.

Who knows but what photography may some day make the compositor a personage of the past, just as it now threatens to extinguish the wood engraver? Type writers are now made weighing only a few pounds, and so small that one of them may be carried in a hand bag, while, by using manifold paper, several copies can be obtained. It is easy to suppose the possibility of newspaper matter and reports being first produced as type writing, being then photographed and finally converted into blocks by a photo-type method.

One notable advantage of this method would be the facility it would afford for including in the text hastily-made pen-and-ink sketches, or autographic matter.

Adopting the ordinary chemigraphic method, some two or three hours would have to elapse before the block could be made; but one may expect improvements to be made as regards rapidity.

The direct transfer of type-written matter to stone for lithographic printing has been occasionally done, but during the present month a small journal produced in this way has made its appearance. It is called *The Monotype*, and is published at 9, Portugal Street, W. C.

The photographer has been following closely in the track of the Prince and Princess of Wales during their tour in Ireland; and the already astounding total of negatives which have been secured from first to last of this popular couple will have been increased by at least a score by the time they return. The public will be most interested, perhaps, to know that an admirable portrait of the Princess Alexandra, in her robes as *Mus. Bac.* of the Royal Irish University, was taken. For one of the negatives she actually sat in the "mortar-board," which literally "caps" an academic costume; but it is not likely that copies of this particular portrait will be published for sale.

Apropos to these photographs of Royalty, it may be interesting to state that amongst the most valued of the art treasures in Her Majesty's private apartments is the series of albums in which are arranged, in chronological order, copies of every photograph of a member of the Royal Family which has ever been taken. The custody and arrangement of these albums—which now form a small library of themselves—are left in the hands of one of the

Queen's most trusted private attendants; and admirably are the duties performed. The portraits of the Prince and Princess of Wales alone reach a total of over 600, and now that her Majesty's grandchildren are marrying, the Royal circle is extending at a most rapid rate. It may become necessary, in fact, seeing how photography is still developing, to appoint a special Court official to act as "Comptroller of the Royal Photographs," "Keeper of the Cartes," or something of the kind.

The primrose is a very pretty flower, and we have nothing to object in the setting apart a day for wearing it. But does not the *St. Stephen's Review*, in its perfervid adoration of Primrose Day and Lord Beaconsfield, go perilously near the ridiculous when it extols some card photographs because "they have the merit of being cheap, and all taken from actual Hughenden primroses?" We always thought one primrose very like another, but evidently, according to the *St. Stephen's Review*, the Hughenden primroses are "distinctly precious."

The *Lady's Pictorial* cites the "military photo frame" as an instance of the tendency just now to assimilate ornament to affairs of public importance. It is interesting to learn that "it has become *de grand genre* for officers to relieve their sombre photographs by the addition of a soldier painted in full uniform on one side of the leather frame, on the lower margin is often put a gun, two crossed swords, a casque or helmet with gauntlets." This description is rather vague, but one can see what is meant, and if the fashion spreads we should not be surprised if frames suitable for the portraits of bishops were made ornamented with mitres and croziers; frames for members of Parliament decorated with the mace and a copy of the oath for an inscription; and frames for lawyers in the shape of a woolsack, and emblazoned at each corner with a representation of the Lord Chancellor's seal!

A monument to the memory of the Rev. F. F. Statham will probably be erected in St. Peter's Church, Walworth. He was essentially the friend and helper of the poor in his parish, and the humbler classes of the parishioners are taking the initiative in the movement. In the *South London Press* we notice a long list of subscriptions; and if any reader should desire to make the list longer, the best way will be to send a cheque to the Editor of the paper in question.

A phototype reproduction of one of the Tironian Psalters will be published shortly by the Royal Stenographic Institute of Dresden, and notes by Dr. O. Lehmann will accompany the reproduction.

"Landscape," written by Mr. P. G. Hamerton, and just published by Seeley, would be valuable to the photographer, even if without the illustrations; but considering that the four hundred folio pages of text are supplemented with plates in the proportion of one to each ten pages, and that each plate teaches a definite lesson, the work is one that every out-door worker with the camera may reasonably desire to possess.

But for the system of photographing criminals, the perpetrator of the recent ghastly murder in Paris might not have been discovered. Marchandon, the butler of Madame Cornet, the murdered woman, had undergone a term of imprisonment in 1881, and the police, suspecting he might be the murderer, had his photograph shown to the keepers of ready-made clothes shops, as it appeared Marchandon had systematically obtained situations as butler, and had absconded with stolen goods. One of the clothes-dealers recognized the photograph as that of a regular customer who had once mentioned that he lived at Compiègne. The photograph was also recognized at Compiègne railway station, and the man himself was at once arrested.

An effort is being made to secure the publication of Gordon's journals in facsimile by one of the photo-zincographic processes which so admirably reproduce an origina MS., or whatever it may be.

The difficulty at the Home for Lost Dogs at Battersea is to dispose speedily of the good dogs that from time to time find their way there. It has been suggested to the committee that the photographic camera might with advantage be brought to their aid, and that the circulation of (say) a weekly circular containing photographs of alll the more eligible of the canine refugees, in London and the Provinces, would probably bring about the desiderated sales.

Herr Wilde, of Görlitz, tells a queer story. A request that he would act as a juror in the photographic department of the Technical Exhibition at Liegnitz was delivered by mistake to a cousin having the same name, and this gentleman, who had no idea of any mistake being made, accepted. As the other photographic juror (Herr Siebe) did not put in an appearance, there was but one acting juror, and this one a gentleman knowing nothing of photographic matters.

Herr Quidde comments on the worthlessness of medals given under such circumstances—indeed, he evidently thinks that medals should be done away with altogether; and he speaks approvingly of the exhibitors at the recent Technical Exhibition in Berlin, they having agreed to take no medals. As a rule, Herr Quidde remarks, medal-seeking exhibitors do not care whence the medals come, so long as they are medals.

This view is perhaps an extreme one, but, as regards the medals of the Photographic Society of Great Britain, it is a question whether it would not be more satisfactory to have them done away with altogether than for the suburban tram-cars to be decorated with portraits, each portrait being accompanied by a notice to the effect that the firm producing it has received the highest possible honour in connection with photography—the medal of the Photographic Society.

Our reference to Mr. Kay's proposal to make sea water potable by means of citrate of silver brings us two communications: one from Mr. Allison, of Hull, descriptive of his castaway locker, which is a small case containing a still, and enough petroleum to produce 100 lbs. of fresh water, to say nothing of what can be produced by burning other materials; also fishing tackle, concentrated food, compass, and other necessaries. The whole apparatus will float when packed. The other communication is from Mr. Kay himself. He asks our opinion of the usefulness of a sealed tube containing the exact quantity of citrate of silver required to make a pint or a quart of water drinkable. Even if one sets aside the variation in the amount of chlorides in sea water, it must be remembered that the use of an exact quantity of silver citrate requires equally exact measuring out of the pint or quart of water.

In the Mississippi State Female College, at Columbus, U.S., photography is to be regularly taught. We give this on the authority of the *St. Louis Photographer.*

Ferrotype dry plates have long been enquired after, and Mr. Gray, of Newcastle-on-Tyne, not only tells us that he has been successful in making them, but he sends us some very good examples of work. May we then not expect collodion to be ousted from one of its last strongholds—the tent of the peripatetic photographer who supplies the public with a portrait complete for sixpence?

It is quite possible that many tourists who would like to have memorials of their travels, but who hesitate to take several dozen glass plates, will be willing to take the more portable and less fragile ferrotype plates.

Patent Intelligence.

Applications for Letters Patent.

4786. Edward Marlow, 4 and 5, Arcade Chambers, Corporation Street, Birmingham, for "Improvements in photographic dark slides."—Dated 18th April, 1885.

Patents Sealed.

5134. Louis de Roux, of Begles, near Bordeaux, Gironde, France, for "Improvements in engraving by photography."—Dated 19th March, 1884.

5647. James Thomson, 21, High Park Street, Liverpool, Lancashire, Photographer, for "Improvements in photographic camera stands for use out of doors, on land or at sea."—Dated 29th March, 1884.

10,558. Count Stanislas Julian D'Ostrorog, 5, Conduit Street, New Bond Street, Middlesex, trading under the name of "Walery," for "Improvements in obtaining pictures on enamel, fixed by fire."—Dated 24th July, 1884.

Specification Published during the Week.

8463. Samuel Dunseith McKellen, of 18, Brown Street, Manchester, in the County of Lancaster, Watch Manufacturer and Jeweller, for "Improvements in photographic cameras."—Dated 20th February, 1884.

The claim is, in a photographic camera, the use of the two pinions for the purpose of giving motion to the sliding frame carrying the front board and lens, or carrying the camera body: such motion causing the front board and the camera body to approach to or to recede from each other.

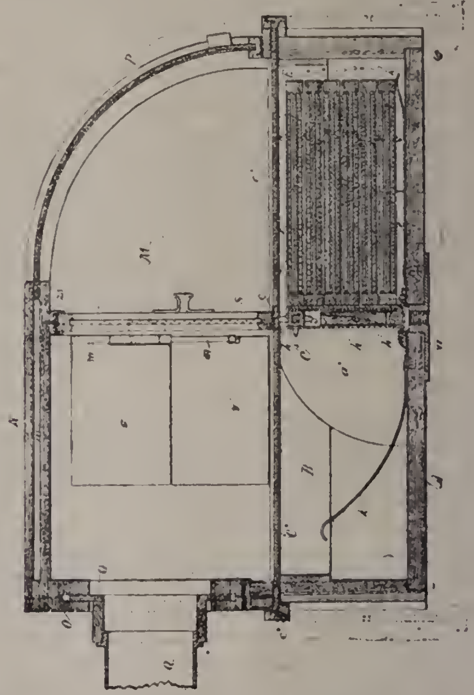
Patents on which the Fourth Year's Renewal Fee of £10 has been Paid.

1751. Ferdinand Hurter, Ph.D., of Widnes, in the County of Lancaster, Alkali Manufacturer, for an invention of "Improvements in actinometers or photometers, or instruments for measuring light."—Dated 23rd April, 1881.

Measuring the intensity of light by causing rays of different refrangibility to be received by or pass through different colours, and to be absorbed by the two sensitive parts of a differential thermometer, and measuring the difference of temperature thus produced, whence the intensity of the light may be ascertained.

Patents Granted in America.

315,156. Scotto C. Nash, Harrisburg, Pa., "Portable camera."—Filed June 14, 1884. (No model.)



Claim.—1. The combination, with a camera, of a box and a series of plate-holders united by a belt, a roller for moving the plate-holders up into position successively, and means for holding the plate in its position whilst the picture is being taken, substantially as set forth.

2. The combination, with the belt and plate-holders, of a box surrounding the same, means for moving such belt of plate-holders, a camera above and connected to the plate-holder box, and lids to the plate-holder box, substantially as set forth.

3. The box B, with a movable bottom, A, and side pieces, *a'*, in combination with the belt and plate-holders, the roller for moving the same, and the partition and roller within the belt and between the sides *a'*, substantially as set forth.

4. The combination, with the plate-holders, of a belt, clamping plates to connect the belt to the plate-holders, and a polygonal roller with teeth for moving the plate-holders and belt, substantially as set forth.

5. The combination, with the box A B, of the plate-holders, the belt connecting the same, the polygonal roller for moving the belt, and the springs upon which the outer ends of the plate-holders rest, substantially as set forth.

6. The combination, with the plate-holders and the belt connecting the same, of the polygonal roller, a square axle passing through the same, the journals for the axle, and the knobs upon the ends of the axle, substantially as set forth.

7. The combination, with the plate-holders, the belt connecting the same, and the means for moving the belt, of a box inclosing the parts and sliding covers composed of slats upon a flexible material, substantially as set forth.

8. In combination with the lens-holder and a flat septum attached to the same, a camera-box having a double front end, with a space between the two parts of the end, into which the septum is received, and within which it can be moved laterally, substantially as set forth.

9. The combination, with the plate-holders and a belt to connect the same, of a box, sliding lids for the same, and a camera

that can be reversed, so as to take pictures upon plates at either side of the plate-holders, substantially as set forth.

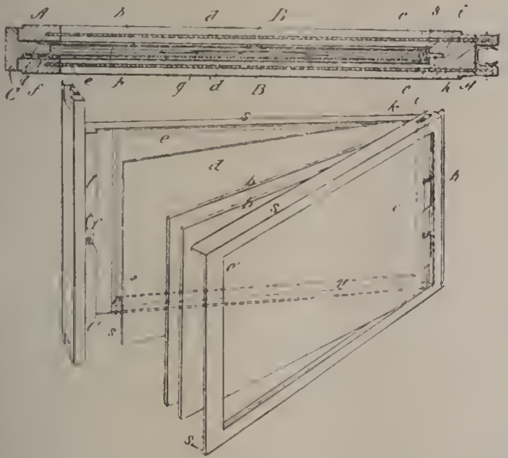
10. The camera-box having a front, end, and sides with segmental grooves, in combination with a cover formed of slats united by flexible material, the ends of the slats being within the grooves, substantially as set forth.

11. The forked stop, spring, turning-head, and notched case, in combination with the plates *u*, and the plate-holders or focussing-frame, substantially as specified.

12. The combination, with the camera-box, of sectional shields within the box, and the axles of the same extending through the camera-box, and turn-buttons or heads for the same, substantially as set forth.

13. The combination, with the plate-holders, the belt for connecting the same, and the roller for moving the belt, of a counting device for indicating the plates that are brought successively into place for the pictures, as set forth.

315,219. Erastus B. Barker, New York, N.Y., assignor to E. and H. T. Anthony and Co., same place, for "Photographic plate or sheet-holder."—Filed Nov. 18, 1884. (No model).



Claim.—1. In a photographic plate-holder, the combination with the septum of the holder, of an open hinged or swinging-frame, constructed to clamp or hold the marginal portions of the sensitive sheet on or against the septum, substantially as specified.

2. A septum for a photographic plate-holder, made substantially as herein shown and described, consisting of pivotted boards, in combination with pivotted open frames, constructed to clamp the marginal portions of the sensitized sheets on or against said boards, essentially as described.

3. The combination, with the septum boards and the pivotted frames, of the separating spring or springs *g*, substantially as described, whereby the edges of the sensitized sheets will be firmly held between the septum boards and the edges of the pivotted frames, as set forth.

4. The pivotted frames *c c'*, constructed with flanges or lips, *s*, substantially as shown and described, whereby the frames will fold one within the other, with the septum boards between, as set forth.

5. The outer frame, *c'*, constructed with a slot, *k*, as shown and described, whereby said frame is made to slide longitudinally upon the other frame and the septum, to facilitate the opening and closing of the several parts, and the insertion and removal of the photographic sheets, as set forth.

6. The fastening, *f*, in combination with the pivotted frame *e'* and the septum head or stop *l*, as shown and described.

7. The combination, with the extremity of the frame *e*, of the projecting fin *h*, as and for the purposes shown and described.

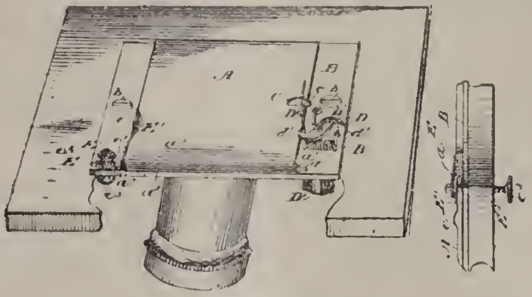
8. The frame *c*, fixedly secured to the septum head or stop *l*, and serving to carry both the outer pivotted frame and septum boards, substantially as specified.

315,296. Harry W. Kellogg, Greenfield, Mass, for "Instantaneous shutter for cameras."—Filed July 12, 1884. (No model).

Claim.—1. In a photographer's camera, the combination, with an instantaneous shutter, of an opening-spring mechanism and a closing tensioned spring, said springs being of unequal resiliency, and situated at opposite sides of the door, substantially as described.

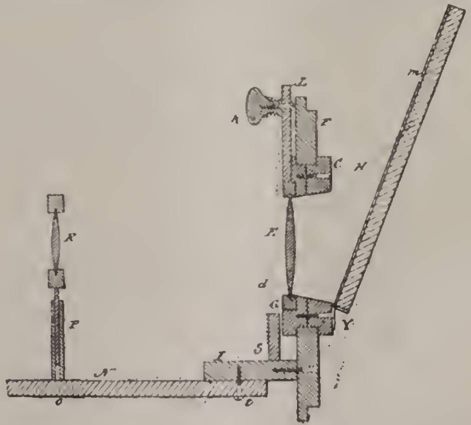
2. In a photographer's camera, the combination, with an instantaneous shutter hinged at its lower side, of a self-setting exposing device consisting of a coiled spring having a spring-finger, which, acting excentrically with a cam operated by a thumb-nut, is brought into engagement with the under side of a lug rigid on the shutter, and the closing mechanism, substantially as described.

3. In a photographer's camera, the combination, with an instantaneous shutter having a self-setting exposing device, of a closing mechanism consisting of a coiled spring, E, having a spring-finger, E', extending from the main coil and engaging with the lug or projection *e* on the shutter, and a tension-screw, E², for varying the exposure, substantially as described.



4. In a photographer's camera, the combination, with an instantaneous-flash shutter or light-door hinged at its lower side, of the opening and closing devices situated at opposite sides of the bottom of the door, and acting conjointly, a thumb-nut for operating said opening and closing devices, and a metal plate upon which the shutter and all the operating mechanism is mounted, substantially as described.

315,450. Wm. C. Strong, Kent's Hill, Me., "Adjustment for solar cameras."—Filed March 22, 1883. (No model.)



Claim.—1. The combination, with the foundation F, having a circular hole near its centre, of the two flanged collars C, fitted to the said hole, the lever L, secured to the inner collar and provided with the knob K, pivoted to it, the mirror *m*, hinged to the outer collar, and the cord H, secured at one end to the mirror, and at the outer end to the knob K, to be wound thereon, substantially as described, whereby the mirror may be both rotated and elevated, or depressed by means of the said knob.

2. The combination, with the foundation F, the mirror *m*, and lens E, secured thereto, as described, and the cross-piece I, also secured to the foundation F, of the lens-bar N, pivoted at *t* to the cross-piece I, the lens R, and the telescoping joint P, supporting the lens and provided with the slide O, fitted to the bar N, as shown and described, whereby the lens R may be raised or lowered, may be caused to approach or recede from the lens E, and may be swung horizontally out of parallel therewith, as described.

THE JEWISH TYPE, AND GALTON'S COMPOSITE PHOTOGRAPHS.

BY JOSEPH JACOBS, B.A.

Most people can tell a Jew when they seen one. There is a certain expression in Jewish faces which causes them to be identified as such in almost every instance. Being engaged in some investigations into Jewish characteristics generally, I was anxious to discover in what this "Jewish expression" consists. It occurred to me that Mr. Galton's method of composite portraiture would enable us to answer this question with some degree of exactitude. I accordingly applied to him about two years ago, and he kindly consented to "compound" some Jewish types. I procured for him photographs of Jewish lads from the Jewish Working Men's Club, and of Jewish boys from the Jews' Free School, and he was good enough to compound them, with the results presented to the readers of the Photographic News this and last week. I am now to speak of them and their scientific value as representing the Jewish type.

Of the fidelity with which they pourtray the Jewish expression there can be no doubt. Each of the eight composites shown might be taken as the portrait of a Jewish lad quite as readily as any of the components. In some cases, indeed, *e. g.*, f_3, the portraits are less Jewish than the composites. The individuality and, I may add, on Mr. Galton's authority, the beauty of these composites are very striking. It is difficult, even for those who know the process, to grasp the fact that the composite E exhibited last week is anything but the portrait of an individual; and the same may be said of D, the composite of five older lads, whose portraits are not shown. A, again, the composite of the five *a*'s, reminds me of several Jewish youngsters of my acquaintance, and might be taken for a slightly blurred photograph of any of them. This is the more curious since A does not resemble very closely any one of its components. These facts are something more than curious: they carry with them conclusions of scientific importance. If these Jewish lads, selected almost at random, and with parents from opposite parts of Europe, yield so markedly individual a type, it can only be because there actually exists a definite and well-defined organic type of modern Jews. Photographic science thus seems to confirm the conclusion I have drawn from history, that, owing to social isolation and other causes, there has been scarcely any admixture of alien blood amongst the Jews since their dispersion.

These composites, there can be no doubt, give the Jewish expression. What do they teach us as to the elements which go to form it? The popular idea of a Jewish face is, that it has a long nose. But the full-face composites exhibited this week have decidedly the Jewish expression, though the shape of the nose does not appear; and further, in composite H, as well as in co-composite G, which represents ten Jewish boys "rolled into one," the shape of the nose is markedly blurred, showing that there is no uniformity in this respect. The popular impression seems, then, to be disproved by these composites. Yet it contains a part of the truth, as do most of those rough averages which we term impressions. The nose does contribute much towards producing the Jewish expression, but it is not so much the shape of its profile, as the accentuation and flexibility of the *nostrils*. This is specially marked in the composite C. Take a narrow strip of paper and place it over the nose in this composite, and much, though not all, of the Jewish expression disappears. And in the profile *components* of last week it will be observed that every face has the curve of the nostril more distinctly marked than would be the case in the ordinary Teutonic face, for example.

A curious experiment illustrates this importance of the nostril towards making the Jewish expression. Artists tell us that the best way to make a caricature of the Jewish nose is to write a figure 6 with a long tail (fig. 1); now remove the turn of the twist as in fig. 2, and much of the Jewishness disappears; and it vanishes entirely when we draw the continuation horizontally as in fig. 3. We may conclude, then, as regards the Jewish nose, that it is more the nostril than the nose itself which goes to form the characteristic Jewish expression.

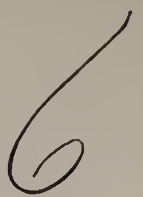


Fig. 1.

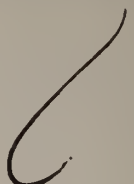


Fig. 2.

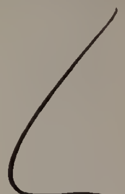


Fig. 3.

But it is not alone this "nostrility" which makes a Jewish face so easily recognizable. Cover up every part of composite A but the eyes, and yet I fancy anyone familiar with Jews would say, "Those are Jewish eyes." I am less able to analyse this effect than in the case of the nose. The fullness of the upper lid, and the protuberance of the lower may be remarked, as well as the scantiness of the eyebrows towards the outer edges. The size, brilliance, and darkness of the iris are also well marked. Many persons have remarked to me that Jewish eyes seem set closer together, and this property is seen in composite A, D giving much of its expression to the latter. I fail to see any of the cold calculation which Mr. Galton seems to have noticed in the boys at any of the composites A, B, and C. There is something more like the dreamer and thinker than the merchant in A. In fact, on my showing this to an eminent painter of my acquaintance, he exclaimed, "I imagine that is how Spinoza looked when a lad," a piece of artistic insight which is remarkably confirmed by the portraits of the philosopher, though the artist had never seen one. The cold and somewhat hard look in composite D, however, is more confirmatory of Mr. Galton's impression. It is note-worthy that this is seen in a composite of young fellows between 17 and 20, who have had to fight a hard battle of life even by that early age.

There remain the forehead, mouth, and chin to add their quota to the Jewish expression. The predominating characteristic of the forehead is breadth, and perhaps the thick and dark hair encircling it has something to contribute to the Jewishness of the face. The thickness of the lips, and especially a characteristic pout of the lower one, come out markedly in components and composites, both full face and profile. One may observe, too, the dimples (if one may use the term) which mark the termination of the mouth, and are seen in an exaggerated form in a_1. Finally, the heavy chin, especially marked in the profile composites, confirms the popular association of this feature with the quality of perseverance, so ingrained in the Jewish nature.

We learn, then, from these composites that the Jewish expression is considerably more complicated than is ordinarily thought. If I have analysed it aright, the Jewish face has accentuated flexible nostrils, largish mouth, with ends well marked, and pouting under lip, heavy chin, broad forehead, with prominent superciliary ridges scantily covered with hair towards the outer extremities, and large dark eyes, set closely together, with heavy upper and protuberant lower lid, having a thoughtful expression in youth, transformed into a keen and penetrating gaze by early manhood. But words fail one most grievously in trying to split up into its elements that most living of all things, human expression; and Mr. Galton's composites say in a glance more than the most skilful physiognomist could express in many pages. "The best definition," said the old logicians, "is pointing with the finger" (*demonstratio optima* *definitio*); and the composites here given will doubtless form for a long time the best available definition of the Jewish expression and the Jewish type.

There is one consideration which lends an interest other than scientific to these composites of Mr. Galton. Most of the readers of this journal will be familiar with the portraits of spirits which gratify the curiosity of spiritualists, and cause ironical laughter among those who know the easy trick by which these plates may be manufactured. But here we have something more ghostly than a ghost, more spiritual than a spirit. The thing, person, spirit, ghost, idea, type, or what you will that looks at us in A has no bodily existence; and yet there is life in its eyes. And it has a definite expression which can only mean that it expresses something. In the present instance, as the components can in all probability trace back to a common ancestor, the composite face must represent, if it represent anything, this Jewish forefather. As the spectroscope has bridged over the abysms of space, and has told the composition of Orion's Belt, so the photographic lens seems, in these composites, to traverse the æons of time and bring up into visible presentment the heroes of the past. In these Jewish composites we have the nearest representation we can hope to possess of the lad Samuel as he ministered before the Ark, or the youthful David when he tended his father's sheep. Or, if this is saying too much, we may see in the composites the Jewish youngsters who "coolly appraised" the ancient prophet, as their components seem to have done with the modern scientist.

Let me, in conclusion, recommend—of course with an eye to my own hobby—any photographer who intends taking up composite portraiture, to try his hand—but not his 'prentice hand—on composites of Jewesses. I am inclined to think that there is less variation in Jewesses than in Jews, so that the composite ought to be even more individual. Besides, in their case portraits can be taken at a later age without fear that any part of the face will be concealed from view, and we should thus be able to study the features when more set than in the case of the Jewish lads. The enterprising photographer who adopts my suggestion need have no anxiety about procuring components. I make bold to assert that my fair co-religionists are as constant visitors to photographic studios as any class of her Majesty's subjects. And if Mr. Galton has succeeded in producing such individual and beautiful composites of Jewish boys, not of a very refined class—well, my argument is obvious, and I leave some of the professional readers of the Photographic News to carry it into effect.

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PHOTO-LITHOGRAPHY AND PHOTO-ZINCOGRAPHY.

BY MAJOR J. WATERHOUSE, B.S.C.,
Assistant Surveyor-General of India.

Chapter XVIII.—Photo-Lithography in Half-Tones.*

III. We now come to the processes in the third class, in which the photographic image is broken up by a network or grain interposed in some way between the negative and the sensitive paper or other surface.

Messrs. Bullock Brothers, of Leamington, who patented a method of photo-lithography in half-tones in 1865, appear to have been the first to recognise and practically carry out the principle of breaking up the photographic image by a definite grain, though Mr. J. W. Swan patented a different process of the same kind about the same time.

In a paper read before the London Photographic Society in April, 1866 (News, vol. x., p. 185), Mr. J. Bullock gave a short resumé of experiments he and his brother had made in this direction.

Making a grain upon the glass plate previous to its being coated with collodion to form a negative was found promising, but troublesome. Forming a grain upon the finished negative by coating it with a granular varnish, or by making the surface slightly adhesive and depositing a fine powder upon it, were tried, but not found satisfactory. Producing the grain in the camera by placing before the prepared plate a glass plate covered with a fine grain was also tried, but a long exposure was required, and an unpleasant pinhole appearance was given to the parts which should have been quite dense. Other methods of placing a grained medium between the negative and the paper were tried, but without success.

The methods which finally were found most successful were—first, by reticulating the negative in the following manner:—A piece of ground glass, or a photographic copy on glass of some reticulated surface, was placed face to face with the negative, and a transparency taken from the two whilst in contact. From this transparency any number of negatives could be produced, each containing a granulation so marked as to give the prints on transfer paper a well-marked half-tone composed of lines or dots.

The second plan, which seems to have given very good results, was to imprint a grain, by aquatint or otherwise, upon the unsensitised gelatine paper—all that was required being to sensitise the paper with bichromate of potash, and print from an ordinary negative. The exposed surface was then inked and washed in the ordinary way. Some excellent specimens were produced and published in the News and other photographic journals, but the process seems to have fallen out of use.

In Mr. Swan's process he first produced what he termed a crayon photograph—*i.e.*, one in which gradation of shade was produced by dots of opaque matter more or less aggregated as the shading is darker or lighter, and therefore corresponding to a crayon drawing in the principle on which the gradation of shade is produced. Such a crayon photograph may be produced in various ways, but Mr. Swan preferred to obtain it by means of a gelatine tissue containing a certain proportion of charcoal or other opaque substance, in such a state of division or granulation that when diffused through the gelatine solution and spread upon glass in a thin layer, the opaque particles will show distinct granularity between particle and particle. This tissue was either prepared ready sensitized with bichromate, or could be sensitized as required. It was exposed under a photographic negative or positive, that surface of the tissue which was uppermost during the solidification of the gelatine being placed next to the cliché, and care being taken that the light might fall at right angles to the plane of the cliche. After exposure the exposed surface of the tissue was coated with a solution of india-rubber and dammar in benzole, and mounted on a glass coated with the same solution, the solvent being allowed to evaporate. The image was then developed in warm water in the usual way. The crayon photograph could also be produced by the dusting process.

Having obtained the crayon photograph by the above methods, it was used instead of an ordinary negative or positive for the production of a transfer print in the usual way.

A process of this class by which have been produced some of the best results in photo-lithographic half-tone the writer has seen, was published last year in the *Photographisches Correspondenz* by Herr Mariot, of the Military Geographical Institute at Vienna, who has done a great deal in perfecting various photo-mechanical processes. Herr Mariot's work is specially interesting because he has thoroughly investigated the question of grain, and has succeeded in working out a method which, being equally applicable to Photo-typography Photo-lithography and Photo-gravure, may be termed a "Universal Photographic Printing Method" (see News, vol. xxvii., p. 802).

Herr Mariot's process is based upon the well-known principle that if we copy a negative of a line or point, the image of the line or point will increase in breadth and coarseness according to the length of exposure; this goes so far that the images of two thick lines or points standing close together (within certain limits) will finally join. This effect will be more readily produced if the covered spaces which should remain white allow some action of light to take place through them under long exposure.

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* Continued from page 60.

If we expose a network of fine lines at a distance apart of about $\frac{1}{50}$ of an inch to diffused light under a sensitive plate, and cover it over in slips, so that the first slip shall have a normal exposure, and the remainder be over-exposed from twice to four times, it will be found that the first slip will correspond with the original, while the rest will show distinctly thicker and thicker lines, till finally they join together.

The same effect occurs when the lines are exposed under a half-tone negative. In the clear parts the lines will be found closed up after a sufficient exposure, and will gradually open out until finally those under the densest parts (the lightest half tones) appear in their proper dimensions. To produce the proper effect, therefore, the exposure must be prolonged until the lines or points which represent the finest tones in the lights are sufficiently clearly developed.

(*To be continued.*)

AN ATTEMPT TO PHOTOGRAPH THE CORONA.

BY W. H. PICKERING.

It occurred to the writer that the late partial solar eclipse would be an excellent chance to repeal Huggin's experimentz on photographing the corona. A 3-inch refractor of about 40 inches focal length was employed. A drop-shutter was attached to the lens, giving an exposure which was estimated at about a fifth of a second. A piece of deep-violet glass was procured, which could be inserted just in front of the plate, or removed, at pleasure. By its use a negative image of the sun's disc was obtained, but without it the plate gave a reversed image; the sun being a positive and transparent, while the surroundings remained negative and were dark, the appearance being strikingly similar to that of a photograph of a total solar eclipse. Both bromide and chloride plates were provided; but, as with Mr. Huggins, the latter proved proved to give much the better coronal effects. A ferrous-oxalate developer was employed, which contained a large proportion of potassium bromide. The weather throughout the eclipse was wholly favourable; and we began photographing at ten o'clock, two hours and twenty minutes before the eclipse began, and continued at work until five minutes past four, or an hour and ten minutes after it had terminated. Photographs were taken every half-hour, with extra ones interpolated at the more interesting phases, making twenty-nine pictures in all.

Very corona-like effects were certainly produced, faint rays here and there shooting out perpendicularly to the sun's surface. But, unfortunately, no two of the pictures were alike, and the corona in front of the moon was quite as well marked as that on the other side of the sun. Indeed, the most corona-like ray produced, appeared in one photograph stretching directly towards, and terminating at, the centre of the moon. Nine photographs taken in succession showed one side of the halo stretching to a greater distance than the other; but in one of these the darkening was carried so far out, that it became nearly separated from the rest of the corona, and appeared as a distinct dark circle of the same size as, and by the side of, the image of the sun. This, of course, showed it to be merely an internal reflection of that image, and nothing more. During the course of the experiments, the object-glass was revolved about its optical axis, photographs being taken in four positions. No effect, however, was discernible upon the plates.

The conclusions I should draw from my experiment are 1st, that, though it is very easy to obtain a corona-like image, one may readily be deceived in such matters, and the same effect be obtained by our atmosphere, without the aid of the solar corona, combined with little defects in the gelatine film (this, I think, is conclusively shown by the extension of the pseudo-corona in front of the moon); 2nd, that chloride plates are more suitable than bromide for obtaining an atmospheric corona, just as Mr. Huggins has claimed that they are more suitable for taking a solar one; hence I think one must not rely too much on the ultra-violet region sensitiveness of the chloride plate for a separation of the two; lastly, though my experiments fail to corroborate Mr. Huggins's results, they do not, of course, show that his corona may not be solar, but merely indicate that under very favourable circumstances I could obtain no trace of it.

I have before me a print made from a negative by Dr. O. Lohse, in October, 1878, showing effects very similar to those obtained by myself, except that his view was not taken during an eclipse. He considers that the halo is wholly atmospheric, and not coronal.

MOUNTING LARGE PHOTOGRAPHS.

BY F. J. HAYNES.

Having recently had a varied experience in mounting full sheet prints, I would be pleased to inform your numerous readers of our method of mounting and preventing warping, if the following is of sufficient importance to justify its publication.

If mounting on cardboard 22 by 26, have a stretcher made of 3-inch strips well put together, 23 by 27 outside measure; this allows half-an-inch margin over the cardboard; mount the print as usual on the dry cardboard, place it face down on the stretcher, and cover the back with a piece of strong Manilla paper large enough to bind the print and cardboard securely to the stretcher. Allow it to remain on the stretcher until thoroughly dry. If your back paper is poor, the contraction will break it loose from the stretcher, and the desired effect will not be obtained. But if a first quality of paper is used it will hold it securely; and when the cardboard is cut loose, it will be as straight as the original cardboard, and will remain so.

Large views mounted in this way can be placed in portfolios on easels, &c., with some pleasure; they will not be like a lot of stove pipes. We have mounted during the last three months some two thousand, and can recommend this plan as entirely satisfactory, and certainly one that is appreciated by the purchaser of the views.

Any number of these stretchers can be made; but with twelve we have been able to get along rapidly enough, as the print dries in a few hours, when it can be cut off, and the stretcher is ready for use again.—*Photographic Times.*

Correspondence.

THE NEW DANGER.

Sir,—The subjoined extracts from correspondents will prove the interest taken by the profession in the above case. As the matter is still in the hands of my solicitor, I refrain from making any remarks.—Yours truly,

49, *King William Street, E.C.* A. L. Henderson.

A Northampton photographer writes:—

"Dear Sir,—I have just returned from a short holiday, and on picking up my News found your letter, 'A New Danger.' I must confess to feelings of thankfulness that you had the promptitude to unmask the wretched cheat. I have no clubs here, so naturally I was pleased to read your letter. I knew that the individual, on being liberated from prison, was going on for a London firm; but I little thought he had ventured to use your name. I am afraid I can be of little service, but please command me if necessary in this matter."

"Dear Sir,—Seeing a letter in the Photographic News of last week of yours, I beg respectfully to call your attention to what I think you may, perhaps, have overlooked in connection with the 'New Danger.' First, your letter would only be seen by at most about sixty or seventy persons, as not more than that number of copies of the News are circulated in the town. Second, as your letter does not mention the name of the canvasser referred to, it throws discredit upon *all* canvassers in this town. Knowing you have for many years past exposed various shams and frauds in connection with the profession, I feel sure you would not willingly wish to brand all for one. I would suggest that if action be not taken before the magistrates, that an advertisement in the Northampton *Daily Reporter* or *Daily Chronicle* disclaiming *your connection* with the so-called firm would at once set the matter at rest. I trust you will pardon the liberty I am taking in this matter, but I am speaking on behalf of canvassers of two or three firms represented in the town, whom I am sure you would not wish to suffer under a ban for another's ill-doings."

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 16th inst., Mr. A. L. Henderson in the chair.

The preliminary business having been disposed of, the Chairman invited Mr. W. K. Burton to deliver his lecture on "Modern Developers."

Mr. Burton commenced by saying that "Modern Developers" might be said to have dated from 1861, when alkaline development was first made known. Before this date some acid, always accompanied with nitrate of silver, was employed to build up the image; but in the year mentioned it was discovered, that if an alkali be substituted for the acid and free silver, an image could be developed, thus preparing the road for the present methods. In 1877, Carey Lea pointed out that alkaline pyrogallol could be replaced by organic iron salts. This form of development the lecturer did not consider the best for plates, but it was better for paper. The question then arose, which alkali should accompany the pyrogallol? He believed ammonia was used almost invariably. He then passed round a series of transparencies wherein each of the carbonates had been employed. A similar series, which included the caustic alkalies, followed. Forty-eight examples were then shown, in which the proportions of pyrogallol per ounce varied from $\frac{1}{2}$ to 2 grains, bromide of ammonia $\frac{1}{4}$ to 2 grains, and ammonia $\frac{1}{2}$ to 4 minims. He then referred to the addition of sulphite of soda, a subject upon which opinions widely differed. So far as his experiments went, he was unable to trace any particular advantage to its use, neither would he say it was injurious. Hydrokinone was then spoken of and illustrated; three grains, together with a quarter of a grain of restrainer, bromide of ammonium, being used, the result of which was satisfactory. Hydroxylamine, on the contrary, failed to give an image with any of the caustic alkalies. He had not tried the salt with either of the carbonates, as he assumed the result would also have been *nil*. All the examples illustrating comparative values of ammonia pyro and bromide, received an exposure of twenty seconds to a duplex paraffin lamp, and were all developed for as much detail as could be obtained from them in half an hour. He did not recommend keeping the stock developer in one solution for obvious reasons, but to show that it was practical, he passed round examples which had been mixed for a month; they were of a brown colour, but had not lost any developing power, a fact afterwards satisfactorily demonstrated. The solution was composed of ammonium bromide, pyrogallol, and caustic soda in methylated spirit, the limit being governed by the solubility of the bromide salt. At the conclusion of the lecture, a discussion took place.

Mr. A. Cowan preferred the ammonia carbonate to either soda or potash, and instanced the development of plates by a solution which had been kept twelve months, after developing eight plates. He had diluted some developer with sixty-four times its bulk of water, and obtained an image in fifteen hours.

Mr. A. Mackie remarked upon the yellowness of the images so obtained, even with one hour's development.

Mr. W. J. H. Wellington was in doubt whether another brand of plates would yield similar results to those obtained by the lecturer, since formulæ differed so much. He had lately been trying Dr. Eder's sulphocyanide of ammonium formula, and his plates then gave green fog; with sulphite of soda they were perfectly clear.

The Chairman called attention to the amount of halation as well as density in one of the examples, and remarked that ferrous oxalate development was due to Willis rather than Carey Lea.

Mr. Burton said it might be taken as an axiom, that the same plate would increase in halation as it increased in detail. His information regarding Carey Lea was derived from the journals of that time.

The Hon. Secretary showed a plate illustrating the disadvantage of an impure sample of sodium sulphate, a little sulphide being apparently present, and the Chairman illustrated a similar defect, together with red and green fog; other plates of the same subject developed minus the sodium sulphite were in both these cases perfect.

Mr. C. H. Trinks pointed out the necessity of testing samples of sodium sulphite for alkalinity, and correcting the same with an acid, to avoid green fog.

Mr. Haddon referred to a series of experiments he had conducted some time ago; he found that working under exactly similar conditions, some plates gave green fog, and others not. Regarding the preservation of pyro in solution, he had not met with anything so good as sulphurous acid. He dissolved one ounce of pyrogallol in 10 ounces of water, containing $\frac{1}{2}$ an ounce of sulphurous acid. He had some which had been in solution more than six months, and was now perfectly clear. He used ammonia, and needed no restrainer, as a little sulphite of ammonia was formed.

A vote of thanks was then accorded to Mr. Burton for his interesting lecture, and it was announced that on the following lecturette night Mr. G. M. Satchfield will demonstrate "Toning and Fixing the Acme Paper."

Chicago Photographic Association.

The regular monthly meeting was held on Wednesday evening, April 1st. After the transaction of some routine business,

Mr. Greene related some peculiar experiences that had lately happened to him in the matter of silvering albumen paper. At a recent meeting he had mentioned the fact of his paper curling obstinately; since that time he had been badly troubled with "measly" prints, and thinking his bath might be weak, he tested it with the hydrometer, and found it to read 42 grains. This induced him to precipitate the silver with chloride of sodium, when, after washing and drying the precipitate, he found that he had $1\frac{1}{2}$ ounces of silver chloride from 55 ounces of solution. His theory was, that the nitrate of silver now in the market was largely adulterated with (probably) nitrate of potash, which, not being taken up by the paper, accumulated in the bath, and accounted for the false reading of the hydrometer. To guard against being misunderstood, Mr. Greene said he was well aware that the hydrometer test was unreliable, except with a new bath.

Dr. Garrison, in reply, said he believed all the leading makers of silver nitrate furnished a practically pure article, and that adulteration with potassium nitrate was readily detected by the difference in the shape of the crystals of the two salts. He considered that the density shown by the hydrometer was legitimately accounted for by the nitrates formed in the bath by double decomposition between the nitrate of silver in the latter and the chlorides in the paper.

Mr. Greene asked how it happened, if this theory held good, that when he was, for a number of weeks, silvering 100 sheets a day, this trouble never occurred, although he relied on his hydrometer for keeping up the strength of the solution?

Being asked how often he boiled down his bath,

Mr. Greene replied that, until this winter, it had not had a thorough boiling for fourteen or fifteen years. He occasionally gave it a slight boiling to coagulate any albumen it might contain. He added that, since making a new bath, he was no longer troubled with paper curling.

Glasgow and West of Scotland Amateur Photographic Association.

The usual monthly meeting was held on Tuesday, the 14th inst The following new members were admitted:—Messrs. John. Gillespie, H. B. Collins, and John G. Walker.

After various letters had been read,

The President exhibited and explained Warnerke's sensitometer, with special reference to Mr. Goodwin's paper at the March meeting on "Aids to Correct Exposure."

A short discussion followed, which was taken part in by various members.

Mr. W. Lang, Jun. then read his paper on "Carbon Printing" (see page 263), and developed a number of carbon prints, which were handed round.

A specimen of the result on an isochromatic plate was then handed round, and compared with a print from one of Wratten's plates, and it was considered that any advantage gained in one colour was lost in another colour.

As this was the last regular meeting of the season, it was agreed to hold informal meetings on the second and fourth Tuesdays of each month at 7.30 p.m. It was also agreed that the Council should procure an album, each member to be asked to contribute prints towards same.

GLOUCESTER SCHOOL OF SCIENCE PHILOSOPHICAL SOCIETY.

Photographic Section.

THE usual monthly meeting was held on Tuesday, the 14th inst., Mr. J. M. COLLETT in the chair.

The minutes of the previous meeting having been read and confirmed,

The CHAIRMAN said that the subject set down for consideration was, the "Best Form of Tripod Camera Stand."

Mr. F. M. BRIDGEWATER, introducing the subject, said that he had, soon after taking up the pursuit of photography, become convinced of the desirability of obtaining a stand which it would be possible to carry without so obviously announcing to the general public the business that the bearer was abroad upon, as did the one supplied to him with his camera, and which was simply a two-fold one. Practically, the bearer of an ordinary tripod stand might as well be labelled "Photographer," and in an article in one of the year-books, stands of the ordinary type had been appropriately designated "The Tell-tale Legs." Being desirous of overcoming what he considered an objection to the prevailing forms of stand, he had given some attention to the consideration of the best means of so shortening the length of the stand, when packed up, as to allow of its being placed in the receptacle in which the camera was carried. It became clear at once that there were only two possible methods of securing the desired end—viz., by multiplying the number of folds or pivots, so as to shorten them, or by some arrangement of a telescopic character. The first of these alternatives did not appear very practicable, unless accompanied by an increase in bulk and weight, which would go far to counteract its advantages in other respects. The second seemed quite feasible, and in consequence he came near doing, in regard to a telescopic camera stand, what he had fully succeeded in doing with reference to one or two other things—viz., evolving a contrivance which had been invented and perfected by somebody else long before. It happened, however, that just when his ideas had reached the point indicated, he met with an advertisement of just such a stand as he had in his mind's eye, and which had been patented. By the kindness of the patentee he was enabled to show them one of these stands. It would be observed that it was made of brass, the joints telescoping one within the other. The height of the one then before them was, when erected, 4 feet, and the length of each of the three legs, when closed, was 12 inches. There were no loose screws or pieces of any kind, simply the three legs and the head into which they screwed. Stands were also made, so as to close into three 10-inch lengths, with a slight addition to the diameter of the tube. The two principal requisites in a tripod stand were, he considered, rigidity and portability, and these were more perfectly secured in the stand before them than in any other he had seen. The weight of the stand was 2¼ lbs., while his oak sliding-leg stand, to carry a similar camera (half-plate) weighed 3½ lbs.

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Talk in the Studio.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next Monthly Technical Meeting of this Society will take place on Tuesday next, April 28th, at 8 p.m., at the Gallery, 5A, Pall Mall East, when some questions relative to the "Chemical Reaction of Alum, Tannin, and Bichromate of Potash on Gelatine," will be discussed.

MISS MARY ANDERSON'S PHOTOGRAPH.—Alexander M. Rossi, an artist, of 177, Adelaide Road, St. John's Wood, appeared to answer two adjourned summonses, taken out by Henry Van der Weyde, of 182, Regent Street, one for infringement of the copyright of the photograph of Miss Anderson and selling copies of the same. Mr. Rain, barrister, supported the summons, and Mr. Corrie Grant, barrister, was for the defendant. Several witnesses were now called, who said there was no likeness between the face in the photograph and the defendant's picture. Mr. de Rutzen reserved his decision in the case.

BALLOON PHOTOGRAPHY.—The experiments in Paris by the Triboulet system of photographing all the country seen from a captive balloon, by opening the valve of a panoramic object-glass with a current sent from the ground, has succeeded wonderfully well. As the operators remain on the ground, a very small balloon is sufficient to carry the photographic apparatus. The impressions, being taken on films, can be inspected with a microscope, and are useful for military purposes.—*Nature.*

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting, on Wednesday, April 29th, will be on "The Preparation of Lantern Slides." This is a Lantern Night. Visitors invited. The Saturday Outdoor Meeting will be held at Hampstead Heath; after, meet at "Bull and Bush." Trains from Broad Street every quarter of an hour.

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To Correspondents.

*** We cannot undertake to return rejected communications.

W. T.—You have made use of sulphuric acid instead of sulphurous acid, and there is nothing to be done but to throw away all the developer you have prepared. It is fortunate that you did not do yourself some injury.

HYPO.—Cut a print in two parts, and mount one half upon the questionable card, and the other half on a sample upon which you can depend. Now keep both side by side in a damp place, and note what happens. If you purchased the cardboard from a general stationer, who did not know the purpose for which you bought it, and it causes the prints to fade, you have no remedy; but if, on the other hand, you bought it from a dealer in photographic requisites, and it was sold expressly to be used as mounts for photographs, the dealer is responsible for their quality, and should compensate you for loss of trade and reputation.

ENQUIRER.—1. Probably half or one-third. 2. Lambert's registering frames were supplied by the Autotype Company; but we do not know whether they keep them in stock now. 3. Probably next week; it is as you suppose.

THOS. SMITH.—1. There are very useful articles in Spon's Cyclopedia, and some other publications; but we do not know of any special book treating exhaustively on the subject. 2. It is not what you suppose, but a true enamel; perhaps dusted on an adhesive ground, and then fired.

B. CUNNINGHAM.—They may be very conveniently made of wood, and if well varnished with a bitumenous varnish, they answer very well. The varnish may be made somewhat elastic by incorporating with it a little melted india-rubber. The rubber should be unvulcanised, and ought to be heated until it becomes viscous, like treacle.

A. B. BOLAND.—We congratulate you on your success, thank you for your offer, and will write in a day or so.

HENRY SPINK.—Cowell's clearing solution is perhaps the best for the purpose:—

Alum...	1 part
Citric acid	2 parts
Water	10 ,,

E. L.—1. We cannot ascertain for you whether the lithograph is copyright, but one may reasonably expect that it is. 2. We do not quite understand your position, but assume that you have bought a right to reproduce from some person who has no power to sell the right. 3. The prints and stamps are returned by post.

A. MILLER.—The suggestion is a good one, and we intend to adopt it when the proper time comes round.

ALUM AND WATER.—1. Details will be given before long. 2. Let them run on thin brass wires stretched across.

C. P. G.—It may be from the use of old hyposulphite; indeed, we can suggest nothing else.

J. M.—From the Silvertown India Rubber Co., 100, Cannon Street, London, E.C.

J. YELDER. Will you send us a description and sketch of the arrangement? We shall also be glad to receive an account of your method of printing.

The Photographic News.

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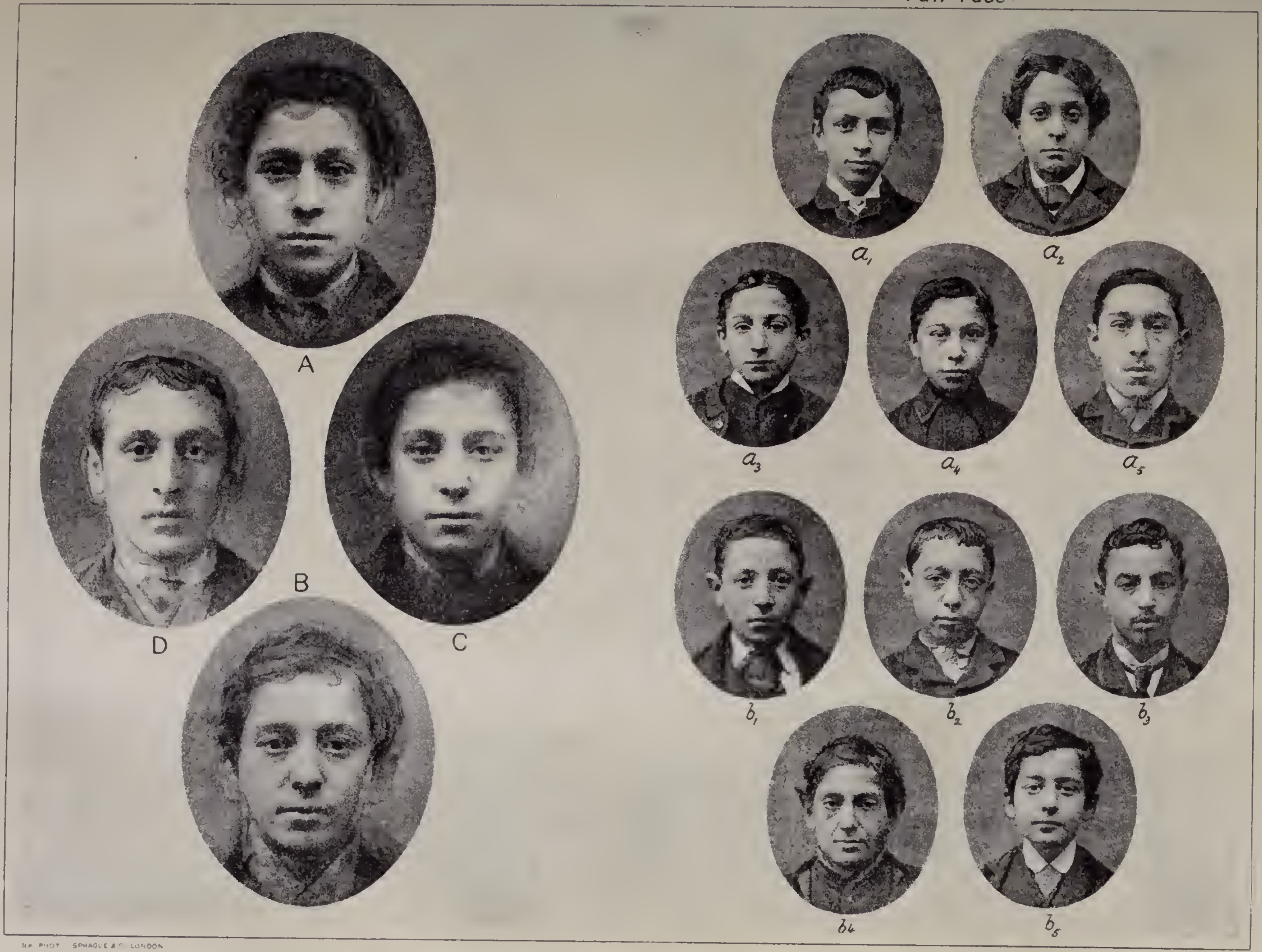

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1391.—*May* 1, 1885.

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GELATINE PLATES FOR MAKING FILM NEGATIVES BY STRIPPING.

To make gelatine plates from which the film can be readily stripped is quite an easy matter, but in this country the demand for reversed negatives is perhaps hardly sufficient to induce manufacturers of plates to introduce such plates into commerce.

Not merely once have we described how to prepare plates from which the film can be stripped, but in order that our readers may have the full advantage of the new details given by M. Otto in the *Bulletin Belge*, we now give a tolerably full abstract of his method of working.

The plates are first cleaned by being well rubbed with a solution of caustic potash, after which they are thoroughly rinsed and polished with tripoli. The next proceeding is to wax them by rubbing one face over with a solution of twelve grains of bee's wax on one ounce of ether, this being applied by means of a piece of cotton or linen cloth saturated with the solution. In polishing off the excess of waxing solution, care must be taken not to destroy the continuity of the extremely thin and almost invisible film of wax which it is necessary to leave on the glass in order to ensure the easy and complete separation of the film. Some persons prefer to wax the plates by warming them to a temperature somewhat over the melting point of wax, then rubbing one face over with a lump of the article; the excess being now polished off with a piece of flannel before the temperature of the glass falls below the melting point of the wax. It may be mentioned that before waxing, it is as well to mark the working surface of each plate by making a diamond scratch in one corner.

A small piece of cloth moistened with ether or benzole is now used to remove all traces of wax from the edges of the plates—a margin having a width of an inch being sufficient; and it is well to paint this margin with albumen and allow it to dry. If the edges of the plate were not denuded of all traces of wax, there would be a great probability of the film separating from the glasses at too early a stage, and adhesion at the edges is made more certain by the use of albumen. A moderately dilute solution of silicate of soda may be used instead of albumen.

The waxed side of each glass is now coated with collodion containing a little castor oil; eight grains of tough pyroxyline and three drops of castor oil to each ounce of mixed solvents (equal volume of alcohol and ether) being a convenient preparation.

The collodion being dry, the plates are coated with emulsion. The emulsion flows very badly on the collodionized surface, but by using a bow made of a piece of sewing cotton stretched across an arc of thin iron wire the difficulty may be readily overcome. The thread is to be drawn over the surface of the plate after the required quantity of emulsion has been poured on, and it is scarcely necessary to say that the glass should be supported on a levelling-stand.

Plates prepared in this way are developed and fixed in the ordinary manner, and when a plate is dry it is sufficient to cut through the film inside the edge which has been denuded of wax, when the film negative can be easily stripped off. In this case, however, the film is very thin, and it is often desirable to thicken it somewhat before stripping. For this purpose a piece of thin commercial sheet gelatine is taken and is soaked in water till it becomes quite flaccid, and this is laid on the negative, care being taken that no air is included between them. A sheet of wet paper or of mackintosh is now laid on the gelatine film, and all excess of water is expelled from between the negative and the soft gelatine film by stroking the upper surface of the paper or of the mackintosh cloth with a squeezee—that is to say, a strip of soft india-rubber set in a wooden handle.

It is now easy to remove the paper or the india-rubber cloth which was used to protect the soft gelatine from the action of the squeezee, and the plate can be set up to dry. When dry, the film is cut through within the border from which the wax was cleared off, and the film will separate readily; but should there be any tendency towards a too early separation owing to the contractile force of the fresh thickness of gelatine, the edges of the plate may be bound with strips of gummed paper.

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PHOTO-ENGRAVING FOR THE DECORATION OF POTTERY.

Readers of the News may possibly remember Mr. F. J. Emery's recent communication on this subject, and it is interesting to note that he has, for his own manufactures (pottery), been producing copper-plates by this means during the past fifteen months.

As exemplifying the celerity of production, the following test was applied. At the request of Mr. Emery we despatched from London, by the night mail of April 23, a drawing, which, for the purpose of identification, we signed and dated on the face. This drawing was received at 7.45 a.m. of the 24th April at Mr. Emery's manufactory in Burslem, Staffordshire. A copper-plate made therefrom, and bearing our signature, left Burslem at 11.40 the same morning, and was delivered in London in the evening. Thus, a drawing was converted into a potter's copper-plate engraving and despatched from the works within four hours, also delivered in London a trifle over twenty-four hours from the time of the posting of the sketch; a fired plaque from a transfer that had been printed from the plate reaching town twelve hours later.

THE CARBONATES IN THE ALKALINE DEVELOPER.

The subject of development is one of perennial never-failing interest to photographers. Development may indeed be said to be the very backbone of the photographer's art—looking at it from the physical point of view. It is therefore right that any the smallest improvement should be hailed with welcome, and that even matters of the most minute detail should not be let pass without notice.

The proposal to use the alkaline carbonates instead of caustic ammonia, in connection with pyrogallol, can by no means be considered a recent innovation, inasmuch as the carbonates were used even in the very early days of alkaline development. Indeed, experiments with various alkalies followed close upon the discovery that, if a bath plate thoroughly washed, treated with gallic acid or tannin as a preservative, dried and exposed, were wetted with water, and placed where the fumes of ammonia could act upon it, development of the latent image would ensue. So far as we are aware, however, it is only lately that the use of the carbonates of ammonium, sodium, and potassium have been extensively used in the development of gelatine dry plates.

The recent introduction of these carbonates in the alkaline developer has given a grand opportunity to that class of photographers who delight in building up a formula with the main object, so far as the uninitiated can conjecture, of throwing as many items into it as is possible, so that the uninventive may hold up their hands in astonishment, exclaiming—"What a brilliant genius must not this be who can devise so wonderfully intricate a formula!"

For the consolation of those who have abstained from the use of the carbonates in the developer on account of the complications usually introduced in the formula, let us say that after trying various of these same formulæ, in which a number of foreign substances are introduced, we have found none of them to give better results than a plain aqueous solution of one of the carbonates and pyrogallol. Here, in all its simplicity, stands a formula for a "carbonate" developer, which we venture to say will give as good results as any other.

Pyrogallol...	1½ grains
Carbonate of ammonium ...	25 "
Water ... ... up to	1 ounce

The pyro may of course be kept in solution with any of the usual preservatives, but it is to be borne in mind that the developer works without restrainer, and that therefore it is not advisable to use as a preservative an acid—such as citric acid—which may, by decomposing the carbonate, produce a powerful restrainer, except in very small quantity. The pyro may, as we have said, be mixed in the usual way with a preservative, but we wonder whether photographers of the present day are all aware of the satisfactory results to be obtained by mixing, when work is commenced for the day, enough pyro to do the day's work with plain water, and using this as a stock solution. It is only lately that this method has ceased to be the customary one.

We give carbonate of ammonium in preference to either the carbonate of potassium or sodium, because, in a series of comparative experiments which we have made, we have got the best results with it. In our experiments we made use of three different samples of commercial plates, and preferred the ammonium carbonate for all of them. It is, however, possible that with some makes of plates one of the other carbonates might give the best results. The opinion that carbonate of ammonium is, on the whole, the one of the three carbonates to be preferred, is corroborated by a recent remark of Mr. A. Cowan. He stated that he had obtained better results using this carbonate than using any other.

An alkaline carbonate may be looked at from a photographic point of view as an alkali plus a restrainer. Moreover, if the time taken for development, even when a large quantity of the carbonate is used, can be taken as a criterion, the power of the restrainer must be considerable. It may be argued from this that a developer in which a carbonate is used as an alkali is not a suitable one for such cases where it is desired to work with the minimum of exposure, as, for example, in the majority of "instantaneous" work.

Our experience does not by any means uphold this view. We have been able to bring up in all cases quite as much detail when using carbonate of ammonia as when using caustic ammonia, and sometimes more. Indeed, we consider that the fact of there being a considerable quantity of restrainer present is favourable to the getting out of the greatest possible amount of detail *if time enough be allowed in development.* This is an opinion which we have more than once enunciated, and it is confirmed by the results of a series of experiments which were exhibited by Mr. W. K. Burton at a recent meeting of the London and Provincial Photographic Association. There were shown the results of developing a set of plates all exposed under the sensitometer for the same length of time, with almost all the conceivable variations in quantity of pyro ammonia, and ammonium bromide. Without by any means entering into details with regard to these experiments—which, indeed, would be useless unless we could put the *results* before our readers—we may say that we noticed that the highest figures of the sensitometer were brought out by those developers which contained a very considerable proportion of restrainer; whilst those which contained a large quantity of ammonia, and but little restrainer, brought out several figures less. The highest figures were brought out by developers containing to the ounce one grain of bromide of ammonium and two minims of ammonia. These developers required considerable time to accomplish their work. We were told about ten minutes.

We enquired what particular brand of commercial plates was used in the experiments referred to. We need not give the name of the maker here, but may say that the brand is one with which we are quite familiar; and we may add that it is one which by no means *requires* a large proportion of restrainer in the developer, and that, moreover, the instructions which accompany the plates, direct that a very large quantity of ammonia in proportion to ammonium bromide be used.

The moral of what we have here said is, that if we wish to get the very most out of an over-exposed plate, the best course is to use a well-restrained developer—whether the restrainer be present in the form of the carbonic acid of a carbonate, or in the form of a soluble bromide, or in any other form, and to give plenty of time.

Most of our readers will be familiar with Mr. W. Cobb's wonderful instantaneous street views. Mr. Cobb has told us that the average time taken for developing the negatives from which these were printed was about an hour! Another point to be deduced from what we have said, is that the formula which the dry plate maker issues with his plates is not always the one which suits them best.

CAPTAIN ABNEY'S SECOND CANTOR LECTURE.

On Monday last the Lecturer explained the action of the prism as a means of analysing light, and he strongly emphasised the remarkable influence which the material of the prism exercises on the result. To illustrate the matter, a beam of light was passed through four prisms, which were made of glass of varying density; these prisms being piled up so as to form a column. Under these circumstances the relative position of the resulting spectra on the screen demonstrated the fact that the refractive power increases with the density of the glass; while the lengths of these four spectra showed at a glance the respective dispersive energies of the four prisms, and the spectrum formed by the densest prism appeared to the eye about two-and-a-half times as long as that formed by the prism made of very light glass.

Next in order came an explanation of the direct vision prism, and although this instrument is very convenient for class and lecture work, it is of comparatively little use in the laboratory of the investigator, more especially when the records are to be made by photography. Apart from the fact that the complex direct-vision prism has a low dispersive power in proportion to the amount of glass through which the light must pass, it is subject to the serious disadvantage of possessing many reflecting surfaces, and from a photographic point of view this means diffused light and fog. "What term can be more indefinite than glass?" asked the lecturer, as he pointed out the desirability of making photo-spectral experiments with prisms consisting of definite materials, bodies have specific chemical formulæ.

Rock crystal is a definite compound of silicon and oxygen, and it will allow many rays to pass which are cut off by glass, especially rays in the ultra-violet. A spectrum made by passing the light of the electric arc through a rock crystal prism was now projected upon the screen, and the ultra-violet rays were made visible by allowing them to impinge upon fluorescent substances, quinine and heavy petroleum being selected for this purpose. It is scarcely necessary to say that in the case of this experiment, the condenser and the object-glass were also made of rock crystal or quartz.

Considering that many of the ultra violet rays, which are cut off by glass, are allowed to pass freely by rock-crystal, one might suppose that there would be an enormous advantage in making photographic objectives of this latter material; but the advantage of quartz is inconsiderable when sunlight is used, although considerable in the case of the electric light. If an optician were making an objective for especial use in a studio where the work is done by the electric light, he might perhaps use quartz with advantage. In certain researches on the ultra violet spectrum of the electric arc, quartz prisms and lenses are essential.

Iceland spar, which consists of pure carbonate of lime, yields better results in the ultra-violet than glass, but not such an extended spectrum as can be obtained by the use of quartz, and the value of Iceland spar prisms was illustrated by the exhibition of some of the wonderfully perfect stellar spectra obtained by Dr. Huggins.

When light is reflected from a surface of pure silver, there is a considerable loss of the ultra-violet rays; but as the loss occurs mainly in the extra solar rays, there is not much practical disadvantage in using silver reflectors for work executed by daylight; but when electric light is reflected from silver, there is a notable loss as regards actinic power.

The development of a plate by white light was then demonstrated, the white light being made up by combining a particular tint of the spectral orange with a portion of the blue. This experiment is practicable with an iodide or a chloride plate, but would not succeed with a bromide plate, as the blue would set up an action. Another white light may be made by combining red and green, or any other complementary colours; but of course such forms of white light must not be confounded with white light as we ordinarily experience it. A colour chart affords a very simple and rapid means of analysing a compound light, as it is obvious that only those colours can be seen which are present in the light.

The slit for photo-spectral work may ordinarily be about $\frac{1}{500}$th of an inch wide, and a magnified image of such a slit was exhibited on the screen; after which the Lecturer demonstrated the means adopted for superimposing spectra, and taking a number of spectra on the same plate for making comparisons. The rack-and-pinion slide in which the plate can be made to move to a known extent after each exposure, was shown; no less than sixteen photographs of spectra being occasionally taken on the same plate. Afterwards attention was called to the form of slide used for exposing a plate in any required gas or liquid, the plate being included in a glass vessel fitted with an air-tight cover, and provided with tubes for filling or emptying.

Diffraction gratings were next discussed, and several very fine ones were shown, the most notable being a concave grating made by Professor Rowland, and measuring 6 by 3¼ inches, and the great dispersive power and remarkable dividing capabilities of this instrument were illustrated to the audience by projecting the mixed spectra of zinc and copper on to a transparent screen placed between the Lecturer and the audience.

The full text of the lectures will be printed before long.

THUMB-NAIL NOTES.

(The Grosvenor Gallery.)

The exhibition this year at the Grosvenor is rich in portraits, and, what is worthy of note, most of the portraits are good. On the look-out for points of special interest, I took particular heed of the treatment, in several notable instances, of the hands, and found much to profit the photographer. Mr. Millais' grand portrait of Mr. Gladstone at once fixes the attention in this respect. The hands are here kept well in shadow, and yet are sufficiently marked to catch the eye, and perfect, by the firmness of the muscles, the picture of nervous energy impressed on the face. Had the artist chosen to hang them limply, or crumple them loosely, the painting would have lost half its force. Brought together as they are, one hand clasping the other, not carelessly, but as though enforcing the determination of the face, a complete harmony is attained.

Mr. Frank Holl's portrait of Mr. William T. Palmer, meritorious in many respects, is weak in regard to the hands. The right is resting on the arm of the chair, the left is supported by the knees. Of equal force and size, and too widely separated, they are thereby brought into undue prominence, and the face suffers in consequence. Mr. Holl's Lord Overstone has not this fault, but as the picture is obviously unfinished, it would not be fair to criticise it.

All Mr. Herkomer's portraits will repay the study bestowed upon them. The pose of each is easy without being vulgar, the painting is vigorous—almost too vigorous in the case of Mr. C. Villiers Stanford, the musical composer—and one feels that the artist has caught the true expression of the sitter. Mr. Stanford is standing in what a photographer would call a risky attitude. It is almost a full-face view, and both hands are in the trousers pockets. No attitude could be more life-like, no attitude could be more commonplace. Yet there is nothing commonplace about Mr. Herkomer's picture. Photographs with one hand in the pocket are not uncommon, but with both hands thus concealed, rare. A good deal depends upon the coat. The loose jacket-like garment worn by Mr. Stanford consorts well with the attitude. A frock coat would have been quite out of keeping. Photographers, unfortunately, have generally to deal with frock coats, and too often of the Sunday-go-to-meeting-store clothes variety. People sit to painters in their comfortable half-worn garments: why should they not thus sit to photographers? Mr. Herkomer apparently does not care to show much of his sitter's hands. In No. 197 (Mr. William Sandbach) they are very subdued. One hand is resting on the other and conceals it, and only the knuckles of three fingers and the thumb of the upper hand are visible. In No. 17 (Mr. Owen Grant) a portion of one hand can just be seen over the frame.

Mr. W. B. Richmond, despite his *tour de force* in "An audience in Athens during the representation of the Agamemnon" where he has had to pose a dozen or more figures in attitudes of fixed attention—a subject demanding much study in the placing of hands—is to my mind a little unsatisfactory in the hands of his portraits. Most photographers are familiar with the tiresome interlacing which a nervous sitter sometimes gets his or her fingers into. It is unmeaning, and in a photograph often has a ludicrous effect, occasionally resulting in six fingers to one hand, lopping off top joints, and indulging in other eccentricities. Mr. Richmond of course perpetrates none of these blunders in No. 110, a portrait of a complacent, portly, and not over handsome dame; but he has spread out the fingers crosswise in such a way that it is impossible not to believe the sitter was very anxious to show the rings with which each hand is bountifully supplied. In No. 174 (the Hon. Lady Loyd Lindsay), Mr. Richmond has given us a specimen of what may be called the Book of Beauty variety of hand. The outline from the wrist to the tip of the forefinger takes a conventional curve of the Hogarthian type, the fingers are bent and slightly separated, and the whole is obviously artificially posed. Too many examples of this are to be seen in photographs. The same fault in a far lesser degree marks the otherwise fine portrait of Mr. Andrew Lang. Here the arm is hanging far down over the back of the chair, and the hand is limp and flaccid. If anyone tries this pose it will be found that in a minute or two the veins become distended, and all smoothness of outline is lost. Mr. Richmond has not shown this, but then he may intend his portrait to be an instantaneous effect taken just as Mr. Lang threw himself into the chair, and before the hand became turgid.

Mr. R. Lehmann has an admirable portrait of Mr. Robert Browning—a picture which makes the indifferent work of Mr. R. Barrett Browning, who sends a portrait of his father, seem the poorer by contrast. But surely the only hand seen—it is resting lightly on the hip—is too small, or has Mr. Browning exceptionally small hands?

Mr. Alma Tadema's contribution in the way of portraiture, No. 1, is in some respects very remarkable. It is the portrait of a physician. He is sitting by the bedside of a patient; in one hand he holds his watch, with the other he is feeling the pulse of the sick person, whose face is not seen. The hands are those of a strong, self-reliant man, large, well formed, and nervous. The hand of the patient is that of a woman. The contrast tells the story even better than the anxious, thoughtful face of the doctor.

If the portraiture at the Royal Academy be only half as good as the portraiture at the Grosvenor, it will do well.

Wide-Angle.

ARTISTIC FEELING IN PHOTOGRAPHY.

BY A. H. WALL.

Part III.—Portraiture.

Consulting some old photo journals, I stumbled over the report of a meeting of the South London Photographic Society held in January, 1863. Mr. Sebastian Davis was in the chair, and a paper was read on the past progress and present prospects of photography, by Mr. Fry. In the course of a very animated discussion that ensued, I took the opportunity of urging upon the members of the experimental committee, the vast importance of dry-plate photography as an element of artistic progress. I find that Mr. Davis and several of those present agreed with me, and our worthy Vice-president, who was at the head of that committee, said (I quote the report):—"The artist is dependent on scientific investigation for increased facilities in the practice of his art, and although the experiments in connection with dry plates have not hitherto led to any striking result, yet there is nothing so important to the advancement of the art phase of photography as the placing in the hands of the artist a dry plate equal in sensibility to the wet." But this was a prospect which even Mr. Davis did not regard very hopefully.

In a conversation which this report originated with one of the dearest and most tenderly remembered of my, alas! many dead friends, O. G. Rejlander, he said what he afterwards very frequently repeated, "We shall never acquire full control over the art-qualities of photography until we have what I often sigh for, dry plates as sensitive as wet ones."

I remember, too, how, at the meeting in question (what a long, long way off it seems when I think of all the men I then knew so well, and so long ago lost sight of) it was urged as against my views, so far as portraiture was concerned, that in photography this was a too purely commercial branch ever to be studied on artistic principles; that it must perforce be regarded as a kind of manufacturing process, "quantity, not quality, being," as one photographic journalist remarked, "the chief consideration." I shrugged my shoulders at this idea, and said, despondently, if so, there is very little chance of upward advancement in photographic portraiture, and very considerable danger of a downward tendency, by which the art will suffer not only artistically, but commercially. But, such is my conceit and obstinacy, I still believe I was right. Mechanically produced work is valued at little beyond the actual money-cost of its production. It is common, and the largeness of the supply, however great the demand, soon lowers prices, until at last competition brings them down to a level which drives out of the market all who are not satisfied with its paltry profits, and can carry their talents into a more promising field of labour.

Well, the longed-for improvement of that day is accomplished. We now have dry plates as sensitive as wet ones were, and the question arises, has any correspondingly great advance been made in photographic portraiture? If not, why? If non-progress is admitted, is it still due to the prevalence of commercial ideas of quantity before quality; and if so, has it advanced the commercial aspect? In simpler words, do portrait photographers make now either more artistic pictures or more money by their art than they did twenty or thirty years ago? I know as a rule that prices are very much lower than they were when I practised photographic portraiture, and I know, moreover, that some of the most successful photographic portraitists of to-day are those who are artists, and commanding the highest prices.

To hear some folk speak on this subject, one might imagine that the only things required are the means of doing artistic work. But of course these are of small utility in the hands of those who do not know what good work is. A skilful operator is not of necessity an accomplished artist, and although this appears self-evident enough to go without words, it is very often really necessary to demonstrate it to those who are young in artistic photography, and are apt to think that tools and materials at their best, with skilful mechanical manipulation, are all-sufficient for the production of art photographs.

A good artistic portrait is one in which the well-lighted head stands out from the background, modelled and rounded out into apparent solidity. The treatment is in general harmony with the sentiment and character. The outlines compose well, the greater masses of light and shade give dignity and importance to the general effect, the pose is not hacknied and common-place, and every part falls into its properly dominant or subordinate place. But admirable and striking as the qualities of such a picture must be, these things are largely the result of general rules and principles well understood and cleverly applied. The higher qualities of good portraiture go beyond them. To give expressions which denote character and suggest the presence of thought, and positions which indicate life and action, tax a different class of intellectual acquirements, denoting the artist of a loftier type. And here dry plate photography ministers to the operator's powers, rendering possible many things for which such artists as Lake Price, O. G. Rejlander, and others of their time, sighed so often and so vainly. Here steps in that which is above and beyond all mere practical rules, that which we call Feeling.

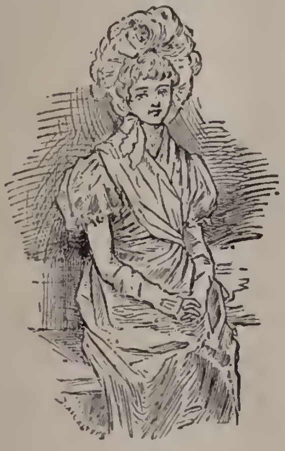
In the expression of feeling and character, the true test of greatness resides, and the most perfect tools and appliances, with the most skilful manipulation, and the greatest technical knowledge, are here not the end, but the means; not the art, but its tools. A portrait may be very like and very real looking, and yet want that artistic merit which is its crowning perfection, thereby justifying critics and artists who award it an inferior position as a work of art, as the Royal Academicians very justly did the works of a certain well-known sculptor at a certain well-known trial, thereby awakening the scornful ridicule of people who thought the sole test of artistic merit was resemblance in the relative forms of the model and the art-production.

A paper on portraiture, written by J. Burnet, F.R.S., author of "Practical Hints on Painting," &c., says:—"When we hear people cry out that a portrait is as like as it can stare! we may rest assured that it is a vulgar likeness, possessing neither those undulations of expression to be perceived in the living original, which, by giving the beauty attendant on motion, heighten the interest; nor those generalizing principles which add dignity to the character."

We also see likenesses which make people exclaim, "How ridiculously like!" which arises from caricaturing the dominant features: and others that are disagreeably like from the hardness and harshness of the light and shade, or general treatment. All these should serve to show that something more than mere likeness is essential to good portraiture.

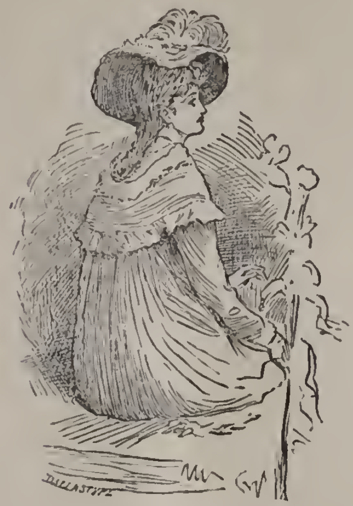
I shall now introduce a few sketches from three well-known pictures, to illustrate the simplicity and naturalness with which a pose is caught—not, mark you, by any more mechanical rule-of-thumb operations of moving the head this way, or the body that; a leg a little more to the right, or arm a little more to the left—but by watchfulness and waiting to catch the sitter in some characteristic attitude or action, which is part and parcel of his or her character and feeling, something springing from the thought or impulse of a moment, and conveying no other impression to the spectator's mind.

The first is from a thumb-nail sketch made in the Royal Academy Exhibition of 1879, from an admirable picture



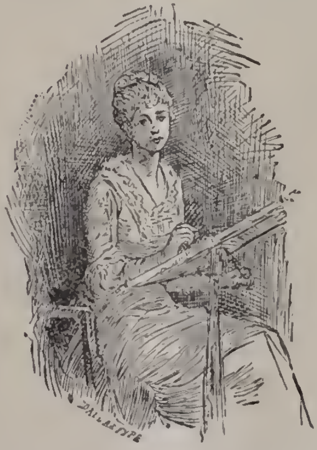
by G. F. Tyrrell, called "Stella." In the character and expression of face, figure, pose, costume, and general treatment, one idea prevails—that of quiet simplicity. The general treatment, in warm delicate tones of grey and yellow, was in tender and complete accord with the prevailing sentiment. It was a genuine lesson in Feeling.

The second, a sketch from the same important collection, was from Marcus Stone's picture, called "Summer Time."



Here the air of pleasant and gentle repose expressed by face and attitude was the key-note of a composition charming in its unconventionality, naturalness, and graceful ease.

The third pen-and-ink sketch is from a portrait by Miss Louisa Starr, a young lady who, if memory deceives



not, turned the heads and won the hearts of half the students of the R. A. in the days when she was one amongst them. The gentle sway of the slightly bending figure, the temporarily suspended action of the hands, the expressive turn of the head and eyes—are all suggestive of life, motion, and purpose. It looks natural enough to have been caught suddenly from nature on an ambushed dry-plate from an unconscious model by an artist who knew and felt of what a picture is really composed.

(To be Continued.)

A SIMPLE METHOD OF COLOURING AND ENAMELLING PHOTOGRAPHS.

BY T. G. WHAITE.

The following method of colouring and enamelling prints has proved in the hands of those to whom I have given instructions, of very great value (commercially). Excellent results are attained at once with very little labour and the minimum of art knowledge. It is not intended to replace any of the "legitimate" methods of colouring photographs, but rather to displace the "chrystoleum." At the first glance, it will strike many as being this process; but the results are so much finer, and with this difference, that the opaque and too dark parts of the photograph are capable of being coloured. This cannot be done with the chrystoleum, it being possible only to *tint through* the very light parts of the print. The operator will, after a few trials, be able to rival many of the laboriously-stippled photographs, and never risk losing the rememblance. I am convinced, also, a much greater degree of permanence is attained in the photograph itself by the treatment it undergoes. I have subjected prints thus treated, with one-half of the face covered with opaque paper in the printing-frame, to the sun for many months, and at the end of the summer it was barely possible to detect the line of exposure. This was a test sufficiently severe, and convinced me that prints with the ordinary subdued light they are always viewed in, would not suffer; the margin of the white mounting board suffered more from the exposure than did the coloured print, and was considerably bleached.

The following is a list of the requirements:—

Fine pumice powder, such as used by dentists.

Two or three sable brushes—oil sables answer quite as well, and are very much cheaper than water-colour brushes.

Rose madder.
Orange vermilion, selected on account of its body.
Chinese white (moist in bottles).
Indian red (for body).

These few colours are all that are necessary for flesh; other colours may be added for hair, draperies, &c., as required.

A piece of thick boiler plate-iron, say about 8 by 6 inches.
Several sheets of blotting-paper, white.
Solid paraffin (wax).
Paraffin oil.
Cotton-wool.
Gelatine, Nelson's No. 1.
Enamel collodion.
Flannel to filter.

First prepare the glass plate with the enamel collodion and gelatine (those who have not previously done this, see instructions at end), then take an unmounted print, lay it down on blotting-paper, and with the tip of the finger freed from grease, rub with a little pumice powder, and with a circular motion, very gently on the face and hands only, to give a slight tooth for the colouring; do not abrade the surface or destroy any half-tone. Now wash the face with a brush and clean water, and pass the tongue over it. As soon as dry, give a flat wash all over the face, eyes and all, with a flesh tint of rose madder and orange vermilion. As soon as dry (which it will be by the time another print is thus prepared), clean out the eyes with the brush nearly dry. Now take body colour, and colour such parts as brooches or any portion that comes too dark in the photograph, on the albumen surface, using a little of the Chinese white in the body colour, and put in all high-lights of lace, &c.; also tint the lips which are too dark, the upper one especially, with rose madder and Indian red. All this may be done in less time than is required to write it, and is all that is required to be done on the surface.

The next proceeding is to wax and make transparent the print, which also binds the colour already on. This is effected thus: place the print face down on several thicknesses of blotting-paper placed on the heated iron plate, and with the solid block of paraffin rub over the back; if the iron be sufficiently heated, in a minute or so the wax will permeate the print and render it very transparent; let it be thoroughly saturated, and immediately with a clean cloth remove all superfluous wax from the back and front. Now take a pledget of cotton-wool, and with the paraffin oil rub lightly both sides; allow it to soak well in for two or three minutes. With clean cloth rub off all the oil, and dip it entirely in the melted gelatine (prepared as at end), and squeezee it on the glass previously prepared with the enamel collodion. Wash all gelatine off the back with a sponge and warm water; there will now be no greasiness, and the glass can be placed on a retouching desk with a sheet of white card as a reflector, and coloured at the back. The face may now have the under lip and cheeks coloured, and the hair, ribbons, &c., and can be examined for the complexion by placing a piece of white paper closely pressed behind it. It will rarely require more colour on the face than the carnations, unless the first colouring on the albumen has been too pale. The draperies and background may now have very strong colour on to tell through the tone of the photograph, but the colour on the face should be very delicate, as when finally backed up they appear much stronger.

When the colour is dry, again pass over the paraffin oil, this time lightly dabbing it only; allow it to remain three minutes, and as carefully dab off with clean cotton. Do not rub it, or the colour will be disturbed.

The thin mounting board, such as is used for enamelled print, is now gelatinized and squeezeed to the coloured print, and left till thoroughly dry. The object of this last application of paraffin oil is to prevent the possibility of the squeezeeing disturbing the colour. Do not attempt to strip it from the glass until thoroughly dry (say next morning), then mount it in the usual manner by gluing about one-eighth of an inch round the edge of the thin cardboard after trimming, then place under pressure.

The following method of preparing the enamelled surface on the glass sheets will be found a simple and certain one.

Procure a sheet of plate glass free from scratches. The most useful size is 12½ inches by 9; this size will take several cabinets, promenades, or cartes without waste of enamelled surface. With a file or emery cloth rough about one-eighth of an inch all round the edges, to prevent the prints leaving the glass before quite dry. Rub the glass (when new) several times with waxing solution:—

Best yellow wax	5 grains
Benzole	1 ounce

Rub it on with a pad of tissue paper, and with another pad rub off, and finally polish with the palm of the hand, removing all that is possible in this manner, or streaks in the enamelled surface will show.

A piece of new glass requires treating thus several times before it is suitable for receiving the prints; afterwards, one rubbing on and off is all that is required. The glasses must never be washed after stripping, but be kept out of the dust, and any bits of film left on the margin rubbed off before re-waxing. Now coat with the enamel collodion, either purchased or made thus:—

Gun-cotton	½ ounce
Meth. alcohol	45 ounces
Meth. ether	25 ,,

And a few drops of castor oil.

After coating, leave in a dry place until set well, and all the ether has passed off; then pour over in the same manner the warm gelatine solution, having been previously filtered through flannel. The gelatinizing solution is thus composed:—

Nelson's No. 1 gelatine	1 pound
Water	128 ounces
Meth. spirit	10 ,,
Glycerine	1½ ,,

Soak the gelatine first, then warm, and filter.

The prints may be laid on this as soon as set if necessary, but a better surface is obtained if allowed to dry.

It is important in colouring to remember to clear out the high lights at the back from forehead, &c. This leaves only the first colouring on the albumen to tint the lights, which will be found quite sufficient, otherwise the face will have a flushed look when backed up with the cardboard.

Every necessary detail is explained here, and if followed closely, failure is impossible, and will be found, after one rehearsal, a rapid and extremely simple method.

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THE COMBINATION OF PHOTOGRAPHY WITH TRICYCLING.

BY FRANCIS COBB.*

Most of us, no doubt, have experienced the desire, as our machines have passed some pretty and specially picturesque bits of scenery, to take away with us some memory to be recalled at some future time of what we were then passing by, and most of us have also experienced the difficulty, as one picturesque scene is replaced by another, and so on to the end of our journey, of preventing the many scenes getting somewhat blended in our minds, and an inability to reproduce details with accuracy. To sit down and sketch such scenes would be to reduce the journey to a sketching tour, and the distance to be covered must be reduced accordingly, thus depriving the 'cyclist of the usefulness of his machine.

That which the tourist desires may be accomplished by the aid of photography, and the whole addition to the impedimenta of the 'cyclist can be so arranged as to be trifling.

The best machine, in the opinion of most who have discussed the matter from a photographic point of view, is the Coventry Rotary, but to my mind it is a question whether the Sparkbrook should not be looked upon with more favour from a photographic aspect.

The rear-steerer, as ordinarily made, has serious disadvantages, as it is never a double-driver in the truest sense of the word; but its construction is certainly convenient for luggage carrying. Some persons contend that its most serious disadvantage—the risk of losing the steering—is almost balanced by putting the photographic luggage so that it shall bear principally on the back wheel; but how far this is the case depends largely on circumstances.

The apparatus consists of tripod, camera, and case. My camera, with leather case and provision for exposing a dozen 5 by 4 plates, weighs between fourteen and fifteen pounds, and as it is before you you can examine it for yourselves. The effects of vibration are serious, and I deprecate the use of the clip on the wheel, or even on the steering-bar; but much prefer to use a tripod.

I have endeavoured to show, in the brief space of time at my disposal, how the enjoyment of a 'cyclist's ramble may be enhanced by that most wonderful combination of chemistry, optics, and mechanics, which has resulted in placing the science of photography within the reach of the amateur.

When we have imprisoned our sun pictures and have them safe, latent, though invisible, intangible, and impalpable to any of our senses, we may at our leisure (it may be months after)—by means of those marvellous chemical affinities which throw the haloid salts of silver again into chemical life—produce on the films the pictures we have so desired; and then again, by further use of the light, we print our scenes on the sensitive paper. We have then a pictorial history in our albums which will recall the pleasant memories of happy days spent long, long years ago.

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PRINTING-IN CLOUDS IN LANDSCAPES.

BY E. BRIGHTMAN.†

In comparing good landscape photographs of the present day with those of fifteen or twenty years since, the one point of superiority most noticeable in the modern photographs is the introduction of clouds.

No landscape will now pass muster unless clouds in some form or other are introduced. In the earlier days of photography the aim of landscape photographers was to obtain a dense sky in the negative, which would give a dead blank space of white in the print, and in cases where from accident the sky was thin it was a common practice to block out the sky with a mask of paper or black varnish.

The use of gelatine plates has doubtless, to a considerable extent, led to the introduction of clouds in our pictures, for fairly lighted and well defined clouds are readily obtained in the same negative as the landscape, provided such clouds are present at the time of taking the picture. Unfortunately, however, it is rare that suitable clouds are present when a negative of the landscape is taken, for as a rule, when fine masses of effective clouds are drifting about, the wind is usually so high as to preclude the possibility of landscape work, and on the calm still days best suited for photography, the clouds are absent. We have therefore to adopt the method of printing-in the clouds from separate cloud negatives.

The first point necessary is to obtain a good series of cloud negatives, not being contented with a solitary plate or two made to do service for all classes of subjects. A series of forty or fifty should be kept on hand, and even with this number it is not an easy matter to get up (say) a dozen pictures for exhibition, each with a different sky, and each sky suited to its respective picture. I find it is an excellent plan to have a number of cloud negatives considerably larger than the sizes in general use; for example, a 12 by 10 plate comes in well for printing clouds on 7½ by 5 or whole-plate pictures.

The print can then be placed exactly in the position to print the portion of cloud most suited to the picture; whereas, if the cloud negative and the print are both the same size, we are restricted to one position. In order to select the cloud negative best suited to the print, I hold the negative up to the light, and, placing the print behind it, change the position of each till a suitable portion of cloud covers the required space on the print. In some cases it may be necessary to examine a dozen or so of cloud negatives before finding the one best suited to the landscape. It is always advisable to number all cloud negatives, and keep a note of what number is best suited to any given picture. As an example of the superiority of pictures with clouds suitably adapted to the subject, I have here three prints from the same negative of Lynmouth Harbour, No. 1 without clouds, No. 2 with clouds not particularly suitable for the subject, and No. 3 with a mass of fine storm clouds exactly in keeping with the class of picture. One glance will show the necessity of judgment in selection of the cloud negative.

Cloud negatives for printing-in should be thin, soft, and delicate, and any gelatine plates which do not give sufficient density for ordinary work may be set aside and reserved as particularly suited for this purpose, as on no account should development be pushed too far, or the resulting negative will be far too dense for the purpose of printing-in; for it must be borne in mind that any approach to hardness will necessitate long printing, and thus increase the difficulties of avoiding a line at the junction of the horizon and the sky, and the results will also be harsh and unsatisfactory, and, instead of improving the landscape, may detract from its merits. Softness and delicacy of gradation are the two points to be aimed at, any striking and violent contrasts, except for special effects, being decidedly objectionable.

Having obtained a series of cloud negatives, the printing-in is a matter of little difficulty if set about in the proper way. The method usually recommended is to cut a paper mask with which to cover the print while the clouds are being printed in. With the paper mask, however, I find there is always a difficulty in avoiding a more or less distinct line showing the junction of the clouds with the landscape.

Clouds, when properly printed in, should show no lines or indication of the join, and be, in fact, distinguishable from clouds taken with the landscape.

My method of working is as follows. I keep a perfectly level drawing-board covered with a thick layer of soft felt. After selecting a suitable cloud negative, the print is placed face upwards on the felt pad, and the cloud negative, which is considerably larger than the print, is carefully adjusted in the required position over it, some lead weights being placed on the ends of the plate to hold it in place. A thin board or sheet of card is then placed so as to cover the landscape to within about an inch or so of the horizon. A soft silk handkerchief or towel is then placed with the fingers so as to follow as closely as possible the outline of the landscape. The whole is then exposed to the light, and the edges of the towel slightly moved every few seconds, constantly varying the outline, and thus avoiding any sign of the junction in printing. A little practice soon renders this a simple and easy matter; in fact, it is more difficult to describe than to do.

This detailed description may lead to the conclusion that it is a matter occupying a considerable time, but I find I can attend to three or four prints at the same time, and as the printing from a thin cloud negative in a good light takes not more than five or six minutes, at least ten or a dozen prints may be done in half-an-hour.

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* Read before the Society of 'Cyclists.

† Read before the Bristol and West of England Photographic Association.

Notes.

"Getting under Weigh," by Mr. Slingsby, which forms our supplement this week, completely tells it own tale; and this is one reason why it has already been so much appreciated by those who are well able to judge as to the artistic qualities of a photograph.

Those sympathizing with the objects of the Photographers' Benevolent Association should attend the adjourned annual meeting, No. 181, Aldersgate Street, at 8 p.m. on Wednesday, the 6th of May. It is wished that all proposals for extending the usefulness of the Society shall be thoroughly considered.

The Royal Academy will open to the public on Monday. A glance round the wall this week was sufficient to show that the Exhibition is not one of surpassing excellence. There is, of course, much good work, but no one picture that will become the talk of London. The portraits number some 150, and some could well be spared. Of the many portraits contributed by Mr. Frank Holl (eight), Mr. Ouless (six), and Mr. Herkomer (three), only one, that of Lord Dufferin, is the portrait of a really notable person. Mr. Millais is represented by a masterly painting, "The Ruling Passion," two charming pictures of children, "The Lady Peggy Primrose," and "Orphans," and the portrait of a Mr. Simon Laser. The first-named of these, together with Mr. Marcus Stone's "A Gambler's Wife," Mr. Briton Rivers' "The Sheep Stealers," Mr. W. F. Yeame's "Prisoners of War," "The Salon of Madame Récamier" of Mr. W. L. Orchardson, and "Love's Labour Lost," one of Mr. E. Long's effective pictures of Eastern life, and Mr. Poynter's "Diadumenè," may be mentioned as standing out particularly beyond the rest.

Organised on the same lines as the Chemical Society, Photographic Society, and other analogous associations, is the new "Society of 'Cyclists," Dr. B. W. Richardson being president.

Meetings are held at 9, Conduit Street, W., once a month during the session (October to May), and the matters discussed may be antiquarian, artistic, geographical, mechanical, or scientific. On Tuesday last Mr. Francis Cobb read a paper on "The Combination of 'Cycling and Photography," an abstract of this being given on page 279.

A "detective" camera made by Mr. A. Stroh presents several novel features, and some excellent pictures of London life have been made with it.

Exposure is made by lifting a flap, so that when this reaches a horizontal position it liberates a quick shutter, as in the apparatus of Reynolds and Branson, and in most cases Mr. Stroh has made his pictures while holding the camera in his hand. A rising lens carrier, and an adjustment for focussing by making an estimate of the distance of the object, are provided; while a draw bar at the bottom of the case works the plate-changing contrivance. As made for stereoscopic plates the external dimensions are seven by eight inches, and nine inches high.

Mr. Stroh will probably send us a detailed description, not only of the camera, but also of his adventures in using it. Now that the police are very prone to mistake so many articles of everyday use for combinations of dynamite and clock-work, we can readily imagine that Mr. Stroh will have a good deal to relate before many months are over.

More illustrations of amateur photography from *Funny Folks*. The result of a fruitless attempt to photograph Pa in the garden are sufficiently illustrated in our miniature reproduction; but the comic artist has taken a trifle more than the usual "licence," in giving us the subjoined as the result of an exposure by magnesium light.

The Dresden printsellers and stationers breathe again now that no one has been found willing to give £150,000 for the Madonna di San Sisto of Raffaelle. This picture is the glory of the Dresden Gallery, and more photographs are sold of it to tourists than of all the other pictures put together. There would be a considerable loss of income to the dealers were the picture removed.

Two thousand pounds is guaranteed by some of the inhabitants of Aberdeen towards entertaining and fêting the members of the British Association in September next. This kind of thing is now carried on to a most undesirable excess, and it is interesting to note that while the scientific value of the British Association meetings has of late years been rapidly approaching the absolute zero, there has been extra eagerness of the non-efficient members to take advantage of subscription to the Association, as a ready means of getting a cheap holiday.

Friends of photography, of course, look after "No. 1," wherever they are. At the "Inventions," however, they will do well to look after "No. 29" as well, that being the official designation of the Court space set apart for "Photography" in the new Exhibition.

Court "No. 29" will be very easy to find, for the simple reason that it lies immediately beyond—that is to say, on the Albert Hall side of—the Prince of Wales's Pavilion, which has become one of the best known landmarks of the South Kensington Exhibitions. "Photography" is sandwiched between "Clocks and Watches" and "Philosophical Instruments," so it is not likely to quarrel with its neighbhours.

An odd story, arising out of a County Court case, comes from South London. A photographer, who had been sued by his assistant for balance of wages, urged as a defence that the assistant was not competent, and produced specimens of the latter's work to prove his statement. A portrait of a lady was first handed up to the judge, who remarked that "there is a funny look about the nose." "Yes," promptly replied the plaintiff's counsel, "but that may be the fault of the original." There was force in the argument; but as the lady was not in court, the point (of the question at issue, not the nose) was submitted to an expert, who was giving evidence. "The effect," said the expert, "is produced by imperfect washing." The judge, who was not a photographer, immediately jumped to the conclusion that it was the lady's nose that wanted washing! Then was submitted the negative of a dog, which the defendant contended was "spotty," through bad manipulation; but plaintiff's counsel was again equal to the occasion, and argued that there was nothing to show that the dog itself was not "spotty," and put the case so well before his honour's mind that the assistant came off victorious. But had the judge been a photographer the reverse might have happened.

A glance at the three pictures of the late Hans Makart now on view at the St. James Galleries makes evident to the practised eye of the photographer a glaring anomaly. These pictures form a portion of the series of sketches for the cavalcade which took place in Vienna on the occasion of the Silver Wedding of the Emperor and Empress of Austria. The scene is of course in the open air, yet the face of nearly every personage is lighted as though standing in the studio. It is impossible to think that the artist himself was unconscious of this, and we can only attribute it to the fact that it was his habit to make the portraits of his aristocratic sitters do duty in his historical pictures, and thus pay them the highest compliment of which he was capable. But this must have involved their sitting to him in his studio, and hence the effect. It may be mentioned that a portrait of the artist himself—a Rembrandt—appears in one of the pictures.

Messrs. Braun are now devoting their energies to the copying of the Buckingham Palace pictures, a task which they began some considerable time ago, and which they have practically recommenced, not being satisfied with the negatives originally made. The collection is one of which the public know little or nothing. The bulk consists of examples of the Dutch and Flemish schools, and Jan Steen, Teniers, Van Ostade, Terburg Netscher, Dow, Metzu, Mieris, Hobbema, Ruysdael, and Cuyp are especially well represented. To these have been added valuable purchases by Her Majesty, and selections from Windsor and Hampton Court. It would be a graceful and highly appreciated act if the Queen were to present copies of the photographs to South Kensington, Bethnal Green, and the various provincial art museums. The public are certainly never likely to see the paintings in any other form than as photographs.

The contract for photographing at the Inventions' Exhibition has not been carried out quite in the terms of the original programme, the Woodburytype Company taking the general right to photograph exhibits; but they in no way identify themselves with the portrait-taking business which is to be carried on in the Exhibition.

Unless we are misinformed, the Council of the Exhibition have entered into a separate arrangement with Messrs. Downey to fit up a studio for portrait work, and we may reasonably suppose that this enterprise is worked on a share-of-receipts system, as originally suggested.

It is much to be regretted that the independent and non-commercial character of the Exhibition should be sacrificed by such an arrangement as that which we understand has been made with Messrs. Downey. Space which ought to have been devoted to the display of inventions is to be used for organising a portrait studio which will unfairly compete with private concerns; and we cannot but regard the portrait business separated from general photography in the Exhibition as far more objectionable than the portrait business combined with the rest of the photographic work. At any rate, the Woodburytype Company have done well to have nothing to do with the portraits.

Professor Langley's "bolometer," described by him at the last meeting of the Astronomical Society, shows lines in the infra-red end of the solar spectrum far beyond those photographed by Captain Abney. The bolometer consists of a very fine wire, which, subjected to an electric current, is extremely sensitive to heat, and the changes in conductivity thus produced are indicated by a deflection of the needle of a delicate galvanometer. Professor Langley's experiments with this instrument indicate that the lunar spectrum has a more extended range in the infra-red region than has the solar spectrum. At the same meeting Mr. Common showed a series of enlarged photographs of the nebula of Orion, taken with various exposures. The longest was sixty minutes, and many stars were obtained on the photographic plate which could not be seen by the telescope.

For the dark-room window there is no lack of suggestions, and among them may be mentioned that made by M. Cassan. Two tubes of gamboge water-colour, one tube of Prussian blue water-colour, ten ounces of water, and an ounce and a quarter of gelatine are incorporated into a kind of paint (used hot, of course). Three coats of this on the glass of the dark room, and two layers of yellow tissue paper, make an efficient non-actinic medium.

FRENCH CORRESPONDENCE.

Dark-Box for Tablet of Plates—Phototype Processes.

Dark-Box.—I am surprised that no one has yet constructed a negative dark-slide for containing plates or pellicles successively superposed as in blotting tablets or drawing blocks. A dark-box of this kind would be invaluable, especially for pocket apparatus, because only one would be required in use with a sufficient number of plates. I have been wondering whether it were possible to carry out such an idea practically, and after thoroughly studying the question I have given my plans to a cabinet maker to be carried out, while with the help of the wood-cuts I can present it to my readers. My dark-box is composed of three distinct parts: 1. The block A B C D consisting of an ebonite or wooden tablet to support the superposed sensitive plates, D D′ D″, &c; 2. A case E F G H, enclosing the block; 3. A metal plate I J, terminating at I by a sheet of steel serrated at its two extremities, R R′; this plate can be moved from front to back of the case from E to H by four screws moving in fixed sockets. Each turn of the screw corresponds to the displacement of a plate one way or the other to the extent of two millimetres. The heads of the screws V V′ V″ V‴ slightly project from the surface of the case. Now for the action of the dark-box. Let us suppose it is for twelve plates of I millimetre in thickness, the whole width from F to G is only 33 m.m. When placed at the back of the camera in its destined groove, all shut up, and the metallic slide I J brought up to H G, so as to allow the block to drop easily into the case without the last plate, C′ D′, rubbing against I J. To expose, the case E F G H is drawn down as in the position shown in fig. 1. That done, the case has only to be pushed up again; but before so doing turn the four screws to push I J back two millimetres, which distance is marked on the screws. The sheet is then placed between the first and second plates, and the case is pushed up into its place. The two sharp parts of the metal plate R R′ (fig. 2) cut the two bands of paper gummed on the edges of the plates at K K′ and K″ K‴, the first plate C D is detached and falls between HG and the metal slide I J. To expose the second plate one has only to draw the lens back two millimetres and open the case as before. When exposed, I J is screwed back the two millimetres and remounted, this time passing between the second and third plates, when the former is detached from the block, and the same process is continued throughout the whole series of plates until the metal slide is pressed against the tablet A B. Figure 1 represents the side view after the exposure of three plates, the metal slide I J so placed as to detach the fourth when pushed up. When using pellicles they must be very flat, and the block will be lighter and able to contain more; but care must be taken to leave a space of one millimetre between each, to allow for the variation in the thickness of supports. The metal must not be allowed to scratch the surface of the emulsion, and that is why it should be unscrewed a little more at the upper part, so that the back of the plate should not come in contact with it. If glass be used, a dozen plates weighing from 135 to 140 grammes will, when enclosed in such a dark-box, only amount to about 200 grammes altogether. To avoid any possible transmission of light it would suffice to fold a piece of thin black or red paper over the back of the glasses. This seems to me the most convenient and simple system of any I have studied. The mounting of the tablets or blocks does not present any difficulty. Place the plates in grooves at the requisite distance apart, and glue on to the two longest edges the two strips of paper destined to maintain them in their position. This kind of dark-box seems to be most suitable for small apparatus such as my photographic *En-cas.*

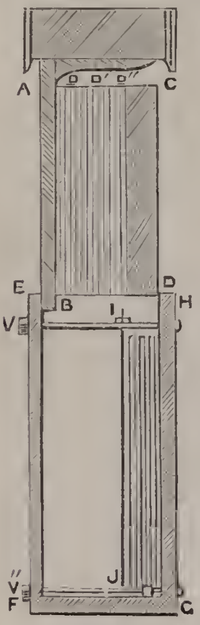

Fig. 1.

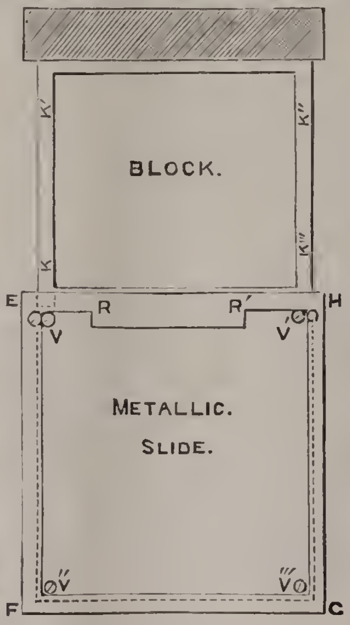

Fig. 2.

Phototype Processes.—The question of photographic processes is one of the most interesting of the time. Everywhere are improvements sought after in the manner of direct transformation of photographic negatives into typographic blocks. *L'Illustration*, the best of our French illustrated journals, has just published its *Salon* number, giving a good many reproductions of pictures to be exhibited at the coming Salon on May 1st. M. Manzi's photo-engraving process has been used, that which has been applied with so much success in MM. Boussod Valadon and Co's. studios. The day is not far off when these processes may be used for all illustrating purposes. The method known as the Talbot process, by which a copper plate is bitten through a gelatine film, is one of the best I know for getting the effect in proportion to the action of light. I will describe the whole operation another time.

LEON VIDAL.

Patent Intelligence.

Applications for Letters Patent.

5014. John Kershaw, 10, Quadrant, Buxton, Derbyshire, for "Improvements in the shutters of photographic cameras."—23rd April, 1885.

5052. John Clayton Mewburn, 169, Fleet Street, London, for "Improvements in the production of pictures with the aid of photography."—(*Louis Jacques Henri Cellerier*, France).—23rd April, 1885.

5103. George Frederick Redfern, 4, South Street, Finsbury, Middlesex, for "Improvements in the reproduction of engravings, drawings, and the like."—(*Pierre Edmund de Saint Florent*, France.)—2[illegible]th April, 1885.

5181. George Sylvester Grimston, 3, Mycenae Villas, Mycenae Road, Westcombe Park, Greenwich, S.E., Kent, for "Improvements in instantaneous shutters for photographic purposes."—27th April, 1885.

Patents Sealed.

6688. Samuel Dunseith McKellen, 18, Brown Street, Manchester, Watch Manufacturer and Jeweller, for "An improvement in cameras for photographic purposes."—Dated 23rd April, 1884.

6743. Norman Macbeth, Victoria Foundry, Bolton, Lancashire, Engineer, for "Improvements in the production of printing surfaces by the aid of photo-reliefs."—Dated 24th April, 1884.

Specifications Published during the Week.

8721. **William Samuel Atwood**, of 1, Lime Tree Villas, Chase Side, Southgate, in the County of Middlesex, Photographer, and **Samuel Benjamin Goslin**, of 27, Jewin Crescent, Cripplegate, in the City of London, Engineer, for "Improvements in photographic cameras."—Dated 9th March, 1885.

The claim is :

1. A camera having a dark slide with a sheath completely surrounding a pair of sensitive plates, which sheath, when drawn off, leaves both plates uncovered, substantially as herein described.

2. A camera capable of being closed at the back behind the focussing glass by a door, and in combination therewith, a dark slide carrying a pair of sensitive plates, which are covered and uncovered simultaneously, substantially as described.

3. Our improved photographic camera, substantially as described and represented by the drawings annexed.

8771. **Henry Joseph Shawcross**, at the Office for Patents, 6, Lord Street, Liverpool, in the county of Lancaster, Bachelor of Engineering, for "Improvements in the manufacture and subsequent treatment of sensitive paper for copying drawings, documents written on one side, and the like, by photography."—Dated 16th June, 1884.

The patentee claims :—

1st. In the treatment of sensitive paper, such as described*, the addition of powdered tannic or gallic acid rubbed in, either before or after exposure—whereby the paper can be developed by being placed in an ordinary solvent such as water.

2nd. In the manufacture of sensitive paper, adding to the paper either the sensitive chemical, or the developer or both in the form of a dry powder or film, by which means the image can be developed by simple immersion in a solvent.

8852. **Frederick Woodward Branson**, of Leeds, in the county of York, Pharmaceutical Chemist, for "Improvements in the means for uncapping and capping the lenses of photographic apparatus."—Dated 11th March, 1885.

This invention has for its object the application of pneumatic or hydraulic pressure for photographic purposes, so that the lens, by means of a shutter or other covering, is uncapped or exposed, as may be required.

I apply a cylinder, which is attached to the side or framework of the shutter, so that it is capable of oscillation.

Within this cylinder is provided a piston rod to a crank on the end of the flap spindle referred to in the specification of the above-mentioned invention. At the bottom of the cylinder I insert a hollow plug, the inner end of which is covered by preference with india-rubber, and to the outer end is attached a tube. The piston rests upon the india-rubber cover, and such india-rubber cover being expanded within the cylinder by hydraulic or pneumatic pressure transmitted through the tube, forces the piston forwards, which, through the medium of the piston rod, crank, and flap spindle, rotates or raises the flap, and exposes the lens.

On withdrawing the pressure, the india-rubber returns to its normal position, and allows the piston to fall and the flap to close.

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ON A FEW DARK-ROOMS.

"Do I know anything about dark rooms? Well, I ought to, considering I've been in the profession five and twenty years and more."

He was a melancholy man with a dark saturnine cast of countenance. We had encountered him—no matter where, and he had drunk at our expense—no matter what.

"I suppose they do build studios on purpose now-a-days, but when I first became a photographer anything did. Studios—I don't think we called 'em studios then, 'galleries' was the word in my time—were tacked on just where it happened to be most convenient. As for the dark-rooms—well, black holes would be a better name. There was one place I worked at where the dark-room was under the studio, and you had to get to it through a trap door. How much bad language I used over that trap—because you had to move the camera stand every time you wanted to go down—I should be afraid to say ; and in the summer time it got so stifling it nearly made me ill. In another place the dark-room was made in a recess, just because the recess happened to be there. Well, the man who had it built was a small man, and to economise space he had the door made as narrow as he could. Twenty years ago I was twice as stout as I am now, though you wouldn't think it ; and I tell you it was as much as I could do to squeeze myself through. And when I got inside I had to be pretty careful to keep my elbow from clearing the shelves of the bottles, because, say what you like, bottles will accumulate in a dark-room, and the more shelves you have, the more the bottles collect. A third dark-room that I remember was under a flight of stairs where people were continually running up and down. If I'd stopped another month I'd have gone out of my mind."

"Why was that?" we enquired ; "was it unhealthy?"

"It was healthy enough—at least, as healthy as most dark-rooms—but it was the dust that upset me. The staircase was old, and the least touch sent the dust flying about. Just when I was coating the plate or taking it out of the bath, somebody always ran upstairs, and down came a shower, mucking the plate all over ; and if you're a photographer, you'll bear me out that when a plate gets a spot of dust, the spot in nineteen cases out of twenty settles itself on or near the eye. Why it does so I don't know, unless out of pure aggravation.

"Well, then there are the makeshift dark-rooms—they're cautions, if you like—made in the studio itself generally, out of canvas stretched on a light frame and papered. Talk about traps to catch sunbeams, there's nothing like these temporary—trumpery they ought to be called—dark-rooms. Go over the paper and canvas as carefully as you will, there's always a crack you overlook. Or if you have succeeded in making it light-tight, you are only secure for about a week. The heat of the studio contracts the paper and starts it somewhere, and you get foggy plates for a month or so, and blow up everybody all round for meddling with your bath. As for dry plates, well, I defy anybody to work them properly in one of these canvas and paper structures. And then the door—oh, that door! You never get it to shut properly. It's a peculiarity of this canvas door that it either bulges out at the top or the bottom. It never by any possibility comes level with the framework of the doorway. Again, if it fits loosely it lets in the light, and if it fits tightly you shake the whole business when you open it, and down goes your dark slide into the sink, and all your bottles off the shelves."

"You seem to have been unusually unfortunate in your dark-rooms," we ventured to observe. "Have you never had one in which you could work with comfort?"

"Yes. I remember one that I thought was perfection. It was at the seaside, and I suppose ground isn't so valuable there as it is in town, and the builder put in plenty of space. The beauty of it was that there wasn't a dark corner in it, because the window was none of your miserable single panes, which some men think are sufficient, but a whole frame going right across the end. If the light was strong, and you thought it was risky, why there was a canary-coloured blind which you could pull down, and you were as safe as could be. Then this window opened to the fresh air, and that was worth something.

"Talking of the lighting of dark-rooms, did you ever try green glass?"

"No, can't say as I have ; but I tell you what I found once, and that was, if the dark-room was painted inside of a medium-tinted green, it made it pleasanter to work in. At least, *I* used to think so. But take them altogether, sir, dark-rooms want reforming. To my mind, they're more important than the studio. An assistant-operator, as I was, has to spend more than half his day in the dark-room, and if it is a small, inconvenient, badly-ventilated, ill-lighted, stuffy, sloppy place, with, perhaps, the pipe of the sink going into a drain, and no attempt at a trap, it's a miracle if he escapes without blood-poisoning at some time in his life."

Our friend finished his story and his drink about the same time, and bade us good day.

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* A paper prepared by a method analogous to that of Pellet.

AN ATTEMPT TO PHOTOGRAPH THE CORONA.

The following correspondence will be of interest in connection with Mr. Pickering's paper, which appeared on page 270 of our present volume. This paper, which was communicated to the Photographic News by the author, is the same as that referred to below as having appeared in the American journal *Science*:—

COPY OF REPLY ADDRESSED TO THE EDITOR OF "SCIENCE."

Upper Tulse Hill, London, S.W.,
April 22nd, 1885.

Sir,—Mr. W. H. Pickering having called my attention to his letter entitled, "An Attempt to Photograph the Corona," printed in *Science* for April 3, may I ask you to insert the following lines in the next number of your journal?

The false coronal effects which Mr. Pickering describes are precisely those which might have been expected to result from his optical and instrumental methods. I have in my papers called special attention to the two principal sources of false effects which are present in the form of apparatus employed by Mr. Pickering—namely, the use of a lens, and the position of the drop-shutter, which is said to have been "attached to the lens."

In some early attempts which I made with lenses, any true coronal effect which may possibly have been upon the plates was completely masked by very strong false coronal appearances and rays, similar to those obtained by Mr. Pickering. These were due probably, in part, to outstanding chromatic aberrations of the lenses, though corrected for photographic work; in part to reflections from the surfaces of the lenses, and in part to a diffraction annulus about the sun's image. It was on account of these, and some other probable sources of error when a lens is used, that I had recourse to reflection from a finely-polished mirror of speculum metal. When the mirror was used, all these false effects disappeared.

It is scarcely necessary to remind your scientific readers that the only position in which the drop-shutter can be placed, when an object so bright as the sun is photographed, without introducing strong false coronal effects about the sun's image from diffraction, is in, or very near, the focal plane. "Attached to the lens," whether behind or in front of it, a strong diffraction effect is produced upon the plate at the beginning, and again towards the end of the exposure. If Mr. Pickering will direct his apparatus to the sun, and observe the sun's image on the ground-glass of the camera during the time that the drop-shutter is moved very slowly past the lens, he will be the spectator of a succession of fine diffraction effects, which in the aggregate, as far as they were bright enough, must have recorded themselves on his plates. In this way, with care and skill, the sources of other instrumental effects could, no doubt, be tracked out.

In one of my papers, my words are:—"The moving shutter being placed very near the sensitive surface, and practically in the focal plane, could not give rise to effects of diffraction upon the plate."

I may now add that, even with the shutter near the plate, care has to be taken that no light is reflected from the edge of the moving plate of the shutter.

I state that with my apparatus, when the sky is free from clouds, but whity from a strong scattering of the sun's light, "the sun is well-defined upon a sensibly uniform surrounding of air-glare, but without any indication of the corona. It is only when the sky becomes clear and blue in colour, that coronal appearances present themselves with more or less distinctness." Any apparatus intended for photographing the corona must fulfil perfectly these conditions before any serious attempts are made to obtain the corona.

I stated, in a paper presented to the British Association for the Advancement of Science, in the summer of 1883, that I had discarded the use of coloured glass (or cells of coloured solutions), because of the danger of false appearances from imperfections in the surfaces, or in the substance of the glass.

Mr. Pickering does not state that his sensitive plates were "backed" with a solution of asphaltum or other black medium, in optical contact with the glass—an essential condition.

No tube, with suitable diaphragms inside, appears to have been used in front of the lens to prevent light falling upon the inside of the telescope tube or camera, and being thence reflected possibly upon the plate. The desirable precaution of using a metal disc, with a suitable surface, a little larger than the sun's image, and placed close in front of the sensitive plate, does not seem to have been taken.

Mr. Pickering says of the violet glass, "by its use a negative image of the sun's disc was obtained, but without it the plate gave a reversed image." I found no difficulty in obtaining a negative or a reversed image, when violet glass was used, by a suitable change of the time of exposure, and therefore Mr. Pickering's time of exposure was in fault, if he wished a different result.

Mr. Pickering says, "Both bromide and chloride plates were provided; but, as with Mr. Huggins, the latter proved to give much the better coronal effects." And again, towards the end of the letter, he says that "chloride plates are more suitable than bromide ones for obtaining an atmospheric corona, just as Mr. Huggins has claimed that they are more suitable for taking a solar one; hence I think one must not rely too much on the ultra-violet sensitiveness of the chloride plate for the separation of the two."

Passing by the use of the words "atmospheric corona" for the false appearances which were due in great part, if not altogether, to diffraction and other instrumental effects, as I have already pointed out, and presuming that Mr. Pickering was not unfamiliar with the greater blackness of chloride plates, especially when developed with ferrous-oxalate, he seems to infer some special suitability of the chloride plates to bring out the false effects upon his plates. It may be suggested that Mr. Pickering seems to have used the same length of exposure throughout, "giving an exposure which may be estimated at about a fifth of a second." Now, it is scarcely probable that the bromide and chloride plates possessed the same sensitiveness, and it may have been that the (probably) more sensitive bromide plates were thin from excessive exposure. It may even have occurred that his lens, if corrected for bromide plates, gave an outstanding aberration about H, or a little beyond. Any way, until these and some other similar points are cleared, it does not seem to me that Mr. Pickering is justified in making the insinuation which seems to lie in the words which I have quoted.

In conclusion, I cannot refrain from expressing great surprise that Mr. Pickering should have mentioned my name in connection with experiments carried out in complete disregard of the conditions to which I had called attention, as essential in a matter of such extreme delicacy as photographing the corona, and in which no little skill and special experience are necessary on the part of the *photographer* as well as on the part of the physicist.

Mr. Pickering has, no doubt, received authority from Dr. O. Lohse to say that "he (Dr. Lohse) considers that the halo on his plate is wholly atmospheric, and not coronal;" but Dr. Lohse's published statement reads differently. Dr. O. Lohse's words are:—"Es gelang aber dieselben (die Schwierigkeiten) zu überwinden und Resultate zu erhalten welche zu einer Fortsetzung der—hier freilich selten möglichen und mit grösserem Vortheil in möglichst hoher Lage anzustellenden—Experimenten ermuthigen." (Vierteljahrsschrift der Astronomischen Gesellschaft, B, XV., p. 134) I have not seen Dr. Lohse's plates, and can therefore express no opinion as to the nature of the appearances upon them.

William Huggins.

Mr. Pickering's interesting experiments described in *Science* for April 3 would seem to be practically conclusive as to the unreality of the coronal forms which appear upon the plates of Dr. Huggins and Mr. Woods, if it were evident that he had observed all the conditions which they indicate as essential.

His letter, however, is silent in respect to one important point. It is not stated whether or not the plates were "backed" with any light-absorbing substance, in order to prevent the so-called "halation" produced by reflection from the back surface of the plate under a strong light. The English observers insist urgently upon the necessity of this precaution, and use for the purpose, I believe, a coat of asphalt varnish, coloured with Brunswick black. It is possible that even this expedient would not wholly prevent a streaky scattering of light at the edge of the sun's image, because minute particles of foreign matter embedded in the glass itself would have their influence; but it is obvious that, if the experiment was tried without the precaution, it cannot be looked upon as any way decisive.

Perhaps Mr. Pickering would kindly supplement his communication by a brief statement regarding this point.

Princeton, N.J., April 8th. C. A. Young.

In reply to Professor Young's communication, I would say that the precaution to which he refers was carefully attended to, and that all the plates employed were backed the day before the eclipse with asphalt varnish. It would be very interesting to know how far the corona, as photographed by Dr. Huggins, extends from the sun: for a very long exposure would probably mask the real phenomenon; one that was very short would be insufficient to obtain an impression of it. My exposures were so timed, that by a long development, the darkening could be traced to a distance of ·8 of the sun's diameter, while, with a short development, the darkening only reached to ·2. But in no case could any particular rays be identified in the different photographs.

Wm. H. Pickering.

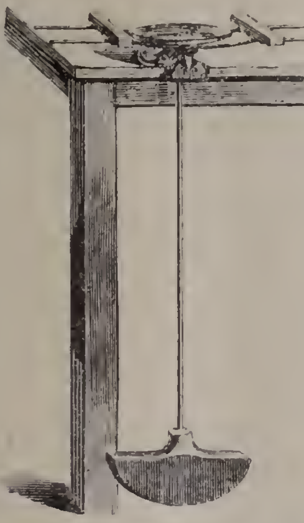
A ROCKING APPARATUS FOR USE IN DEVELOPING DRY PLATES.

BY DR. J. M. EDER.

In developing gelatine-bromide plates, the vessel containing the developer should be kept in motion, particularly when the amount of developer is small.

Automatic rocking apparatus make the temporary absence of the operator practicable, and hence may be of value not only in large establishments, but also for amateurs.

I have therefore no hesitation in calling attention to an arrangement made by Herr Braun, of Berlin, and which was much appreciated by the visitors to the Frankfort Exhibition; and as Herr Braun was good enough to send one to Vienna, I had an opportunity of exhibiting it at the general meeting of the Photographic Society in this city. The apparatus is, as the figure indicates, screwed upon a table, and it consists of an iron plate having two V-pieces, in which work the knife-edges of the pendulum. Over these knife-edges is a small round platform, upon which the dish stands, and there are steadying pieces, which slide on iron rods, as shown in the figure. When once the heavy iron pendulum is set in motion, it remains swinging for a long time.



THE INFLUENCE OF PHOTOGRAPHY ON POPULAR TASTE AND THE GRAPHIC ARTS.

BY J. S. POLLITT.*

Those who have studied the history of our country during the already expended portion of the present century—and for that matter I may say all civilised nations during the same period—will readily recognise the fact that immense changes, chiefly noticeable in the manufacturing and commercial districts, in the habits, manners, and even bent of thought, have taken place amongst the people; and it further requires no great penetration to trace these rapid marches in the progress of civilisation and growth of intelligence to the wondrous—and it may also be said unprecedented—development of the arts and sciences during the aforesaid brief space of time.

Forty years ago the public were only just being made aware that a process, apparently to many minds miraculous, had just then been so far made practicable that by its means both landscape and portrait pictures could be produced in an incredibly short space of time, without the aid of either pencil or crayon, and yet with a fidelity to nature, as to truthfulness of outline and minuteness of detail, which the most sanguine student of art had never before dreamt of as approachable, much less possible. Many curious speculations arose in the untutored but inquisitive as to the cause which could produce such marvellous effects! The camera, when seen at work, was often looked upon as a box containing some occult arrangement of mechanism which did its work in some inexplicable way; but then the mystery was, how could the machine make a picture when there was no actual contact with the subject? In the old silhouette machine, at one time so extensively used at country fairs and wakes, in making the black and gold pictures then in good demand by the working-classes, the principle was simple enough to the most ordinary mind, the outline being produced by a lever, one end of which, being run round the contour of the head and face in profile, the other end of said lever which passed through an universal joint, finishing with a finely-pointed pencil which reproduced the tracing on a proper scale on a piece of cardboard brought in contact therewith; but the making a picture in which all the minutiæ of detail was faithfully copied from the original by the mere operation of pointing a lens and a dark box to the model, was a phenomenon which the uninitiated could not understand; and at this point I am tempted to relate one of my own photographic experiences. When working in a country village, where, mayhap, the schoolmaster had been a good deal abroad, I was quickly surrounded by a group of wondering onlookers, amongst whom was an old man whose mind was not a little exercised by the novelty of the operation. After, however, cogitating the matter over for some time, and assisted, probably, in the solution of the difficulty by some hazy recollection of the Scriptural narrative of the spontaneous opening of the iron gate of the city on the occasion of the Apostle Peter's liberation from prison, he arrived at the—to his mind—satisfactory conclusion that the machine did it of its "own accord," and forthwith communicated the said discovery to his companions among the bystanders.

The desire to perpetuate the facial lineaments of individuals in the minds of their friends and posterity has been a sort of weakness, if it may be so called, amongst both civilised and semi-civilised nations in all ages, and it is to this ruling passion, as exhibited in the rude pictorial productions of the ancient Egyptians, long before the era of letters, that we have been enabled to obtain glimpses of the manners and customs, and even the domestic life, of a people in pre-historic times. The art of delineation, which in its earliest stages made its appearance in such a grotesque and primitive fashion, would naturally keep pace, in its development, with the progress of time and the march of civilisation until it attained the high state of perfection displayed in the productions of the great masters of the Italian, German, and other schools, which flourished between the thirteenth and seventeenth centuries of the Christian era. In the nature of things, however, the influence of these grand works in refining public taste was extremely limited; their great scarcity, and the high value at which they were appraised by those who owned them, were sufficient reasons for shutting them out, to a large extent, from constant inspection by the multitude, and hence it came to pass that among the labouring, the artizan, and even the middle classes, artistic taste and judgment remained, until a very recent period, at an extremely low point; pictorial surroundings of some kind in their houses they must have, but in many cases such works were striking examples of bad drawing, and worse composition. It is true that miniature portrait painting, both on paper and on ivory, had in some hands attained a high state of perfection, but the price for really good work was very high, and kept it out of reach of all but the wealthier classes.

The Woodbury, the Autotype, and many other mechanical processes, which may be said to be mainly photographic (as the printing table or block is made directly from the negative) are processes now extensively employed both in book illustration and other forms of pictorial representation, and have all the recommendation, apart from all else, of being true both to form, and in perspective, which could seldom be said of the work of the wood engraver at a period anterior to the use of the camera. Many of these photo-mechanical processes are very beautiful, especially the Woodburytype, and have exercised a beneficial influence on the work of the engraver; much even of the woodcut portrait work of the present day, apart from the tool lines of the workman, having, as regards light and shade, all the characteristics of the best photographs.

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* Abstract of a communication to the Hyde Amateur Photographic Society.

With respect to mural pictures, such as are constantly to be seen in populous districts on the immense posters, and now so extensively used as advertisements by theatrical companies, it does not require much discrimination to trace the indebtedness of those who produce them to the art of photography. Some of them are indeed charming, in fact quite works of art in their way, and at no period in the history of the art of printing have pictorial posters of such high merit been produced, as those of the present time. This is saying a good deal, but not a whit too much either for those whose untiring genius has developed this branch of art industry to its present state of marvellous excellence, or for the influence which photography has so clearly exercised in directing that industry to its present perfection.

It is further pleasing to note that although in the early history of the art-science, artists were wont to fight shy of the photographer, and to look upon their productions as being of a too mechanical nature to be worthy their notice, that state of things is now very much altered, and I have of late years come in contact with many eminent painters who have freely admitted the assistance they have derived in working up the details of their pictures from the study of photographic prints. Of course the true artist will always go directly to nature for her colours and her evanescent effects, but for form and detail he will never go far wrong in relying on the fidelity of a photograph.

◆

Correspondence.

POSITIVES ON GELATINO-CHLORIDE OF SILVER.

Dear Sir,—Will you kindly afford us an opportunity to make a slight, yet important, correction to our formulæ, which appeared in your issue, April 17th.

Page 245, first column, 28th line, should be, ammonium chloride 1·24 grammes, instead of 124 grammes; and the following line should be, potassium chloride ·88 grammes, instead of 88 grammes.—Yours faithfully,

Ashman and Offord.

A PHOTOGRAPHIC CLUB FOR AMATEURS.

Sir,—Amateur photography, I find, has worked its way even amongst the Eton boys, so universally have its delightful fascinations spread. It has occurred to me that the time has come for amateurs to have a club of their own. If those of your many readers who feel the need of a place in London where amateurs can meet and hold interchange of ideas upon this most interesting and profitable pursuit will lend me their support, I will proceed at once to form a "Camera Club" for their immediate benefit. I will thank those who write to me direct upon the subject to put on the outside of the envelope the words "Camera Club," so that the correspondence receive the special attention it deserves.—I am, yours truly,

Cumming Macdona.

April 29th, Hilbre House, West Kirby, Cheshire.

◆

Proceedings of Societies.

Photographic Society of Great Britain.

A technical meeting was held on Tuesday last, the 28th ult., in the small room attached to the Gallery, 5a, Pall Mall East, Mr. W. Bedford in the chair.

Mr. A. Cowan exhibited his combined camera and changing box, a description of which appeared on p. 238 (*ante*). A point not previously mentioned was the automatic registration of exposed plates. This was achieved by the rotation of a serrated wheel in connection with a dial plate, the same being revolved one section upon each change of plate.

The Chairman characterized the exhibit as wonderfully ingenious, and he thought that although Mr. Cowan gave much of the credit to Mr. Harrison, yet the camera before them showed several improvements introduced by the exhibitor. Such cameras would doubtless come more into use when they succeeded in getting developed prints uniform.

Mr. W. Cobb said he had some experience with the working of Mr. Harrison's small camera, and found no difficulty with it; still, he was not prepared to say that he would prefer taking small plates for subsequent enlargements when there was an opportunity of making the negatives direct.

Mr. W. Brooks had often made 10 by 12 negatives from 2 by 2 negatives, and they were quite satisfactory.

The following question was then read and discussed:—"What are the Chemical Reactions which take place on the addition of Alum or Tannin to Gelatine, and what is the Difference between the two Precipitates so produced; if any?"

Mr. A. Spiller thought the chemical effect produced by tannin on gelatine was not well understood. In the case of alum he considered it would be decomposed, the alumina then combining with the gelatine to form a compound of these two substances. Chrome alum would also act in a somewhat similar manner.

Mr. Atkinson understood that a certain decomposition took place at the parts in contact, but not through the whole mass. If he put a plate in dilute sulphuric acid to remove stains, it did not frill; but if he soaked the film some time in water afterwards, it floated off the plate.

This led to a discussion on the removal of yellow pyro stains from negatives.

Mr. Brooks supported the claims of dilute 1—80 sulphuric acid, inasmuch as the colour did not return after continued washing, as it does with hydrochloric and other acids.

Mr. Cowan preferred the alum bath before fixing.

The Chairman obtained black films by adding four ounces of ferrous sulphate to each sixty ounces of fixing bath, taking the precaution to keep the bath neutral.

Another question was then read as follows:—"What are the chemical and physical properties of the compound produced by oxidizing gelatine with bichromate of potash, and light?"

Mr. A. Spiller instanced the usually accepted theory of carbon printing; he did not think that gelatine became oxidized, however.

There being no further remarks on this question,

Mr. Atkinson passed round three plates to illustrate reversed images by increasing exposure.

Mr. Cowan referred to an experiment wherein he obtained positive and negative images on a test plate under the sensitometer.

Mr. J. D. England had obtained a similar result.

Mr. Dagley sent a cabinet for washing plates; it was filled with a series of zinc trays placed on shelves for the purpose of economising the water, which passed from one to the other, through the series, the upper tray receiving the supply.

Several speakers advocated washing gelatine plates by placing the film downwards.

Mr. Pringle had several boxes, each made to wash six plates with the films downward, and he had no trouble with stains afterwards.

Mr. J. D. England enquired if eosine had been found so far to be the best substance for staining gelatine plates?

Mr. A. Spiller: According to Dr. Vogel, azaline is preferable, since it has a more decided effect on red tints than eosine.

Mr. Gale enquired the best means to remove red stains from old gelatine plates which had been apparently imperfectly fixed?

The general opinion of those present was that if neither acid nor potassium cyanide effected removal, the case was hopeless.

The Chairman strongly advocated the use of a thick coating of collodion to negatives before printing, not merely pouring on and off similar to coating plates, but allowing it to set on a levelling stand. Negatives protected in this manner had withstood the action of blotting-paper moistened with silver nitrate for the space of twenty-four hours.

It was announced that in future the rooms will be opened on Technical evenings at 7.15, to enable members and their friends to peruse the home and foreign photographic literature before the business of the evening commences.

London and Provincial Photographic Association.

At the usual weekly meeting on Thursday, the 23rd inst., Mr. A. **Haddon** occupied the chair.

Referring to a question at the previous meeting with respect to halation,

Mr. H. **Starnes** said he had been trying some experiments. He handed to the Chairman some negatives that he said would be found to be quite free from halation in the high-lights; this he attributed to the small quantity of silver in the film, which he had lessened to half a grain to each quarter plate.

The **Chairman** was of opinion that the cause of halation might be traced more to the colour of the film than to the poverty of silver, instancing the case of a chloride plate, which, with an increased amount of silver, gave no halation.

In reply to a member,

Mr. **Starnes** said the emulsion was an unwashed one made by the ammonia-nitrate process.

The **Chairman** had made an emulsion from the formula given by Mr. Henderson in his recent lecturette, but was unable to get density with it; he passed round some negatives as examples.

Mr. A. L. **Henderson** remarked that want of density was characteristic of very rapid plates. He thought, in reference to the plates shown, that less exposure, or longer development, might have produced a different result. He had recently made two emulsions, both showing the same number, 22, exposed under a sensitometer. One emulsion contained one per cent. iodide; this was found to be from four to five times more rapid in the camera than the other emulsion, which contained no iodide.

The **Chairman** objected to iodide, from the length of time the plates took in fixing.

Mr. A. L. **Henderson** had been experimenting in this direction. He cut a plate in two diagonally after development, placing one half on a twenty per cent. solution of hyposulphite of soda—this fixed in six and a-half minutes—putting the other half in a twenty per cent. solution of cyanide, which fixed in thirteen minutes. There was no apparent difference in the result, beyond a slight tendency to frill with the cyanide. He also drew attention to a gelatine print which he handed to the members for inspection; the paper, he stated, he had prepared and sensitized, fixing the same by simply washing it in water.

Bristol and West of England Amateur Photographic Association.

The ordinary monthly meeting was held, as usual, at the Queen's Hotel, on Wednesday, 22nd inst., Col. **Playfair**, Vice-President, in the chair.

After the usual preliminaries the **Chairman** called on Mr. C. Brightman to read his notes on "Printing-in Clouds in Landscapes" (see page 279).

In reply to questions at the close of the paper, Mr. **Brightman** said that he always printed the landscape before the clouds, and that in development he used exactly the same formula as for his general work, only using much less ammonia.

The **Chairman** said that he used to use cotton wool, with which some very passable imitation clouds could be produced.

Mr. **Daniel** said that instead of the plain braid suggested by Mr. Brightman, for placing the negatives and prints on, he found a similar thing, but hinged in the middle, preferable, as the results of the printing could be examined from time to time; the braid being thin, a spring-clip could be made to keep the negative and print in good contact.

Rev. H. B. **Hare** wished to know if any one had tried Morgan and Kidd's paper for cloud negatives. The speaker had lately made an attempt, and the result was, for an early trial, fairly good. He exhibited a paper negative he had done, the subject being a landscape.

Mr. P. W. **Bush** said he found some difficulty in getting good cloud negatives.

Mr. **Hare** suggested his beginning on slow plates.

Mr. **Brightman** rather inclined to rapid plates, as less likely to be over-dense.

The **Chairman** exhibited a shutter to which, under his instructions, a simple plan had been devised for instantly terminating the exposure, if necessary. In reply to a question, he said the arrangement was not pneumatic.

Rev. H. B. **Hare** expressed the hope that the members would give him the pleasure of their company for a day, in May, at Great Elm, as they had once on a previous occasion; and

Mr. **Daniel** said he would feel great pleasure in welcoming the Association at his residence in June, as he had the pleasure of doing last year.

The **Chairman** was sure he was only expressing the feeling of all present, in heartily thanking Mr. Hare and Mr. Daniel for their kind invitations.

The meeting (the last evening one till September) was then adjourned.

Bolton Photographic Society.

The fourth annual open meeting was held on Wednesday, in the Baths Assembly Room, Mr. Bridson presiding. There was a very large number of members and members' friends in attendance, and for their diversion the hall was hung with photographic specimens, being for the most part the production of members of the Society. There were also several tables of photographs in the prize competition, which circumstance was a novelty in the proceedings of the Society, having been introduced for the purpose of lending additional attractiveness to the out-door summer meetings of the Society. Besides the outcome of this competition, the exhibition was supplemented by a table of numerous and interesting appliances in photographic apparatus; also a variety of graphoscopes for the magnifying and examination of photographs, together with the many appurtenances of the art. The collection, as a whole, was exceptionally good.

Landscapes formed the predominating feature in the exhibits, there being represented almost every sequestered haunt and choice bit of scenery in the locality. Mr. Bridson (president) contributed a number of views in Windermere district. Mr. R. Mercer showed views of North Devon in platinotype, also a number of coloured views. An artistic set of Norwegian views was contributed by Dr. Johnston. Mr. J. Boothroyd presented some finely-executed enlargements of local views. Mr. C. K. Dalton (Secretary) showed an extremely valuable set of local views in platinotype. Mr. John Taylor showed a medley group. A number of North African views were supplied by Mr. J. C. Sewell. Mr. Wm. Banks showed a table of graphoscopes, &c. Mr. T. Parkinson exhibited a choice selection of portraits of celebrities in plush frames, together with numerous nicknacks, and a new patent camera. He also showed his "Souvenir of Bolton." Mr. E. N. Ashworth showed a selection of local views, Mr. J. E. Austwick contributed local views and portraits, and Mr. R. Harwood showed about 60 views, including Welsh scenery.

The prizes offered in the competition were three in number, and were given by Mr. Bridson. For the best general exhibit the first prize was £2 10s., and was carried off by Mr. C. K. Dalton (secretary). The second prize, £2, was divided between Mr. J. Taylor and Mr. William Laithwaite. A prize of 10s. was given for the best set of transparencies, not less than six, and was won by Mr. Walter Knowles. The judges were Messrs. J. Pollitt (President of the Manchester Photographic Society), Robert Knott, and T. Parkinson. The enlargements, by Mr. Boothroyd, from small 4¼ by 3¼ negatives, were highly commended by the judges.

Upwards of 120 transparencies were contributed by the members, and were mostly competitive, and these were exhibited to the assembly by the aid of the oxyhydrogen light, worked by Mr. James Leach. Mr. W. B. Wood explained the views as they were cast upon the sheet, and enhanced the enjoyment of the entertainment by his droll references.

Mr. C. K. **Dalton** read his annual report, in which he congratulated the Society upon the increased membership, and further stating that at no time since its formation had the Society been on a sounder basis. He said the balance in the hands of the treasurer was increasing.

The report further detailed the demonstrations that had been given during the season.

The **President**, in the course of a brief address said, after examining the exhibits they saw around them, he thought they would agree with him that there was a great improvement noticeable in the work of the members. He could not say there had been a great many inventions during the past year, with the exception of improvements in the lens and camera, &c. The chief difficulty still remained—that was the obtaining of the right exposure and also a correct development. Those were the only two difficulties in the whole art, and which they must try to overcome. The work of the Society helped its members to occupy their leisure hours, and he was sure it also gave them pleasure. In fact, a photographer must cultivate habits of patience, perseverance, and preciseness, and other qualifications, and especially the faculty of observation.

During the evening the proceedings were agreeably interspersed by musical contributions, and the meeting terminated in the usual manner, and was pronounced one of the most successful the Society has held.

Hyde Amateur Photographic Society.

This Society held its meeting on Wednesday evening, the 15th inst., when there was a goodly number present.

After confirming the minutes of the previous meeting and electing two members,

Mr. Jno. Pennington proposed, and Mr. McClean seconded, that a very cordial vote of thanks be given to Mr. Cheetham for his very handsome presentation plate to each ordinary and honorary member.

Arrangements were made for a number of excursions during the coming season.

There was a test betwixt a three-wick lantern and a two-wick lantern as to which was the best, and the conclusion arrived at was that the two-wick was the best lamp.

This brought a very pleasant evening to a close.

Talk in the Studio.

The Ameer and Photographers.—The special correspondent of the *Daily News* at Rawul Pindi, in referring to the Ameer of Afghanistan, writes:—"He was particularly sensible of the honour paid him when the Duke of Connaught accompanied Lord Dufferin on the Viceroy's first private visit to his residence, and willingly submitted to being photographed, in company with his Excellency and his Royal Highness. Not that he had any great liking for the photographers, who besiege his residence, and are always trying to fix him with their cameras. The Commander-in-Chief, Sir Donald Stewart, on a recent visit, told him the Ameer Shere Ali enjoyed being photographed. Abdur Rahman smiled, and said Shere Ali was perhaps prouder of his personal appearance than he himself was."

Miss Mary Anderson's Photograph.—The case of Mr. Alexander M. Rossi, an artist, who was summoned for infringing the copyright of the photograph of Miss Mary Anderson, the property of Mr. Van der Weyde, of 182, Regent Street, also for selling copies of the same, and which we alluded to last week, came before the Court for decision on Wednesday. Mr. de Rutzen said that after reviewing the evidence, and taking into account the conflict there was in the evidence in regard to the dates on which the witnesses saw the picture they spoke of, he could come to no other conclusion than that the picture now produced was never in Mr. Nathan's Gallery in Old Bond Street when Mr. Van der Weyde went there. There must, in his opinion, based upon what the witnesses had said, have been two pictures. In saying that, he did not for one moment wish to cast any reflection upon either of the parties; but taking the view he did of the case, he could come to no other conclusion than that the picture which Mr. Van der Weyde saw was a colourable imitation of the photograph of Miss Anderson, consequently there had been an infringement of the copyright. He should, therefore, order the defendant to pay a penalty of £10, with five guineas cost; but as the picture in Court was not, it appeared, the one in dispute, he should not order the defendant to forfeit it.

Photographing Ruins after Fires.—The photographing of ruins of buildings injured or destroyed by fire is now regarded by the profession as a legitimate chance for speculation. Two recent destructive fires in Chicago have furnished ample opportunities, of which several enterprising operators have taken due advantage, and the shop windows of the stores are crowded with the prints of the two buildings, taken from every conceivable point of view. One of the fires occurred when the thermometer was below zero, and the walls of the building, as well as the telegraph wires and poles near by, were covered with a heavy coat of ice, formed from the huge volumes of water thrown on the flames. Some photographs taken of these ruins before the ice melted, made very striking pictures.—*Photographic Times.*

In the Law Courts.—Photography seems every day to play a more important part in law suits. Only recently in New Orleans, an enlargement of writing was thrown on a screen before a jury, by means of photography, which had great influence in deciding the case. In murder trials, photography frequently proves the strongest evidence. Recently, in this city, in various divorce cases, photographs gave conclusive evidence in favour of those who produced them.—*The Eye.*

Photographic Club.—The subject for discussion on Wednesday, May 6th, will be on "Enlargements." The Saturday Outdoor Meeting will be held at Putney and Kew, along towing path.

To Correspondents.

*** We cannot undertake to return rejected communications.

Enquirer (H. C.).—They are doubtless due to the presence of traces of greasy matter in the gelatine. Try another sample, or wash the sheets in ether before dissolving them.

F. M. Sutcliffe.—1. Although the unprotected metals are often used without any apparent disadvantage, it is perhaps a wise precaution to use a protective film of varnish. We have found that most kinds of Brunswick black will adhere well to lead or zinc, provided that the metal is perfectly dry when the material is applied. 2. The best of all is a sash to open by means of a pulley and cords. It should be at the highest part of the ridge.

F. W. Evers.—1. Use the large portrait lens well stopped down. If, however, you were to purchase an instrument specially for the work, it would be well to obtain one of the rectilinear or symmetrical type. 2. As far as we know, they are not to be purchased in London: but surely you can find some one who can sketch them for you?

R. B.—You will find the information in our "Notes" this week.

An Amateur.—Add a solution of carbonate of soda until a fresh addition will produce no further precipitation, and collect the precipitate on a calico filter.

Panel.—The instrument you suggest will answer very well, but, as you are aware, will be far slower than a portrait lens; and it is for you to consider whether the possibility of working more quickly will make it worth while for you to purchase the latter instrument. Do not, however, forget that the quality you call depth of focus cannot exist to any great extent in a rapid lens. Possibly the maker may let you have the two lenses on trial.

Copyright.—1. In every case put your name and address in full. 2. It is unreasonable to suppose that the consent of every one is required in such a case, as in many instances you would have no means of communicating with the parties. Leave columns 2 and 3 blank.

J. Gray.—It shall be attended to.

C. A. Cloughton.—Add a dozen drops of sulphuric acid to each pint of the solution of sulphate of iron. If this should not prove sufficient, increase the dose.

A Plate Maker.—We can certainly see no objection to using all the haloid salts which you mention together, but at the same time it is difficult to see what advantage can result from such a course. Ammonia added afterwards does not seem to be so energetic in its action.

R. Appleton.—If you make a photograph for a customer as a matter of business, the picture is his, and you have neither a legal nor a moral right to dispose of copies without his consent. In order to secure the copyright by registration, it is advisable for both the actual producer, and the person who employs the actual producer, to be parties to the registration. If you make a picture at your own expense and for your own purpose, the copyright belongs to yourself.

C. A. C.—It would not be practicable, as it frequently happens that very many conditions are implied in the queries, and to insert particulars as to all of these would involve the using up of too much space.

Equitas.—It seems to us that you have been unfairly treated, but we cannot see what you can do but leave his service.

Carbon.—It is probable that the insolubility arises from the presence of acid fumes. Make the sensitizing bath slightly alkaline with ammonia, and sprinkle a little ammonia over the floor of the room where you dry your tissue.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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THE BIRTHPLACE OF ENGLISH PHOTOGRAPHY.

In our supplement of this week we reproduce one of the now rapidly-fading illustrations from the first book illustrated by means of the camera—Fox Talbot's *Pencil of Nature.*

The view shows the residence of Talbot, and it is interesting to reproduce in a permanent form one of those early photographs of which the originals will soon be no more.

In referring to this photograph Mr. Talbot says:—

> "This is one of a series of views representing the author's country seat in Wiltshire. It is a religious structure of great antiquity, erected early in the thirteenth century, many parts of which are still remaining in excellent preservation.
>
> "This plate gives a distant view of the Abbey, which is seen reflected in the waters of the river Avon. The spectator is looking to the north-west. The tower, which occupies the south-eastern corner of the building, is believed to be of Queen Elizabeth's time; but the lower portion of it is much older, and coeval with the first foundation of the Abbey.
>
> "In my first account of 'The Art of Photogenic Drawing,' read to the Royal Society in January, 1839, I mentioned this building as being the first 'that was ever yet known to have drawn its own picture.'
>
> "It was in the summer of 1835 that these curious self-representations were first obtained. Their size was very small; indeed, they were but miniatures, though very distinct; and the shortest time of making them was nine or ten minutes."

It may be interesting to note in this place the chief points of the Talbotype process—a process which, in a modified form, is still occasionally used for making enlargements on paper. Iodide of silver is deposited on the texture of a fine hard paper, and this is rendered sensitive by means of a nitrate of silver solution to which gallic acid and acetic acid have been added. The picture is developed with a solution of gallic acid to which a little nitrate of silver and acetic acid have been added. Hyposulphite of soda is used for fixing.

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DRY PLATES AND DEVELOPERS IN AMERICA.

The New York Amateur Photographic Society instituted a committee on dry plates some months ago, and the committee, consisting of H. J. Newton (Chairman) J. H. Janeway, D. H. Walker, C. W. Dean (Secretary) has just issued a voluminous report. Out of 38 different brands of American plates, 12 showed a sensitiveness amounting to 25 on the Warnerke scale, while the lowest sensitiveness recorded was 14. It is also interesting to notice that only 5 brands of plates were free from stains and markings, arising from the packing materials. These the plates of Carbutt, which are packed with varnished mats; those of Forbes, which are packed face to face with nothing between them; those of Ingless, packed with twine; the Iowa City plates, packed with a very thin mat; and the Nys Belgian plates, which are wrapped in needle paper. The committee summarises the matter as follows:—

> We are thoroughly convinced on one point, however, and that is that the principal cause of fogged plates is not as a general thing the fault of the emulsions, but is caused by the packing boxes and mats. Five plate-makers have shown us that it is possible to pack plates so that they will not be fogged by the mats and boxes. If our work shall aid in increasing this number, we shall feel that the time and thought we have given the matter has been of some practical value.

The following are the principal developers used in America:—

The Society's standard developer—Water, 1 ounce; dry pyro, 2 grains; carbonate of soda, 5½ grains; sulphite of soda, 11 grains; carbonate of potassium, 5½ grains; yellow prussiate potash, 5½ grains.

Allen and Rowell's Ammonia Developer.—Pyrogallic acid, 30 grains; water, 10 ounces; liquor ammonia, 1 dram; water, 15 ounces; bromide potassium, 20 grains. To develop, take 2 ounces of the pyro solution and 1 ounce of the ammonia solution.

Beeb's Iron Developer.—No. 1.—Neutral oxalate potash, 1 lb.; water, 5 pints. Make decidedly acid with citric acid, and filter. No. 2.—Iron, 1 lb.; water, 2 quarts. Filter, and add 60 drops sulphuric acid. To develop, take No. 1, oxalate solution, 4 ounces; No. 2, iron, 4 drams.

Carbutt's Pyro and Potash Developer.—No. 1.—Water, 10 ounces; citric acid, 60 grains; crystallized sulphate soda, 2 ounces; pyrogallic acid, 1 ounce; water to make up, 16 ounces. No. 2.—Water, 10 ounces; crystallized sulphite soda, 2 ounces; carbonate potash (C.P), 4 ounces; water to make up, 16 ounces.

For Specials.—Water, 1 ounce; No. 1, ¾ to 1 dram; No. 2, ½ to ¾ dram.

For A and B Plates.—Water, 1 ounce; No. 1, ½ dram; No. 2, ½ dram. No. 1 gives density; No. 2 gives detail.

Cramer's Soda Developer—(Pyro Stock Solution).—Salicylic acid, 6 grains; dissolve in alcohol, 1 dram; add water, 6 ounces; pyrogallic acid, 1 ounce. Soda Stock Solution.—Water, 30 ounces; sulphite soda (gran.), 4 ounces; sal soda, 4 ounces. To develop: to 1 ounce soda stock solution, add 7 ounces water, and ¼ to ½ ounce pyro stock solution.

Chicago Developer.—Make the three following saturated solutions: carbonate potassium, sulphite soda, carbonate soda.—Stock No. 1—(Pyro solution).—Salicylic acid, 6 grains; alcohol, 1 dram; pyrogallic acid, 1 ounce; water, 8 ounces. Stock No. 2—(Soda solution).—Saturated solution carbonate potassium, 1 ounce; saturated solution sulphite soda, 1 ounce; saturated solution carbonate soda, 3 ounces. To develop: to 2 ounces of Stock No. 2, add ¼ to ½ dram Stock No. 1.

Cross's Soda Developer.—No. 1.—Pyrogallic acid, 1 ounce; water, 12 ounces; sulphuric acid, 10 drops. No. 2.—Common sal soda, ¼ lb. avoirdupoise; sulphite of soda (crystals), ¼ lb.; water, 100 ounces. To develop: No. 1, ½ to 1 dram; No. 2, 2 to 3 ounces.

Cooper's Soda Developer.—No. 1.—Sulphite soda (crystals), 1 pound; distilled water, 2 quarts; pyrogallic acid, 2 ounces. No. 2.—Carbonate soda (crystals), ½ pound; water, 2 quarts. To develop, take—No. 1, 2 ounces; No. 2, 2 ounces; water, 2 ounces.

Diamond Ammonia Developer.—No. 1.—Bromide ammonium, 25 grains; strongest ammonia, 1 dram; water, 20 ounces. No. 2.—Pyrogallic acid, 1 ounce; citric acid, 30 grains; water, 9 ounces. To develop, take No. 1, 2 ounces; No. 2, 40 minims.

Forbe's Ammonia Developer (Pyro Solution).—Pyrogallic acid, 1 ounce; alcohol, 8 ounces. (Bromide Solution)—Bromide ammonium, 1 ounce; water, 4 ounces. (Ammonia Solutions)—Stronger water ammonia, 1 ounce.; bromide ammonium, 60 grains; glycerine, 1 ounce; water, 6 ounces. (Normal Developer)—Pyro solution, 2 drams; ammonia solution, 2 drams; water, 8 ounces.

Garrison Formula.—Ammonia Pyro Developer.—No. 1.—Pyrogallic acid, 4 drams; bromide potassium, 3 drams; soda sulphite (crystals), 6 drams; water, 5 ounces; sulphuric acid, 30 minims. No. 2.—Strongest liquor ammonia, 6 drams; water, 5 ounces. To develop, take—Solution No. 1, 1 dram; solution No. 2, 1 dram; water, 3 ounces.

Iowa City Potash Developer (No. 1).—Pure water, 96 ounces; sulphite soda, 2 ounces; citric acid, 60 grains; pyrogallic acid, 1 ounce. No. 2.—Pure water, 96 ounces; carbonate potassa, 3 ounces. To develop, take—Nos. 1 and 2, equal parts.

Iowa City Soda Developer.—No. 1.—Pure water, 8 ounces; pyrogallic acid, 1 ounce; sulphurous acid, 1 dram. No. 2.—Water (pure), 64 ounces; pure chloride calcium, 30 grains; when dissolved, add sulphite soda, 3 ounces; carbonate soda, 4 ounces. To develop—Stock No. 1, ½ to 1 dram; No. 2, 2 ounces.

Inglis' Potash Developer.—No. 1.—Water, 12 ounces; sulphite soda-crystals, 2 ounces; citric acid, 60 grains; bromide ammonia, 20 grains; pyro, 1 ounce. No. 2.—Water, 12 ounces; sulphite soda-crystals, 2 ounces; carbonate potash, 3 ounces. To develop, take—No. 1, 1 dram; No. 2, 1 dram; water, 1 ounce.

Johnston's Developer—(Stock Solutions).—No. 1.—Saturated solution sal soda. No. 2.—Saturated solution sulphite soda. No. 3.—Pyro, 1 ounce; water, 10 ounces; citric acid, 48 grains; No. 4.—Bromide ammonium, 120 grains; water, 6 ounces. To develop, take—No. 1, 2 ounces; No. 2, ½ ounce; No. 3, ¾ drams; No. 4, 1 dram.

Kingston Special Ammonia Developer.—No. 1.—Pyrogallic acid, 1 ounce; citric acid, 30 grains; water, 12 ounces. No. 2,—Bromide ammonium, 150 grains; liquor ammonia, 1 ounce: water, 12 ounces. For use—1 ounce No. 1 in 15 ounces of water; 1 ounce No. 2 in 15 ounces of water. Take equal parts for development.

Kingston Special Glycerine Developer.—No. 1.—Pyrogallic acid, 1 ounce; glycerine, 1 ounce; methylated spirits, or water, 6 ounces. No. 2.—Bromide ammonium, 120 grains; liquor ammonia, 1 ounce; water, 6 ounces. For use—1 ounce No. 1 in 15 ounces of water; 1 ounce No. 2 in 15 ounces of water. Take equal parts for development. Clearing solution—Alum, 1 ounce; citric acid, 1 ounce; sulphate of iron, 3 ounces; water, 20 ounces.

Mawdsley and Dumont Potash Developer—(No. 1).—Water, 16 ounces; citric acid, 60 grains; sulphite soda, 4 ounces; pyro, 1 ounce.—No. 2.—Carbonate potash, 2 ounces; bromide ammonia, 40 grains; water, 16 ounces. To develop: take—Water, 4 ounces; No. 1, 3 drams; No. 2, 3 drams.

Monroe Pyro Ammonia Developer for Portraits—No. 1.—Pyrogallic acid, 1 ounce; alcohol, 8 ounces.—No. 2.—Bromide potassium, 120 grains; water, 7 ounces; stronger ammonia, 1 ounce. To develop, take—Nos. 1 and 2, 1 dram; water, 3 ounces. Restrainer:—Bromide potassium, 80 grains; water, 16 ounces.

Monroe Pyro Sulphite Ammonia Developer for Views.—No. 1.—In 64 ounces of water dissolve 1 ounce sulphite of soda, then add 20 grains of citric acid, and lastly 1 ounce of pyrogallic acid. No. 2.—Water, 64 ounces; bromide potassium, 120 grains; stronger ammonia, 1 ounce. To develop, take equal parts of Nos. 1 and 2.

Monroe Pyro Carbonate of Soda Sulphite Developer for Instantaneous Views.—No. 1.—Sulphite of soda (crystals), 4 ounces; hot water, 11 ounces. When dissolved and cool, acidify with sulphurous acid, which will take between 3 and 4 ounces; then add pyro dry, 1 ounce. No. 2.—Sal soda (C.P.), 3½ ounces; sulphite soda, 6 drams; water, 64 ounces. To develop, take 1 dram of No. 1 to each ounce of No. 2.

Nys Belgian Iron Developer.—No. 1.—Neutral oxalate potash, 12 ounces; water, 40 ounces. No. 2.—Protosulphate of iron, 12 ounces; water, 40 ounces; sulphuric acid, 5 drops. To develop, take No. 1, 3 parts; No. 2, 1 part.

Neidhart's Ammonia Developer.—No. 1.—Water, 100 ounces; sulphite soda (crystals), 120 grains; bromide ammonium, 60 grains: pyrogallic acid, 1 ounce; sulphuric acid, ½ dram. No. 2.—Water, 80 ounces; liquor ammonia, 1 ounce; bromide potassium, 180 grains. Use equal parts No. 1 and No. 2.

Rockford Pyro and Ammonia Developer.—No. 1.—Pyro 1 ounce; water, 8 ounces; salicylic acid 6 grains. No. 2.—Water, 8 ounces; bromide ammonium, 50 to 120 grains; concentrated liquor ammonia, 1½ ounces. To develop, take—No. 1, 1 ounce; water, 16 ounces; No. 2, 1 ounce; water, 16 ounces. Use equal parts Nos. 1 and 2.

Pyro and Sal Soda Developer.—.—No. 1.—Pyro, 1 ounce; water, 8 ounces; salicylic acid, 6 grains. No. 2.—Sulphite soda, 1 ounce; sal soda, 2 ounces; water, 15 ounces. To develop, take water, 3½ ounces; No. 2, ½ ounce; No. 1, ½ to ⅓ dram.

St. Louis Pyro and Ammonia Developer.—No. 1.—Salicylic acid, 6 grains; dissolve in alcohol, 1 dram; add water, 6 ounces; pyro, 1 ounce. No. 2.—Water, 7 ounces; sulphite soda, granulated, ½ ounce; bromide ammonium, 380 grains; concentrated liquor ammonia, 1 ounce. A.—Water, 15 ounces; No. 1, 1 ounce. B.—Water, 15 ounces; No. 2, 1 ounce. To develop, take equal parts of the two solutions, A and B.

St. Louis Dry Plate Co.'s Pyro and Sal Soda Developer—No. 1. Salicylic acid, 6 grains; dissolved in alcohol, 1 dram; add water, 6 ounces; pyro, 1 ounce. No. 2.—Water, 60 ounces; sulphite soda (granulated), 1 ounce; sal soda, 1 ounce. To develop, take No. 2, 4 ounces; No. 1, 1 to 2 drams.

Seed Clearing Solution.—After plates are fixed, place them one-half minute in the following solution:—Citric acid, 1 ounce; alum, 1 ounce; sulphate iron, 3 ounces; water, 20 ounces. Then wash thoroughly.

M. A. Seed Iron Developer.—Oxalate of potassium, 1 pound; water, 64 ounces. Fill one gallon jar two-thirds with water. Suspend from the top a bag made of coarse material, the bottom thereof reaching half way in the jar; fill the bag with protosulphate of iron, which soon will dissolve; keep adding iron till some remain in the bag, then you have a saturated solution. Allow to settle, and carefully decant the clear solution. Add 1 drop of sulphuric acid to each 2 ounces. When above solutions are perfectly clear, take one part of iron to six parts oxalate.

M. A. Seed Soda Developer.—(No. 1—Stock Solution).—Water, 6 ounces; citric acid (C.P.), ½ dram. Mix thoroughly, and then add pyrogallic acid, 1 ounce. No. 2—Stock Solution.—Water, 30 ounces; sal soda, 10 ounces*; sulphite of soda (crystals), 10 ounces*. Take of Solution No. 1, 1 ounce; water, 15 ounces. Take of Solution No. 2, 4 ounces; water, 12 ounces. To develop, take equal parts* originally printed sal soda, 4 ounces; sulphite of soda (crystals), 6 ounces, but corrected (?) with rubber stamp and ink.

Stanley Ammonia Developer.—No. 1.—Sulphite of soda, 4 drams; pyro., 4 drams; bromide of potassium, 2 drams; bromide ammonium, 1 to 2 drams; sulphuric acid (C.P.), 30 minims; water, 44 ounces. No. 2.—Concentrated ammonia, 4 drams; water, 32 ounces. To develop, take equal parts of Nos. 1 and 2.

Stanley Soda Developer.—No. 1.—Sulphite of soda, 4 drams; pyro., 4 drams; bromide of potassium, 25 grains; sulphuric acid (C.P.), 30 minims; water, 44 ounces. No. 2.—Sal soda, 2¼ ounces; water, 32 ounces. To develop, take equal parts of Nos. 1 and 2.

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THE INTERNATIONAL EXHIBITIONS.

Antwerp, Buda-Pesth, and London.

When on the 1st of May, thirty-four years ago, the first great Palace of Industry was opened to the public, it was confidently hoped that this gathering of the trophies of a hundred nations would be a great initial step in the inauguration of a new era of international peace, goodwill, and industrial prosperity; but even if the labours of the

Prince Consort have not altogether brought about the full measure of advantage which was predicted by the optimists of 1851, there has been a rich harvest of results. It may be, however, that at the present time International Exhibitions have become too common; and there is no misrepresentation of the truth in saying that not one of the three Exhibitions opened during the past week is in any sense such a complete expositor of the industrial arts of the time as was the first exhibition. Fewer manufacturing processes are actually illustrated, fewer productive processes at work, the tendency rather being to show dead specimens than live processes, and when the means were apparently provided for actual work, it was, even on the opening day, an exception rather than a rule, for real work to be in progress. These remarks apply more or less to each of the exhibitions opened during the past week—that opened at Antwerp on Saturday, that inaugurated at Buda-Pesth on Sunday, and the British Inventions Exhibition, which was the great event of Monday; but perhaps with especial force to the latter.

Although an excellent show is anticipated in the photographic department of the Antwerp Exhibition, the arrangements in this department are so behindhand that it will be better to defer a detailed report for a week or more, and those of our readers who contemplate a trip to see what Belgium can show, had better wait for a few weeks. The Austria-Hungarian Exhibition at Buda-Pesth, opened with very much pomp, ceremony, and show, on Sunday, is of great interest, but more especially on account of the completeness with which it illustrates the agricultural and forest industries of Eastern Europe: there are fine collections of photographic work and appliances, but not much which can be regarded as by any means novel.

In a quiet and unassuming way the Prince of Wales, his Princess, several other members of the Royal Family, and the leading men of the Exhibition Executive, walked through the buildings, and when in the conservatory, the Prince, after listening patiently to a good deal of second-hand information contained in a long and wordy address by Sir Frederick Bramwell, made a few sensible remarks, and declared the Exhibition open.

Entering by the main entrance, one notices a series of some forty distemper paintings round the Entrance Hall, these serving to illustrate the most important inventions of modern times. The baby steam ships, the embryonic locomotive, and the early printing machine, are shown; while the industrial work of the present day is also well exemplified; the Bessemer converter and the steam hammer being, one may take it, thoroughly typical. These works were, we are told, executed under the direction of Mr. H. Trueman Wood by students in the school of art; and they do credit to all concerned, as the lay-figure-like stiffness of the analogous designs which decorate the exterior of the Albert Hall is noticeably absent, and the paintings have a pleasing aspect of reality. Much has been done to improve the general arrangement, although it is in the main that of the Fisheries and the Health Exhibitions. New buildings provide additional space, and in several cases partitions have been removed so as to afford larger areas for the eye to comprehend at one time.

Not only in the photographic section, but also in several other departments, will much be found to interest our readers; and we may fairly assume that every readers who resides in London, or who can conveniently visit the metropolis during the next six months, will not fail to see what South Kensington has to show.

The historical collection of the Photographic Society is one of the most interesting exhibits, and it comprises specimens illustrating photography from its birth. Early photographs by Nièpce on metal plates, Daguerreotype apparatus and specimens, and examples of Talbotype are to be found. There is a copy of the first book illustrated by photography. Talbot's pencil of nature, and a reproduction from this—a photograph of Talbot's own house—is our supplement of this week. Besides the above-mentioned, there are specimens serving to illustrate most of the discoveries which have made photography what it is.

In the printing department will be found many exhibits bearing upon photography — photo-mechanical printing methods, and methods of printing more or less applicable to photography being well to the fore, while in the American department is a case illustrating the the Ives block process; and among the philosophical instruments (group xxvii.) the optical appliances used by the photographer are to be found.

In group xxix. photography is very well represented, although we find but little that has not been more or less completely described in the Photographic News. This week we give as complete a list of exhibits in this department as circumstances will allow, and next week we shall make some comments on the individual exhibits.

Edward Dunmore, Sunnycote, South Hill Park, Hampstead Heath, London, N.W.—A Landscape Photograph, taken entirely by lunar light in a London suburb. E. W. Foxlee, 22, Goldsmith Road, Acton, London, W.—The effect of moisture and heat in carbon printing. J. P. Mayall, Park Lane Studio, London, W.—The application of a single lens to life-size portraiture. The Woodbury Permanent Photographic Printing Co., 157, Great Portland Street, London, W. — Woodburytype. Woodbury, Treadaway, and Co., Limited, 116 and 117, Great Saffron Hill, London, E.C.—(1) Stannotype Photographic Printing Process; (2) Woodburytype; (3) Stannotype; (4) Photo Filigrane; (5) Metallic Embossing by Photography; (6) Burning Designs by Photography; (7) Photo-Chromography; (8) Woodbury Lantern Slides; (9) Woodbury Photometer; (10) Balloon Photography; (11) Photo-Gravure. Paget Prize Plate Co., Castlebar, Ealing, W.—Gelatino-bromide of silver Dry Plates for instantaneous photography. J. W. Swan, Bromley, Kent—(1) Improvements in photography; (2) Producing Printing Surfaces and obtaining prints therefrom; (3) Photographic Engraving; (4) An Improved Photographic Process. Arnold Spiller, 2, St. Mary's Road, Canonbury, London, N.—Gelatino-chloride of silver Transparencies, developed with Hydroxylamine. L. Warnerke, Silverhowe, Champion Hill, London, S.E.—(1) Various Photographic Processes based on the newly discovered property of the gelatine emulsion; (2) The new Photographic Shutter; (3) Sensitometer. Morgan and Kidd, Kew Foot Road, Richmond, Surrey—Argentic Gelatino-bromide Process, as applied to enlarging on paper, porcelain, canvas, &c. The Platinotype Co., 29, Southampton Row, High Holborn, London, W.C.—The Platinotype Process for photo-chemical printing. F. W. Hart, 8 and 9, Kingsland Green, London, E.—(1) Celluloid Trays or Dishes for developing, and other uses in photography; (2) Photographic Camera; (3) Tripod Stand; (4) Plate Holder; (5) Washing Trough; (6) Magnesium Light Machine; (7) Photographic Pavilion or Portable Studio. Henry Van der Weyde, 182, Regent Street, London, W.—(1) Illuminating artificially objects to be photographed; (2) Improvements in producing vignetted negatives. Archer Clarke, St. John's Cottage, Wandsworth, London, S.W.—(1) Metal Press for emulsion work; (2) The Harrison-Clarke Bijou Camera; (3) Packing Machine for gelatine and other dry plates. T. Samuels, Linden House, Hadley, Barnet—(1) Apparatus for holding dry plates or films before, during, and after exposure, and for changing them in the photographic camera; (2) Improvements in photographic cameras. Marion and Co., 22 and 23, Soho Square, London, W.; and J. Cadett, 84, Grove Lane, Camberwell, London, S.E.—(1) Recent Photographic Apparatus; (2) New or Improved Pneumatic Arrangements for facilitating the uncapping or exposing, and capping or shutting the lenses used in apparatus for depicting persons or objects by photographic means. C. Cusworth, 30, Ellington Street, London, N.—Complete Portable Photographic and Signal Apparatus, and Electric Light Elevators. A. G. and J. Hopkins, Hoddesdon—Simplex Slide and Reversible Camera Back. C. T. Collins, 56, Cochrane Street, N.W.—Improved Photographic Apparatus. George Shaw, 3, Cawley Road, E.—Instantaneous Shutter, and marine views taken with same. S. B. Goslin and W. S. Attwood, Chase Side, Southgate, N.—Improved Dark Slide Cameras. G. E. Barker, High Road, Chiswick, London, W.—Photographers' Electric Light Apparatus. Edmund G. Ganly, 11, Victoria Grove, Kensington Gate, London, W.—A Retouching Machine, and improvements in camera apparatus. G. Hare, 26, Calthorpe Street, Gray's Inn Road, London, W.C.—Photographic Apparatus. Sands and Hunter, 20, Cranbourn Street, London, W.C.—Photographic Apparatus. J. F. Shew and Co., 88, Newman Street, and 132, Wardour Street, London, W.—Photographic Shutter, and various other photographic specialities. J. Swift, 81, Tottenham Court Road, London, W.—Photographic Apparatus, Microscopes, and Microscopical Appliances. Leonard Atkinson, 285, Brockley Road, London, S.E.—Improved Apparatus for micro-photography. S. Lee Bapty, 65, Blackheath Road, Greenwich, London, S.E.—Photographic Enlarging Apparatus. T. Furnell, 1, Matlock Villas, Lordship Lane, East Dulwich, London, S.E.—An Adjustable Instantaneous Shutter for photographic purposes. G. Houghton and Son, 89, High Holborn, London, W.C.—Modern Improvements in photographic apparatus. S. W. McKellen, 18, Brown Street, Manchester—Photographic Apparatus. London Stereoscopic and Photographic Co., 54, Cheapside, and 108 & 110, Regent Street, London, W.—(1) Various Photographic Apparatus for amateur use, showing the latest improvements; (2) Frames containing views taken by amateurs; (3) Specimens of Woodburytype, showing its application to commercial purposes; (4) Specimens of Carbon Photographs as an advertising medium; (5) Carbon Photographs on opal. W. W. Rouch and Co., 180, Strand, London, W.C.—Photographic Apparatus. Reynolds and Branson, 14, Commercial Street, Leeds.—The Phœnix Photographic Shutter. F. W. Monsell, Eglantine, Leeson Park, Dublin.—Circular Drop Shutter. William Ouin, 4, Laurel Cottages, Waverley Road, Parke Lane, Tottenham, Middlesex.—A Drop Shutter for taking instantaneous pictures of moving objects. Newton and Co., 3, Fleet Street, London, E.C.—(1) Patent Enlarging Lantern for photography; (2) Improved Photographic Ruby Lanterns. William Middlemiss, Holmfield Mill, Thornton Road, Bradford—Improvements in photographic apparatus. Photographic Artists' Co-operative Supply Association, Limited, 43, Charterhouse Square, London, E.C.—(1) "Poesa" Camera; (2) "Smith's" Camera; (3) "Charterhouse" and "Uranium" dry plate. W. G. Honey, 3, High Street, Devizes—An Improved Holder, and dark slides to be used therewith for sensitive plates. C. Green and L. V. Fiidge, Ivy Cottage Stratford-on-Avon—Patent Actinometer. H. Garside, 21, Cannon Street, Manchester—An Improved Method of producing surfaces for mechanical or ink printing. W. Bernstein, 72, Finborough Road, South Kensington, London, S.W.—Photopeinture. Norman Macbeth, Victoria Foundry, Bolton—Process for producing printing surfaces on blocks by means of gelatine photo-reliefs. A. L. Henderson, 49, King William Street, London, E.C.—Ceramic Enamels. T. James, 32, Great George Street, Liverpool—Elastic Photo-Printing Blocks for typographic press. B. J. Sayce, Redcross Chambers, Liverpool—The Collodio-Bromide Process.

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PHOTOGRAPHING WITHOUT FOCUSSING.

The conditions under which one can ensure a reasonable degree of sharpness (disc of confusion less than $\frac{1}{100}$th of an inch) have been worked out by a committee of the New York Amateur Society (Messrs. Dean, Janeway, and Metcalfe), and the following is their report.

To those who are using detective cameras, or taking "snap" shots, the following table will be of use, showing the number of feet beyond which everything is in focus when the equivalent focus of the lens and the relative diameter of the stop are known.

Equiv. Focus equals	Stop. f/5	Stop. f/10	f/15	f/20	f/25	f/30	f/40	f/50	f/60
2 in.	7	3½	2¼	2	1½	1¼	1	7/8	3/4
2½ „	10½	5½	3½	3	2⅛	2	1½	1¼	1
3 „	15	8	5	4	3½	3	2	1¾	1½
4 „	27	14	9	7	5½	5	3¾	3	2½
5 „	46	21	14	11	9	7½	6	4¾	4
6 „	60	30	20	15½	12½	10½	8	6½	5½
7 „	82	42	27	21	17	14	10¾	9	7½
8 „	107	54	36	27	22	19	14	11	10
9 „	137	68	45	34	28	23	18	14	12
10 „	167	84	55	42	34	30	21	18	15
11 „	202	101	67	51	41	37	26	21	18
12 „	241	121	80	61	49	41	31	25	21
13 „	283	142	94	71	57	48	37	30	25
14 „	328	164	109	83	66	56	42	34	29
15 „	376	189	125	95	76	64	48	39	33

As no two makers number their stops alike, and some do not number them at all, it is desirable to designate their stops in terms of the focal length of the lens. As an example of how misleading the information is obtained by giving the number of the stop, we would refer to the Dallmeyer lenses: Stop No. 3 in lens 1A is equal to $\frac{f}{35}$; stop No. 3 in lens 3D is equal to $\frac{f}{128}$.

Here are the stops of the same number, in lenses by the same maker, and yet one requires eight times the exposure of the other. We are confident that the small amount of trouble caused by designating our stops in terms of *f* will be amply repaid by the aid it will give us in obtaining correct exposures.

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THUMB-NAIL NOTES.

(The Royal Academy.)

The private view of the Royal Academy was strangely photographic. All the celebrities of the day, whose photographs stare at one from the shopwindows, were present, and the public must have blessed the camera which enabled them to find out Mr. Gladstone, Mr. Toole, Mrs. Langtry, Miss Anderson, and a host of others more or less known to fame, so easily. As for the pictures, criticism on that day was impossible. Still, one fact was very significant. While locomotion in all the rooms was difficult, the crowd before any one picture was not denser than the general throng. In other words, the Exhibition contains no paintings which stand out beyond the rest and compel attention—unless it be the works of Mr. J. R. Herbert, R.A., which for badness go beyond what even that veteran painter of mediocrities has hitherto produced. Mr. Herbert has contributed seven canvasses, all of which are of considerable size, and nearly all hung on the line. One feels, when standing before Mr. Herbert's works, the futility of criticism, and can only regret that so much valuable space is not better occupied, and wonder who it is that buys such feeble productions. With the pictures of Mr. Ouless and Mr. Holl there is no mystery on this last point. Portrait painting is the only branch of art which at the present moment pays, and Mr. Ouless and Mr. Holl do not work without a commission. But why should an unoffending public be compelled to gaze at the uninteresting faces of a Regius Professor of Greek, a bishop in his lawn, a very ordinary clergyman, and two doubtless estimable but obscure private gentlemen which Mr. Ouless gives us? Mr. Holl is a little better, since he numbers Lord Dufferin, the late speaker of the House of Commons, and Mr. Wilson Barrett in his list; but then he overweights them with the portraits of a Cambridge tutor, a Philadelphia doctor, a bishop, a private gentleman, and a general scarcely known out of the Army list: eight portraits by one R.A. Surely this is stretching a privilege too far! On second thoughts, though, I do not object to the portrait of the general. It points a moral. Mr. Holl evidently had to deal with a very large and a very red nose. We may believe that he did his best with it; but, in the interests of truth, he couldn't do otherwise than paint the nose red. In such a case, photography has an advantage. Had the general been photographed, his nose would probably have appeared in shadow, but it would not have been red.

It is pleasant to turn from these uninteresting pictures to Mr. Herkomer's portrait of Miss Katherine Grant. This is worthy the notice of photographers because it suggests what can be done with a very light background. Since the late Adam Solomon started the fashion of dark backgrounds, forcible lighting, and deep shadows, photographers seem to have been afraid of attempting anything else. The background in Mr. Herkomer's picture is lighter than the face. The figure is placed close to the background, and a shadow on the latter thrown by the head gives a wonderful effect of force and brilliancy. Too many photographs admirable in the lighting of the head have a monotony about them from the even and shadowless backgrounds. Experiments with lighter backgrounds than at present favoured, might be worth attempting.

Of Mr. Millais' charming picture of "The Lady Peggy Primrose," it is only necessary to say that it is in his happiest vein. A curious contrast is a companion picture of "The Lady Sibyl Primrose," by Sir Frederick Leighton. The doll-like prettiness of the latter and the complete naturalness of the former are very characteristic. One child is of wax, the other of flesh and blood. The portraits of children in this year's exhibition are very numerous, and one tires of coming across such announcements as "Cecil and Adela, daughters of" this, or "Sarah, daughter of" that. It is odd, too, that parents seem to prefer to have their girls painted rather than their boys. Mr. Sant, R.A., of course is responsible for a good many of these children's portraits, but Mr. Sant's work is of a past age, and is precisely of the kind that photography has done so much to improve. One of Mr. Faulkner's photographs of children is worth half-a-dozen of Mr. Sant's pictures for absence of staginess and fidelity to nature.

But monotonous as these portraits of children become, they are not such offenders as are such huge monstrosities as Mr. John Collier's portraits of "Sir Thos. Boughty, Bart., and Lady Boughty." The "Bart," arrayed in a bran new hunting coat of the most startling red, is standing on a flight of stone steps, and a very plain lady is just within the doorway. At the feet of the "Bart" is a foxhound. They are all painted life-size, and the picture cannot cover less than a hundred square feet of wall space. A finer specimen of the penny plain, twopence coloured, order of art has not been seen at Burlington House.

The portraits of Mr. G. F. Watts, Mr. Long, Mr. Pettie, and Mr. Orchardson exhibit the peculiarity of each master. Mr. Watts has only one picture, an exceedingly fine portrait of Miss Laura Gurney (No. 201). In Mr. Long's eyes all flesh is of a dusky creamyness, possibly through his assiduous study of Eastern beauty; and in his portrait of Miss Fleetwood Wilson he has not been able to rid himself of this notion. One is apt to get tired of Mr. Long's low tones. Mr. Pettie's prediliction is towards a bilious sallowness, and if his Mr. J. G. Orchar (No. 185), and Mr. John Garrett Martin, be truly represented, both are suffering from a liver complaint. Mr. Pettie's capital pictures "Challenged," and two subjects from the "School for Scandal," are free from this peculiarity. Mr. Orchardson favours a greenish-yellow tone; the green predominates in his portrait of Mrs. Ralli, and the yellow in his picture "The Salon of Madame Recamier." Mr. Orchardson's pictures, I fancy, would not photograph well. In some notices of the Academy "The Salon of Madame Recamier" is placed as the picture of the year. Undoubtedly the grouping is good, and painting brilliant, but it is notable only as a collection of portraits. The artist seems to have felt this, for he has had the names of the principal personages placed on the frame under each figure. So far from suggesting the wit and repartee associated with Madame Recamier's assemblies, Mr. Orchardson's picture only conveys an impression of dullness.

The best pictures at the Academy are, of course, not the portraits, but the latter are challenged by photography more directly than are the landscapes and works of imagination. Looking round the walls with their 150 portraits, of which scarcely a dozen can be said to be really interesting, I could not help thinking of Mr. Glaisher's lament that portraiture has been so sparsely represented at the photographic exhibitions of the past few years. With the efforts of the Royal Academicians before me, I felt grateful to photographers for their forbearance. Only men of the highest genius, whether painters or photographers, can make portraits acceptable, and the photographer has the advantage of the painter, because he has a better chance of securing a correct likeness, which, after all, condones a good many faults in other directions. Mr. J. D. Linton's "Marriage of H. R. H. the Duke of Albany, K.G.," painted for her Majesty, is a capital example of shortcoming in this very essential point. The painting consists entirely of portraits, and no doubt Mr. Linton has been largely assisted by photographs; but how oddly he has contrived to miss the likeness in his drawing of the Queen and the Princess of Wales, while that of the late Archbishop of Canterbury is positively absurd! A curious characteristic of portraiture is, that if it be not faithful, it immediately caricatures. Dr. Tait is saying complacently, "There, I think I've done this business pretty smart!" as plainly as paint can make him. The Prince of Wales is decidedly dissatisfied, and is half inclined to insist upon the ceremony being performed again. The Duke of Cambridge is evidently tip-toeing so as to get a better look of the young couple who seem to be remarking, "Yes, here we are, what do you think of us?" The rest of the crowd are hopelessly bored; while one lady who is making a curtsey is agonised by the thought that the court functionary behind her has got his foot on her train. The whole picture is intensely absurd.

The rest of the paintings must be dismissed in a few lines, since they do not come within the scope of this article. Mr. Marcus Stone's "A Gambler's Wife," Mr. Yeames' "Prisoners of War," Mr. H. Stacy Marks' "A Good Story," the "Una Limosnita por el Amor de Dios" of Mr. J. B. Burgess, Mr. W. P. Frith's "John Knox at Holyrood," Mr. E. Long's "Love's Labour Lost," Mr. Alma Tadema's "A Reading from Homer" (the wonderful painting of the marble is more photographic than photography), Mr. P. Calderon's "Andromeda" (never was seen such blue water as Mr. Calderon has here), Mr. H. Garland's "Waiting for a Breeze, Southwold," Mr. Fildes' "Venetians," Mr. Poynter's "Diadumené" (a nude figure with somewhat short legs), Mr. E. Blair Leighton's "The Secret" (a very powerful picture of a dying man whispering in the ear of a monk), are a few of the more notable works. Mr. Colin Hunter, by the way, should study photographs of wave effects. His curly, yeasty seas, arranged in parallel lines, are becoming intolerably monotonous.

To the majority of the outsiders, it can scarcely be said that justice has been done. Their pictures have either been skyed, or placed so low that they cannot be seen without going on one's knees. In justice to the hanging committee, however, it must be said that a whole host of small pictures appear to have been hung for no other purpose than because they happened to fill a particular space, and the committee have succeeded in doing this very well.

Wide-Angle.

POSITIVES ON GELATINO-CHLORIDE OF SILVER.

BY W. M. ASHMAN AND R. OFFORD.

Fourth Article.

As we have now shown the manner by which emulsions may be compounded satisfactorily, we will crave the reader's indulgence for a little space in the present article for the consideration of some of the strange peculiarities attending the preparation of mixed emulsions. Doubtless, the uncertainty may be attributed to the presence of chloride and citrate, or other molecules attacking the nascent silver at the same moment. In accordance with certain laws of physical chemistry, we are led to expect that the known affinity of silver nitrate for chlorine would be greatly in excess of that displayed towards many other substances of a more or less organic nature, and that by following up this mode of reasoning we should conclude that the whole of a soluble haloid would be converted into silver haloid before any organic silver salt could be formed. Were we dealing with simple aqueous solutions, it is probable that this explanation would be the true one, since it is capable of verification by means of a voltaic arrangement.

When, however, a viscous liquid of considerable density enters into the calculation, the internal resistance so offered may, nay does, exercise an influence: hence it is that when gelatine is present, the more likely theory would be that the molecules become heterogeneously mixed, and a molecule of silver nitrate seizes upon its nearest neighbour, whichever that neighbour may happen to be, and thus we obtain a number of such molecules of two or more compounds indiscriminately suspended within the walls of our viscous medium-gelatine. Against this supposition we are confounded with the practical difficulty experienced when attempting to suspend certain of the organic silver salts, whereby for some unexplained reason (probably increased gravity) the salts quickly precipitate, and this is further augmented by the application of heat, which also tends to reduce the silver to the metallic state.

To any one meditating a few experiments with the organic salts of silver, we should recommend the following as an introductory step, tending as it does to somewhat modify many generally accepted ideas in regard to the behaviour of these salts in the light, and pave the way for further investigation. Take five two-ounce test tubes, or beakers (wine glasses will do equally well), and place half an ounce of distilled water in each, adding to the water some silver nitrate—say one gramme to the first, and half a gramme to each of the other four. When this is dissolved, weigh out sufficient of the following five salts to throw down the silver in each glass, leaving just a trace of haloid in excess.

Into the first vessel place sodium chloride; the second, potassium or ammonium citrate; the third, potassium oxalate; the fourth, double tartrate of potassium and sodium (Rochelle salt); the fifth, sodic tungstate. There are others that might be added, but these will suffice for illustration of an instructive experiment. Let the operation be conducted in yellow light, such as that given by "golden fabric," and wash the precipitate by decantation; namely, when the precipitate has settled, pour off as much of the water as may be conveniently done without losing the precipitate, refill the vessel with water, and again pour off as much as possible. Take a half-plate—opal by preference—and place it on a very hot piece of slate, plate-glass, or other slab for the purpose of keeping it warm enough to liquefy the gelatine used. Have ready a little moderately strong solution of gelatine in a liquid state; beginning with the first beaker or other vessel, take some of each precipitate, and place each portion on the opal glass in the same order they are taken. Repeat this in another row across the glass, adding to each quantity of the precipitate a drop or two of hot gelatine solution, and well mix with separate strips of glass or stirring rods. Then form a third row consisting of portions from the second, third, fourth, and fifth vessels, to each of which has been added a larger quantity out of the first, as well as a few drops of warm gelatine solution.

Let these all be mixed up well as before, and the experimenter will then have three rows, the first showing plain silver chloride, citrate, oxalate, tartrate, and tungstate; the second presenting the same salts mixed with an organic substance—gelatine; and the third intending to demonstrate the effect of mixing silver chloride with each of four other silver salts that are affected by the action of light. In the fourth and last row of four portions let the chloride (first vessel) be mixed with the others as near as possible in the proportion of four to one. Take the opal plate so prepared into a bright light and watch the printing action carefully, noting the order in which each portion begins to discolour, and the ultimate density presented by them all after an exposure of, say, half an hour. The organic salts will soon be placed in their proper order of sensitiveness and density.

In our second article, contained in the Photographic News of March 6th last,* mention is made of a number of silver salts upon which we had experimented some months before. Among them silver tartrate appears, and as that substance has been recently formulated for use in printing, it is well that we should refer more in detail to our experiments on the subject. The great difficulty in the employment of silver tartrate is its refusal to emulsify by ordinary means. If a tartrate salt, such as neutral potassium tartrate (soluble), or the double tartrate of potassium and sodium, is mixed with gelatine, and silver added, a very slight precipitate is produced, which, long before setting point, has all settled at the bottom, leaving almost a clear jelly. This jelly contains silver, as shown by the colour indicator, but cannot be said to be an emulsion as we understand one in modern photography; whether little or much excess is employed, the results are always the same. The acid in the gelatine causes cream of tartar to be deposited in a small quantity, and this, mixed with a little silver tartrate, may be removed from the bottom of the mixture when set.

Vigorous printing being a characteristic of tartrate of silver in gelatine, we were anxious to overcome its disadvantages, and were a long time before we could obtain a proper white emulsion of this kind; but we succeeded at last in the manner which we propose to explain. If the salt in question be precipitated in water, the p.p. so formed is too coarse for our purpose, but still it can be suspended in gelatine, and an emulsion may be thus formed. Heating the precipitate changes it to a brown colour, and produces the effect seen in mirror manufacturing, the bottom of the beaker or other glass vessel representing a mirror of metallic silver. As in other organic preparations of silver, the heat must be kept down to the lowest degree at which the gelatine can be liquefied, and as very little heat is capable of depositing the silver, this plan becomes necessarily useless. Our experience led us to suspect the potassium salt as being the cause of the inability to produce a satisfactory emulsion, so we tried another salt alone, and with success.

In 40 c.c. of distilled water we dissolved ·8 gramme of tartaric acid. This we neutralized with ·6 gramme of sodium bicarbonate. (Some care must be observed in this experiment that the carbonic acid liberated is not mistaken, by its effect upon litmus paper, for free tartaric acid. To obviate this tendency in some measure, the liquid should be violently agitated and heated up once or twice, when most of the CO_2 will escape. The solution should then be made just faintly acid.) We then added 1·4 grammes of 1·4 hard gelatine (previously soaked in water), and melted at as low a temperature as possible to secure perfect solution: into this we placed 1 gramme of silver nitrate, stirred vigorously, and at once produced a white emulsion. The mixing vessel was quickly transferred to a basin of cold water, and the stirring continued for a few minutes, when setting commenced, and a satisfactory result was so far obtained.

Silver tartrate emulsion, formed as above, is available for mixing with a silver chloride emulsion, in a proportion suited to taste or requirements; one part to five of chloride, or one part to four of chloride answers well.

We have no doubt that in cases where the gelatine refuses to hold the silver salt in supension in the form of a white precipitate, some organic compound, not hitherto chemically defined, is produced in conjunction with the gelatine itself; otherwise, how is it the precipitate, if prepared in water, can be made to form an emulsion by the addition of gelatine and the application of heat. And we are further inclined to the opinion that this change is brought about chiefly through the intervention of a potassium salt, the same effect being sometimes noticeable when using potassium citrate in excess.

It is quite probable that rapid stirring during setting tends to produce a whiter emulsion (a *sine quâ non* for either opal or paper) than would be obtained if the mixture were only slightly agitated; however, this is a matter which can be definitely tested. That certain white compounds are obtained in this manner is a fact of which we are well aware, and it was long ago observed by druggists in the preparation of cold cream and other similar substances; although its application in the present instance may be novel, it is none the less worthy of attention, and before closing this series of articles we shall be in a position to speak with greater certainty upon the subject.

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* Page 149, vol. xxix.

Glass, opal plates, and similar surfaces prepared with a compound emulsion in which silver tartrate is present to any extent, exhibits considerable roughness when dry, irrespective of the manner such combination is brought about. Washing the emulsion for a considerable time does not remove this tendency, while it seriously impoverishes the vigour of the image so obtained, as it does, in fact, in all cases where the organic silver compounds are blended with a chloride emulsion. Curiously enough, however, the roughness of surface here spoken of is not so marked when a similar emulsion possessing this characteristic is spread upon paper, irrespective of the presence or absence of any preliminary substratum the paper may have received.

Taking all things into consideration, we fail to recognize any distinct advantage in the use of the tartrate salts, finding, as we do, that a formula such as the following not only yields the finest possible results on glass, either for transparencies or opals, but can also be spread upon paper, and is in that condition equally amenable to the production of good work. The formula does not materially differ from a previous one we have given; but the method here shown of forming the organic salt has its advantages over the employment of a more or less suspicious-looking crystal, such as the commercial article usually appears.

To make the plain chloride emulsion, we take:—

Gelatine...	3 grammes
Ammonium chloride	·64 ,,
Distilled water	33 c.c.

Warm sufficiently only to ensure solution and mixture, then add—

Silver nitrate	2 grammes
Dissolved in distilled water ...	10 c.c.

Upon testing this emulsion in the manner previously described on page 150, it is found that there is an absence of free silver.

The citrate emulsion is then made as follows:

Gelatine	3 grammes
Distilled water	30 c.c.

Dissolve with gentle heat as before; then add:—

Liq. am. fort ·880	1 c.c.
Citric acid	2 grammes in 10 c.c. of water, or sufficient acid to neutralize the alkali.

Finally we add:—

Silver nitrate	2 grammes
Distilled water	5 c.c.

These proportions are calculated to leave a slight excess of silver. Mix as directed on page 245. The emulsion is then set, and washed in two or three changes of water, the duration of soaking being, as heretofore, five minutes.

The citrate emulsion is then filtered and blended with the chloride emulsion in proportion to the necessities of the work in hand. As a general rule, the proportions we have previously mentioned—viz., one of citrate to four of chloride—may be adhered to; and when larger quantities are employed than those herein stated, it may be found judicious to add an antiseptic, such as thymol in alcohol.

Ammoniacal fuming does not appear at any stage to confer distinct advantages upon gelatine films prepared as described. When an emulsion is of such a character that the action of light produces a red image, then fuming modifies the colour somewhat, and a bluer image is the result; the finished print, however, has not gained anything as regards rapidity or quality, such as we are wont to get when dealing with ordinary printing on albumen; but, on the contrary, such prints appear to lose a good deal of the colour obtained by toning when the operation of fixing takes place, and unless the toning be carried to the stage of bleaching, the films yield images of a yellowish brown colour. Therefore, if a bluish image is considered preferable, such can be more easily obtained by varying the proportion of the organic compound in the manner we have already shown.

Images fixed without toning do not present an agreeable colour such as the majority of persons are accustomed to admire; for this reason, as also in the parent process, collodio-chloride, to produce an attractive result the films must be subjected to the influence of a toning bath.

In seeking for a special toning formula, our experiments have covered a wide range, the result of which may be reduced to a small field, consisting of two or three competitors only—viz., the Maxwell Lyte borax bath (sodium acetate and calcium), and the thiocyanate. Either of these forms of gold toning is suited to work with the formulæ already published, and, as a general rule, will give satisfaction when used. In the event, however, of a film proving refractory in the first named, it may invariably be finished in the last, and often this treatment is to be commended. From our remarks regarding the formation of the sensitive molecules at the commencement of this article, it will be gathered that such films of gelatine do not present the same facilities for toning as are found with collodion and albumen. The upper strata alone receive a deposit of metallic gold unless an agent be employed capable of penetrating the gelatine film and neutralizing any acid contained therein, as well as rendering inert the restraining influence of chlorine or the soluble chloride, citrate, and other salts. By washing the prints in three changes of water, a certain amount of silver in conjunction with the soluble salts which have not been acted upon by light can be abstracted; notwithstanding the fact that the emulsion, previous to coating, shall not, by the colour test before mentioned, show the presence of uncombined silver. As these salts are not beneficial to toning action, but, on the contrary, are detrimental to the toning bath, we recommend a thorough washing.

Further, by soaking the prints in dilute acid solutions, common salt, acetate of soda, &c., toning action is, to a considerable extent, impeded; but a similar treatment in alkaline solutions is found to be favourable to toning. Thus, in the case of an emulsion similar to the above, we should wash the prints to the extent generally adopted with silver prints upon albumenized paper, then transfer them to an alkaline bath composed of—

Bicarbonate of soda ...	10 grammes
Water	1,000 ,,

and move them about in this solution for five minutes, after which we should wash them in two changes of water, and pass them into the borax bath above mentioned, which, if used freshly prepared and of the strength here given, will be found to yield satisfactory tones with less than ten minutes' action, a result unattainable if the bicarbonate of soda bath has not been employed in the manner directed. We make a stock solution in the proportion of one part of borax to eighty parts of water, and of this we use ·1 gramme or ·15 grammes of gold trichloride to each litre of the borax solution.

Either of the mixed emulsions we have formulated, tone well in the baths above mentioned; but when dealing with plain acid chloride emulsion we prefer to employ the thiocyanate of gold toning method, following it with a few minutes' soaking in a plain two per cent. solution of ammonium thiocyanate previous to fixing in the usual sodium thiosulphate (hypo) bath, the strength of which latter need not exceed ten per cent. of the fixing salt. Ammonium thiocyanate is of itself a fixing agent, albeit a slow one, and when used in conjunction with gold, acts similarly but preferably to the mixed hypo and gold toning bath; moreover, if the toning be followed by soaking in a plain solution of the salt, it has the property of clearing the whites and securing the colour from further change when submitted to the hypo bath. We do not, however, advise the use of ammonium thiocyanate in the case of mixed emulsions that will tone satisfactorily with borax.

Coating paper will be dealt with in our next article.

Notes.

How nearly have some of the dreams of the middle-age romancers been realised! The mirror that reflects the past, and also images current events in distant regions, is a reality of our day. Now, it is only the recently past which we find reflected from the silvered plate of the photographers; but if the developed New Zealander of Macaulay is to look from a bridge-pier upon by-gone London, he may take from his pocket a photographic reflection, showing the glories of the hundred and eighty-eighth decade: he may look at the dense traffic as it once passed, in two contrary streams, over the bridge.

Among the oldest of the reflections from the magic mirror of the camera is the picture of Lacock Abbey, the residence of Fox Talbot. "This is," says the father of photography in England, "the first building that was ever yet known to have drawn its own picture."

The original from which our supplement of this week is copied, was published in Talbot's *Pencil of Nature*, forty-one years ago—in 1844. It is in far better preservation than might have been expected, having rather become partially yellow than actually faded; but the yellow portions have photographed nearly as well as those parts that retain the original purplish tone.

The circumstance that, with comparatively few exceptions, the photographs now made are fugitive, and will be completely gone in a few years, suggests the need of some organisation for preserving those photographs which may be useful to future generations. Perhaps the following would be a practicable scheme.

Just as a copy of every book or journal must be sent by the publisher to the British Museum, let it be a law that a copy of every published photograph must be sent to the Museum. Those in charge would then judge of the relative importance of the subjects sent, and those worthy of being preserved could be grouped on a screen, and each group copied on a tolerably large plate—say 24 by 18 inches. From each negative thus obtained a carbon print (or perhaps two) should be made, after which the negative could be cleaned off the glass. If a photographic department were organised at the Museum to do this work, and it were necessary to make ten or twenty reproduced sheets a day, the expense would not be enormous.

All the various developers enumerated on page 289 are more or less adapted to every kind of gelatino-bromide plate, and the experimenter may learn much by trying the various formulæ given.

A correspondent dating from Cork, writes:—"The Handel Festival this year at the Crystal Palace will be of especial interest, as it is the bi-centenary of the great composer's birth. Now would it not be a graceful thing if the Crystal Palace directors had the great orchestra with its 3,000 singers and instrumentalists photographed as a memento of the occasion? The feat would be an easy one, and the cost of reproduction by Woodburytype very small. If a gratis photograph were to accompany each ticket, I think it would be an inducement to the public to purchase." Unquestionably; but would our correspondent kindly explain how a photograph of the Handel Festival is to be obtained *before* the festival takes place? Otherwise, the difficulties attending his proposition of presenting a photograph with each admission ticket are, we fear, insurmountable. Photograph the orchestra by all means, and the audience too, for the matter of that. Both would make effective pictures. Messrs Negretti and Zambra some years ago made several pictures of the orchestra, but these were of course by the collodion process. With a gelatine plate some very curious results might be obtained. Mr. Joseph Maas, for instance, in the act of producing the upper A from the chest in "Sound an Alarm!" He will probably sustain the note seven or eight seconds, quite long enough for the exposure in such a well-lighted place as the Crystal Palace.

The *Lady's Pictorial* makes the old suggestion of a tax on photographs as one means of enabling the Chancellor of the Exchequer to tide over his financial difficulties. We presume that the principle on which this proposal is based is that luxuries should be taxed rather than necessities. If so, how would our contemporary like a tax on fashion plates?

Mr. G. J. Burch focussed an image of the sun on the flame of a paraffin candle, and the spot of light thus produced looked like that obtained by focussing the sun upon such a fluorescent body as petroleum or a solution of quinine sulphate; but a spectroscopic examination shows the difference, as the solar light reflected from the flame showed the Fraunhofer lines, but the light from the fluorescent liquid gave a continuous spectrum.

In the *Lancet* of last week one finds a series of phototypic reproductions of handwriting which are both instructive and suggestive. They show the effect of treatment in curing "writer's cramp," and indicate how the writing of patients gradually improved from an illegible scrawl as the affection became cured.

More than this, the influence of a slight disturbance of the general system is clearly indicated in one of the series by a retrogression in the steadiness of the writing.

The question suggests itself whether the handwriting, if rightly interpreted, might not give in some sense a life history of an individual; and, just as by an inspection of the finger nails one may trace out the order and severity of recent disturbances of the system, it may be that if a series of samples of handwriting were presented to the physician he could gather much valuable information. The ease with which samples of writing can be reproduced and widely distributed by photography should make the matter well worth the attention of the medical world.

The *Graphic* has only just discovered that "most of the gum-arabic of commerce comes from the Soudan," and that "a gum-arabic famine is likely to be one of the minor troubles" in that district. This consequence of the Soudan war was pointed out in these columns two years ago.

On Wednesday, May 6, a highly interesting selection of ethnographic photographs from the collection of the Anthropological Institute was exhibited at the *soirée* of the Royal Society in Burlington House. They consisted chiefly of large portraits of Russians, Kalmucks, Red Indians and Half-breeds, and Hindus, together with some composite photographs of skulls of different races, made by Dr. Billings, Surgeon-General of the United States. Besides these, were albums full of photographs of dwellings, implements, ornaments, &c., of many savage races. Many of the best photographs had been given by Prince Roland Bonaparte. Such a valuable collection as this shows how effectually any photographer may contribute towards anthropological research.

The exhibition of photographic and other automatic engraving processes which was to have been held this month, has been unavoidably postponed. The promoters did not calculate upon the competition which the scheme has excited, and as the exhibition is to be an international one, much time has been taken up by the transmission of the six subjects to be copied. It is an imperative condition that the competitors should deal with the same subjects, and there are twenty competitors representing respectively England, France, and Germany. The subjects for reproduction are at present in France, and have still to be sent to Germany. Specimens will probably be shown at the Inventions Exhibition as soon as they arrive, and be added to as more come to hand.

The Executive Council of the Inventions Exhibition have good reason to be satisfied with the results of their labours, and all arrangements with respect to the opening on Monday last were admirably conducted. Those who saw the condition of the building late on Saturday night can imagine the amount of work which must have been got through between that time and Monday morning.

On the exterior of the conservatory and in the grounds, some thousands of incandescent electric lamps replace the Chinese lanterns of last year, and when these are all alight the effect is very pleasing. By an unfortunate accident, several hundred—perhaps more than a thousand—of these lamps on the exterior of the conservatory and round the horse-shoe galleries were instantly destroyed during the afternoon, a too powerful current from the monster Siemens' dynamos recently fixed behind the Albert Hall having been turned into them. "Did you see those lamps flicker?" said one of the electrical staff, as he rushed out and addressed the nearest bystander, uncertain whether the lamps had gone. "They flicked indeed," remarked the bystander, "but not one of them will flicker again." In less than six minutes some eight or ten men, armed with ladders, and baskets of new lamps, were actively at work, and the mischief was soon repaired.

How should one fix the time for a fifty-year jubilee of the discovery of photography? This was discussed at the Berlin Photographic Society, and after some various opinions had been expressed, it was concluded to take the date of Daguerre's communication to the Academy of Paris in August 1839; so the jubilee is to be celebrated in August 1889.

Matter which appears in the present number of the Photographic News shows how actively useful is the Amateur Photographic Association of New York. To Mr. F. C. Beach, the genial and indefaticable president, we must attribute a large measure of the success of the youthful but important Association.

There is an enormous improvement this year in Mr. Blackburn's illustrated Academy catalogue. Until the present volume, the cuts have been very rough, consisting merely of pen-and-ink sketches photographed. Now the cuts, where they are drawn, are more carefully executed, while many of the pictures themselves have been photographed and reproduced by the Meisenbach process. Possibly the idea which the Academy has of publishing its own illustrated catalogue has stimulated Mr. Blackburn; or it may be the example which the compilers of the Paris *Salon* illustrated catalogue have set for the last three or four years. This catalogue is a very elaborate production, but it must also be remembered that it is nearly four times the price of the English one.

The Director of the National Gallery has seen fit to reply at last to the numerous criticisms upon his conduct in granting special permission to a firm of foreign photographers to prepare photographs from pictures in the national collection. It is but fair to state at once, however, that the explanation serves rather to aggravate than to remove the very natural feeling of injury existing amongst English photographers. The Trustees and Director, the report states, gave their assent because they were satisfied of the "peculiar excellence" of the work of the firm in question. If this is not as much as to say that "peculiar excellence" is not to be found at home, Sir F. Burton has certainly laid himself open to miscomprehension.

Nor is this all, for the Director goes on to say that "for obvious reasons"—what are they?—"the privilege"—which has been freely granted to a foreign firm—"must be regarded as exceptional;" a conclusion which is as unsatisfactory as the original concession was unfair.

This same report, by the way, alludes to the corrugated zinc excrescence, which for three months disfigured the East wing of the National Gallery, as "a temporary *atelier*." But what's in a name? The corrugated zinc excrescence, though dubbed "a temporary *atelier*," was just as ugly. During the time this structure stood it seems that "300 pictures, belonging respectively to the Foreign and British schools of painting, were photographed on a large scale with complete success." So ends, for the time, an incident probably unique, in which a department of a government devoted to free trade exercises protection, not in favour of its own subjects, but on behalf of those of a foreign power! Surely the force of inconsistency can no farther go!

Was it thoughtlessness, or was it by design, that some of the Common Councilmen who figure in a large engraving just published of the Old Council Chamber, Guildhall, sent to the artist old photographs to work from, thus representing them several years younger than they really are? Of course it was not parsimony. We cannot imagine a C.C. begrudging the cost of being photographed afresh. Anyway, the results in many instances are not very satisfactory so far as the likenesses are concerned.

Some people have a queer notion of the requirements of illustrated papers. The portrait of a well-known musician was wanted the other day for publication, and application was made for a photograph, which it was promised should be sent. The photograph, however, never arrived, and the artist, after waiting till the last moment, drew a portrait from memory. When a copy of the paper containing the portrait was sent to the original, he remarked that the likeness was not very good, and then posted the photograph to the editor, hoping it would be in time. Possibly he imagined the corrected portrait would be reprinted in the next week's number.

"I prefer good paintings even to the very best photographs, because there is far more truth in the paintings." This somewhat startling remark was made by a well-known literary man at the private view of the Academy, and we asked him to explain his views. "The photograph is analagous to a newspaper report," he said; "it is a bare record of actual facts; but the painting executed by a master hand is like the word picture written by Shakespeare or by Goldsmith. Such a selection from the crowd of realities which appeal at once to the heart or the mind. Only a genius can make this selection of fragments, and build it up into a pleasing whole."

Who could read the "Vicar of Wakefield" if it were an absolute and photographic record, or report not a spoken word, a passing thought, or an act omitted in the case of any one of the characters? The word artist, however, does not report all; he selects the little that is needed for his purpose; makes, in fact, a concentration of certain truths, all that is not needed being omitted. The painter or the sculptor does the same: into one canvas or into one block of mable he throws the graces of hundreds. Who yet has produced a photograph from the nude which is anything but coarse and sensual?

Patent Intelligence.

Applications for Letters Patent.

5363. William James Lancaster, 6, Livery Street, Birmingham, for "Improvements in instantaneous photographic camera shutters."—1st May, 1885.

5364. William James Lancaster, 6, Livery Street, Birmingham, for "Improvements in photographic cameras."—1st May, 1885.

5367. Albert Pilley, George Arthur Cubley, and Job Preston, 4, High Street, Sheffield, for "Improvements in portable stands for photographic, surveying, optical, and similar purposes."—1st May, 1885.

Patents Sealed.

6893. Henry Joseph Redding, 48, Myddelton Square, London, E.C., Optician and Photographer, for "An improved pocket ruby lantern for photographic purposes."—Dated 28th April, 1884.

Patents Granted in America.

315,994. William H. Ball, Springfield, assignor of one-half to Edward Sachs and David Pruden, Dayton, Ohio. "Frame for exhibiting transparencies."—Filed March 27, 1884. (No model.)

A kind of half-open box with a handle.

316,101. Otis C. White, Worcester, Mass. "Photographic posing-support."—Filed July, 19, 1884. (No model.)

A head-rest, but including no points new to Europeans.

PHOTO-MICROGRAPHS.

BY S. BOTTONE.

Last August I wrote to express the satisfaction which I, in common with all the other readers of the Photographic News, felt at the excellent articles on this subject with which our friend Mr. J. H. Jennings was regaling us. At the same time I mentioned that a good ¼-inch French triplet, costing nine shillings, would be found, for general work, as serviceable as a lens costing ten times that price, and for certain special cases, even preferable. I based this assertion on my own long experience, extending over a period of more than twenty years, and gave as reasons for this aptitude—1st, the long working distance possessed by these triplets; 2nd, their penetration.

Some exception seems to have been taken to this statement, and Dr. Maddox, G. E. Davis, Woodward, Steinberg, and Koch have been adduced as proofs that nothing good could be done except with "the very best English work."

I have yet to learn whether Drs. Woodward, Steinberg, and Koch did use English lenses for their photo-micrographs, and whether they did or not, will not prevent any unbiassed mind from acknowledging good work, whether done by a French, German, or English objective. Mention is also made of Mr. Davis' aperture shutter, as a means whereby penetration can be conferred on a wide-angle objective.

But a wide-angle objective costs much more than one of low-angle, and if the owner of such is still obliged to spend fifteen shillings or twenty shillings for an "aperture shutter," before he gets the penetration and definition which can be got from a French triplet costing a tithe of the price, it would seem that he had better purchase the latter at once.

Words, however, may fail to convince; I therefore give a sheet of photo-micrographs, which is reproduced on the following page, to show what can be done with a French triplet. If anyone can produce better work with any English objective, costing even only double, I am sure we should all be glad to see it, and learn where such objectives may be obtained.

The central disc is a section of pith of *Helianthus tuberosus*, magnified 250 diameters. This was taken in sunlight on wet collodion. The sides and bottoms of the cells are well shown. The top right-hand disc is a photo-

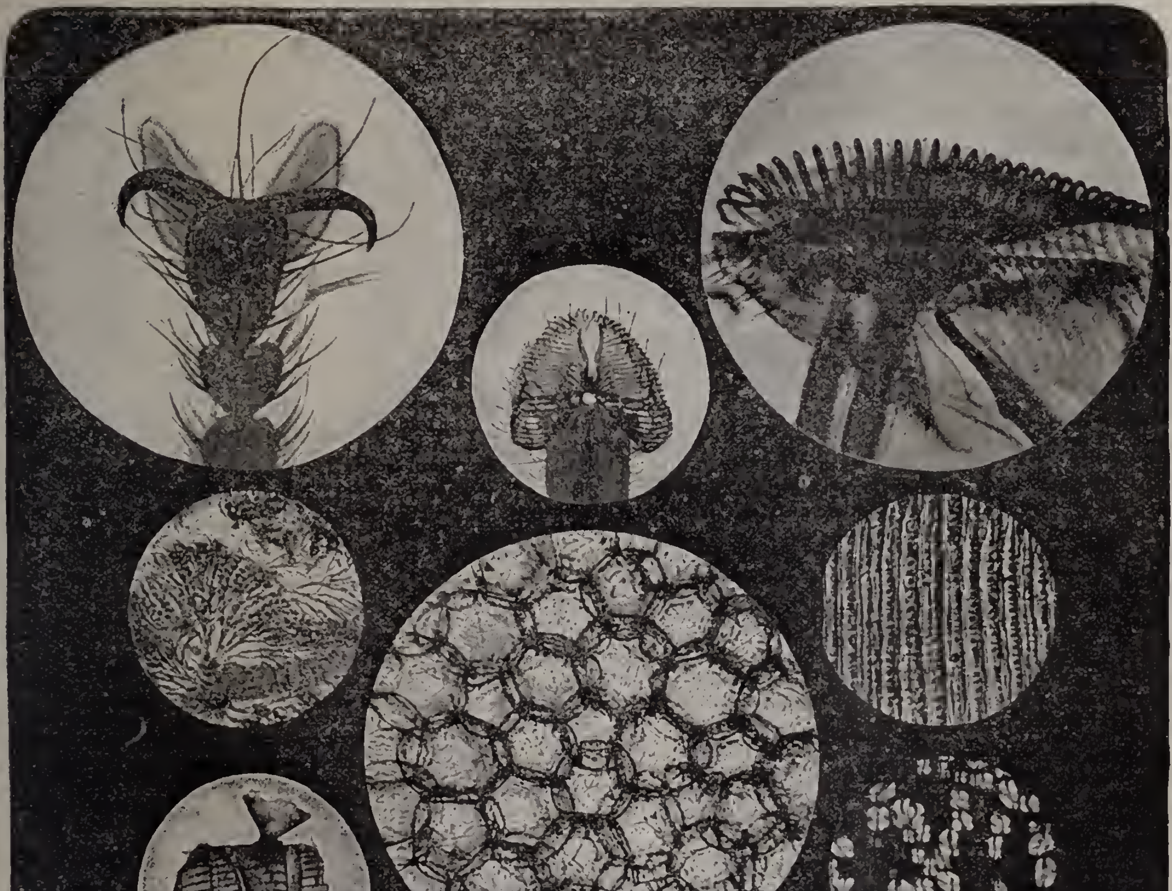

PHOTO-MICROGRAPHS BY SELIMO BOTTONE.

graph of the proboscis of a blow-fly, not flattened, and shows well the extraordinary penetration of the objective. This picture was taken on a gelatine emulsion plate; exposure eight seconds; light, a two-inch paraffin burner; magnification 250 diameters. The left-hand top disc contains the image of the foot of a dung fly, magnified 250 diameters. The wonderful "pads," with their sucker-like arrangement and hair-studded surfaces, are well shown. This was also taken on a gelatine plate, under the same conditions as the tongue. The small central top disc contains a proboscis flattened out, taken with the same triplet, but with the two first combinations removed, so as to give a magnification of about 50 diameters only. In this picture the definition is exquisite, and a transparency from this negative, when thrown on the screen by the optical lantern, enlarges up to ten feet, without any falling off, and shows the spirals, the fleshy bodies, the hairs, &c., wonderfully well.

Just under the foot of dung fly is shown a living frond of *Batrachospermum moniliforme*, magnified 250 diameters: this is also a sunlight collodion picture. In the small disc under this is a frustule of *Isthmia nervosa*, magnified 250 diameters. Here, again, the penetration of the objective is well brought out, the rotundity of the object being clearly shown. On the opposite side of the sheet the upper small disc shows the pitted cells in a section of deal, magnified 250 diameters. This, again, is a collodion sunlit picture.

Just below this are shown grains of potato starch under polarised light; this required half an hour's exposure on an extra rapid gelatine plate, a two-inch paraffin lamp being the source of light. The large left-hand bottom disc shows that beautiful diatom, *Campylodiscus costatus*, magnified 250 diameters. Notice how well the lens defines even those frustules that are standing upright. The right-hand bottom disc shows several frustules of *Pleurosigma Balticum*. This was taken by oblique illumination, and shows the lines (40,000 to the inch) very well indeed. The bottom centre and small disc contains a single frustule of *Aulocodiscus*, with its raised ring and hexagonal apertures.

All the collodion pictures are sunlit pictures, exposure one second only; developed with a strong iron developer; not intensified. The gelatine pictures have all been developed with tartaro-ferrous oxalate, which, in my hands, leaves nothing to be desired.

SOME OF THE FUTURE NEEDS OF A PHOTOGRAPHIC SOCIETY, AND SUGGESTIONS FOR FUTURE WORK.

BY F. C. BEACH.[*]

I wish every member would make an effort during the new year just begun, to think out or invent some better way of constructing some special piece of photographic apparatus, and present his ideas to the Society.

One indispensable portion of apparatus, the tripod, is a continual source of annoyance; it furnishes room for a large amount of study; how to conceal or get rid of it is a puzzling question.

A plate-holder, which shall be adaptable to the many inaccuracies to be found in our dry plates, and capable of being easily and quickly applied to the camera, is wanted.

A substitute for glass, but equal to it, as a base to support a sensitive emulsion, with which amateurs can take large photographs with little inconvenience, would be desirable.

A method of preparing ready-sensitized silver paper on which purple tones can be easily obtained would, in many respects, be of much value.

We are yet without a perfect shutter for instantaneous work, or a good light for the dark room.

There are many other things which might be mentioned, but what I have suggested may, I hope, suffice to awaken among you some latent inventive talent. The number of improvements already suggested, and made by some of you during the past year, shows that the spirit of invention is here. The field for inventive talent is large in view of the great variety of apparatus and applications embraced by photography. It might be well for the Society to specify two or three kinds of apparatus upon which improvements are needed, then offer rewards or prizes to the successful competitor; no doubt such a course would stimulate invention, and we would reap the advantage of whatever results might be achieved.

The cultivation of art, as applied to photography, or the production of artistic photographs, should be encouraged; for instance, in taking a landscape view, the subject should be carefully studied, the imagination should be brought into play as to how the finished picture will appear when reduced, the point of view should be deliberately chosen, and allowances made for the effects of lights and shades.

I am in hopes that arrangements may be made for a series of illustrated lectures upon this subject by competent authorities.

No better or more attractive way of presenting the results of our labours to our friends could be devised than by means of the optical lantern and lantern slides, and as we have had a special lantern constructed, which is to become the permanent property of the Society, I trust the making of slides will attract the attention of a larger number of members than it has heretofore. For the use of educating those who are now in this branch of work, I advise that we have special critical exhibitions of slides occasionally, in order that the defects or good qualities of the slides may be more easily pointed out. The system of exchanging lantern slides with other clubs has been successfully inaugurated, and, from the interest manifested, promises to be a valuable feature of the future. The plan enables us to see in an attractive way the work made by others, and tends to promote a spirit of friendly rivalry and intercourse between the various clubs. The extension of a similar exchange to clubs in foreign countries promises to be successfully carried out during this year, and will furnish material of unending interest.

Regarding our future, I think I am within bounds when I say no similar organization could wish for brighter prospects; our membership, in view of the increasing general interest taken in photography, will probably rapidly augment in numbers, and it will therefore be necessary to provide larger and better quarters for our meetings, and larger facilities for other work.

In order to do this in a manner commensurate with our standing as a society, it would seem advisable that we first become incorporated, and afterward, if thought best, appoint a special committee of responsible gentlemen to undertake the work of finding a suitable permanent site or building, to alter or build it in some special manner, and arrange within it a suitable meeting-room, an art gallery, a skylight, several commodious dark-rooms, equipping them all with the necessary appurtenances and tools for doing good work.

By employing a good operator, at a stated salary, to remain in the building, to give instruction to beginners, and also to do printing, making slides, enlarging, developing, &c., the services of a janitor could be dispensed with, and a large number of members be accommodated.

Furthermore, I would advocate the Society keeping on hand a stock of chemicals and plates, known to be reliable and of good quality, which members could purchase for their own use.

A financial plan which suggested itself to me in regard to this scheme was this, that the incorporated Society might issue bonds on which to raise funds for the purchase of a suitable building; after it was once fitted up and equipped, the interest on the bonds could be met by the revenue derived from the annual dues and initiation fees, and also from the renting of the meeting room to other societies when not in use by us. The surplus revenue could be applied to a sinking fund to be established for the payment of the bonds. The bonds could also be secured by a mortgage on the building. Probably the annual interest charge on the bonds would not exceed the annual rent the Society would have to pay for rooms, yet the facilities afforded and the inducements offered to others to become members would be increased tenfold. Provided with such well-equipped permanent quarters, properly conducted, we ought to become in a short time the leading photographic society in the world, and in time be able to wield an influence in photographic matters such as few would care to contest. It will be the intention of the management during the New Year to present interesting subjects at meetings, for the entertainment of members, and also to promote a more general discussion on photographic subjects.

My impression is, a larger number of members should endeavour to take part in discussions at meetings, as it is desired that every member make known anything novel or strange which he may have seen, encountered, or discovered, connected with photography.

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[*] Abstract of a discourse delivered before the New York Association of Amateur Photographers.

I shall always be glad to receive suggestions from members, and if anyone discovers something useful, and is afraid to speak about it, I shall take pleasure in doing it for him.

During the coming summer several field excursions will be projected, and it will be of special value to me if those of you who know of them will advise me of choice locations that could be visited within convenient distance of the city. Probably a very interesting excursion for the practice of instantaneous work would be to charter a steam tug and make a tour around the harbour among the shipping.

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DISTORTION IN PAPER POSITIVES.

BY J. HARRIS.

It is a noticeable fact that these unpleasant results are not a universal experience. There are those among us who, with a practice of over thirty years, have escaped this failure, so that the annoyance, to whatever cause it may be due, can be localized.

Some ascribe it to the excessive demand on the paper makers, who are in consequence induced to turn out too new a material; that this material not being sufficiently mature, has not had a proper time to harden; that it is therefore more or less pulpy in substance, and necessarily unduly liable to excessive and unequal expansion of the surface, as it passes through the various stages at the hands of the photographic printer. This theory sounds fairly, as theories often sound, but they frequently have the happy propensity of failing just at the moment when the test is applied to them, and the theory of "new" paper is no exception to the aforesaid category of theoretical breakdowns.

If immature paper were the head and front of the offending, all the various makes of albumenized paper would be faulty in this particular, and the stage of india-rubber faces in a chronic state of compression would be a general instead of an individual complaint. Perhaps there may be a modicum of truth anent this new paper; it may be supplied to the albumenizers not so fully matured as in the earlier days of photography, but it is not the cause of the trouble, because all makes of albumenized paper will not produce the defect. And this fact points to another solution, that it is in the glazed surface we must seek our difficulty.

Let our older brethren recall their experiences with some of the past productions in albumenized paper, such as Horne's, Sandford's, Spencer's, &c., and when we take into consideration the pictures of the old days and the sizes then in vogue taken direct up to 15 by 12, and we can safely assert that their quality would have been fatally imperilled by the slightest approach to delineation of undue mobility of feature. Such a complaint as we now experience was not once heard, and we numbered in our ranks artists who would have instantly perceived, and who would have drawn the line at facial compression.

It becomes, then, matter for enquiry how far some of the albumenizers of the present day are in fault, and how far a surface not composed exclusively from the albumen of fresh eggs will become pliable during its various processes to which it is submitted at the hands of the photographer. Let it be remembered that whether one year old or whether five years old, we have to consider a substance of paper completely charged with moisture on the one side, and on the other not a surface of pure fresh albumen thoroughly coagulated by contact with silver, but one which has been glazed with a gelatinous layer which is susceptible to chemical change more or less, and which cannot be sufficiently hardened by silver to resist the swelling out of the pores of the paper when those pores are filled with moisture.

Another point to be considered in these days of sensitizing on solutions under 60 or 80 degrees is that, however theory may apportion the strength of salting and silver baths, the silver, if below the old standard, will not sufficiently harden the glazed surface to prevent its swelling in proportion to the giving out of the paper when saturated with water. Again, it is quite possible for some albumenizers to so prepare their "glaze" that it shall have a tendency to give a swell in the after processes. Speaking from an experience of over a quarter of a century with the brands of paper alluded to, with a make not notorious for high gloss, and though this experience has combined portraiture, reproduction of mechanical drawings, the joining together of photographs of architectural drawings in two or more sections, and this defect or distortion in prints has never once been met with. It may be urged that "high glaze" is an essential; but the "high glaze" can be supplied by the hot press. And it must not be overlooked that pure fresh egg albumen will not give this "high glaze" unless double albumenized, and here the tendency to a cracked surface is too objectionable to permit of its regular employment. There is a make of paper in the market notorious for its high surface, and printers are to be found who will use this paper at the risk of being worried to within an ace of their lives, and almost justifying the assumption that they must possess the right to photograph exclusively all the people with compressed india-rubber faces. Surely there is a greater advantage in the use of a paper bearing a legitimate surface, coagulating that surface thoroughly by means of the old standard strength of silver, and afterwards heightening the gloss by means of the hot press to any extent which may be desired. It will certainly be a less anxious time for the printers, and a truthful delineation of feature will be the result.

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PHOTO-LITHOGRAPHY AND PHOTO-ZINCOGRAPHY.

BY MAJOR J. WATERHOUSE, B.S.C.,

Assistant Surveyor-General of India.

CHAPTER XVIII.—PHOTO-LITHOGRAPHY IN HALF-TONES.*

Direct use may be made of this principle in copying large subjects, which will bear strong grain or lines. A film bearing ruled lines or points—or, better, a suitable grain—is placed between the sensitive photo-lithographic paper and the negative, either being transferred on the latter, or on a very thin collodion or gelatine film. The exposure in diffused light is prolonged until the grain becomes clearly visible in the lights and disappears in the shadows. The copy is then inked as in ordinary photo-lithography, washed, and transferred to zinc or stone; the high lights, which are in all cases too full, are scraped out, and the image is ready for printing.

It is advantageous to copy the original on a larger scale than it is intended to print it, and to transfer the grained image produced on the photo-lithographic paper to enamelled paper; to retouch this, and then reproduce it again on a reduced scale. The same procedure may be followed when dealing with negatives already taken on a small scale, and which will only bear a very fine grain by enlarging them, applying a coarser grain, and then reducing again.

The most suitable grain to employ is that which is given by the wrinkling of an exposed collotype plate. According to the thickness of the gelatine coating and the length of the exposure, a coarse or fine wrinkled grain may be produced at will. A number of different prints can be prepared and selected, according to taste or requirements.

The grain impressions are not obtained by the ordinary collotype process, but the plate, having been exposed, thoroughly washed, and well dried, is coated with printing ink, wiped, and then well cleaned, exactly as a copper-plate printer cleans an engraved plate; and this inked grain plate is used as the mother-plate for making as many copies as required.

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* Continued from page 270.

It is difficult, however, to get, by this method, a perfectly even grain for sizes much larger than cabinet, so it is better to enlarge a small and perfectly even piece to six or eight times, transfer it to stone, then touch up with needle and brush to make it perfectly uniform, and then from this to pull as many re-transfers, as necessary; put them together, cutting the edges in wavy or zigzag lines, and retransfer to stone. The joins, being slightly visible, are touched up, and a proof from this stone then serves as an original for any desired reduction. This seems a roundabout procedure, but this is of little consequence when it is considered that the whole labour is necessary only once, and that a mother-plate is thus obtained which is always ready for future use.

It is important that the transparent and opaque worm-like lines or points should be homogeneous, the transparent lines or points being as large as the opaque ones. If the opaque covering points are too far apart, they coalesce with difficulty, while if they are too close they come together too soon.

If the black and white parts of this grain are alike, it is the same whether a positive or a negative of the grain be used, otherwise the covering or opaque points should be the smallest, so that the details of the negative to be reproduced may not be too much broken up. A fine grain, with a rather stronger one, alternating regularly with it, is also good. The grain should not be quite opaque, but allow a little light to pass through.

The success and beauty of the results depend very much upon the grain being carefully selected of the proper strength and size suitable for the subject. Too strong a grain closes up in the shadows too slowly, or not at all; if it is too fine it closes up too soon or too much, and will be difficult to print. A large subject will take a stronger grain than a smaller one.

After a little practice one can quickly ascertain which grain will be most suitable for any particular purpose by laying the grain plate on the negative.

The grain ought not to break up or overpower the fine details of the negative too much; they must remain quite clear to the eye. On the other hand, it should not be so small as to be scarcely visible; such a grain dirties the picture, and is of little use in printing.

(*To be continued.*)

Correspondence.

UNFAIR COMPETITION.

Dear Sir,—I have a new grievance (or new to me) to contend with, and am desirous of your aid. It is as follows. I have been taking several football teams this season, and have just found that an amateur has copied them to about carte size, and sold them for four shillings the dozen, or two shillings the half dozen. What can be done to prevent this piracy? If it was a professional photographer that did it, I could stand against it in price, &c.; but when amateurs do this kind of thing it becomes very unfair. The original size was 12 by 10.—Yours truly, Alfred Freke.

The Crown Studio, 12, *Duke Street, Cardiff, May* 5.

[If the photographs were not registered in due form, our correspondent has no remedy for such a mean piracy; but Mr. Freke is wrong in calling the pirate an amateur—he becomes a professional by the act of selling the reproductions.—Ed. P.N.]

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 30th ult., Mr. **Alexander Mackie** in the chair.

After reading the minutes,

Mr. **Henderson** called attention to the proportion of cyanide spoken of by him; he used four per cent. in addition to the hypo. Regarding the speed of the two emulsions mentioned, that containing iodide was the slower.

A discussion upon unwashed emulsions was opened by the **Chairman**, who passed round plates prepared from Mr. W. E. Debenham's formula (page 201); the drawback complained of by the preparer of the plates was a crystallization of the nitrate salt upon the surface, the margins alone being free from this defect.

Mr. W. E. **Debenham** explained that there was too much water in the formula; it should have been 2 instead of 5 ounces for the 140 grains of gelatine (page 202).

Mr. J. B. B. **Wellington** remarked that any crystals which formed on the surface could be easily removed with dilute hydrochloric acid.

Mr. A. **Haddon** followed the instructions without obtaining any crystallization; the plates were very spotty, which he attributed to the sample of gelatine used.

Mr. A. L. **Henderson** referred to a formula published by him some months ago, and enquired in what particular the two formulæ differed.

Mr. **Debenham** replied that his was a slight modification of Dr. Maddox's original formula.

The **Chairman** wished to know whether the presence of nitrates affected sensitiveness.

Mr. J. **Barker** made an unwashed emulsion about seven years ago with ammonium bromide 9 grains, silver nitrate 11 grains, and gelatine 20 grains; he did not find it slow, but the films were stained or uneven.

Mr. **Debenham** observed that more gelatine would probably have rectified the unevenness by the greater dispersion of the salts, an opinion which received general support.

The **Chairman** passed round a sample of Kennett's pellicle he had kept over ten years. Surface marks met with in drying plates now were also frequent when he used Kennett's pellicle, and that gentleman told him was it due to insufficient washing.

A question was read regarding the influence of "Holme's Ozone Bleach" for the removal of green fog.

Mr. **Debenham** now uses "Labarraque's" solution as a substitute.

Speaking on the subject of preserving sensitized paper and plates from the action of sulphur compounds,

The **Chairman** suggested wrapping paper or plates containing silver compounds in a material treated with a lead salt such as the nitrate or acetate.

A short discussion on emulsions for printing out followed, in which several members took part; but nothing of importance was mentioned.

St. Helen's Association for the Pursuit of Science, Literature, and Art.

Amateur Photographic Section.

A meeting of this Section was held April 15th at the Association Rooms, 4, Salisbury Street, Mr. **Heather** in the chair.

After the routine business had been disposed of,

The Hon. **Secretary** announced the donation of the Bulletin of the Versailles Society.

Prints, plates, slides, &c., were shown and duly criticised.

The **Chairman** then made an enlargement on gelatino-bromide paper.

A very interesting discussion on enlargements on gelatino-bromide papers, washing prints, soda developer, &c., brought the meeting to a close.

Chicago Amateur Photographers' Club.

The regular monthly meeting was held at the Art Institute, Monday evening, April 20th, Dr. **Garrison** in the chair.

The following new members were elected:—Bement Lyman,

H. D. Spears, M. L. Scudder, Geo. W. Hancock, W. C. Asay, and Mrs. H. H. Shufeldt.

Mr. Gentile displayed some specimens of work made by himself on Carbutt's gelatino-chloride opal plates, developed with the carbonate and sulphite of soda developer habitually used by him for negative work, and untoned. A considerable variation in tone could be secured by varying the exposure.

Mr. Edgeworth described a "wrinkle" for contact printing of transparencies by artificial light, consisting in placing a piece of opal glass at the end of a long square box nearest the source of light, while the negative and sensitive plate occupy the other end.

Mr. Burnham passed round for examination a much under-exposed negative of an out-door view, made by interposing a piece of ruby glass in front of the lens. He asked the members to guess at the exposure it had received, remarking that under the same circumstances, without the red glass, half-a-second would have been a full exposure.

Various guesses were made, varying from ten seconds to five minutes, but Mr. Burnham stated that it was *one hour*.

The same member also detailed some experiments he had been making with a red glass argand lamp chimney brought from Germany last year, such as is commonly used by photographers in that country for dark-room illumination. He succeeded in making a good transparency by the light of a petroleum lamp protected by this chimney, in thirty seconds. By placing outside of it an ordinary red gas chimney, however, he made it safe for all practical purposes.

Mr. Noel said that a few days ago he exposed two 8 by 10 plates, giving them one second exposure, on an out door subject. By an accident they were both dropped out of the plate-holder on to the floor of a well-lighted room in broad daylight, and nearly half a minute must have been consumed in getting them back into their places. Nevertheless, on development they proved the best negatives he had made for some time.

Liverpool Amateur Photographic Association.

The monthly meeting of this Association was held at the Free Library, William Brown Street, on Thursday, 30th April, Mr. J. H. Day, President, in the chair.

The minutes of the previous meetings were read and confirmed.

Messrs. A. Seymour Jones and Edmund Cook were elected members of the Association.

Mr. W. A. Watts then brought up the question of memorialising the railway companies for a grant of the privilege allowed to the Anglers' Association, in support of the admirable suggestion of the Oldham Photographic Association, and the Secretary was instructed to take steps in the matter. Mr. Watts also pointed out the loss to the Society generally arising from the too-diffident manner in which members brought forward improvements.

Mr. H. N. Atkins urged upon members the desirability of bringing forward matters of even apparently trivial importance, as the bearing of trifling occurrences might lead to important aid being given in the settlement of difficulties that all shared in.

Mr. J. H. T. Ellerbeck spoke of the existence of a question-box and an exchange-book, the former for the discussion of difficulties arising in practice, and the latter for the purpose of enabling members possessing surplus photographic apparatus to find purchasers in the Association. Both these aids to the working of the Society were decided to be worthy of resuscitation.

Members were informed that notice would be given at the next meeting of a possible change in the place of meeting, and of an alteration in the prizes offered annually for competition pictures.

The President then called upon Mr. H. Norwood Atkins to take up the discussion of "Printing by Artificial Light on the New Rapid Printing Paper," adjourned from last meeting.

Mr. Atkins then gave particulars of his mode of working. He used—

Saturated solution oxalate potass ...	6 drachms
" " ferrous sulphate...	2 "
Water	2 ounces
Bromide ammonium ... ..., ...	3 grains

for development. He arranged, in actual practice, a circle of printing frames with a radius of nine inches, and if dark brown prints were required, he burned in these circles of eighteen inches' diameter one inch of magnesium ribbon; or, if the prints were required red for gold toning, he used three to four inches. Each print he developed separately; first soaking it in clean water, he laid it in the dish film side uppermost, and flowed the developer over it until the first trace of an image was seen; the moment the image was seen, the developer was poured off into the measure, and the image went on gaining in power until completed. He carried on this process in moderate gaslight, as the red image was nearly invisible in red light. He found great convenience in pouring off the developer as soon as the first trace of an image appeared, as this averts over-development, and the same solution develops a large number of prints. As soon as each print is developed, he places it in clean water, and when all are ready he fixes in hypo four ounces, water twenty ounces.

After "fixation" the dark prints are put away to wash. The red prints are toned in Warnerke's hypo and gold toning bath, or, more simply, in—

Hypo	4 ounces
Water	4 "
Gold	1 grain

Toning can be carried on in full daylight. Prints are completed by washing and drying, either on ebonite or with a matt surface.

Mr. Atkins then exhibited a variety of prints illustrating the subject, all done on Morgan's paper. He proposed to show the development of two, but, owing to an accident, this portion of the programme was not carried out.

Several prints were shown by members, and some discussion followed.

Mr. Harry Pointer's famous "Brighton Cats" were on view, and were much admired; also a series of large platinotype views was shown by Mr. J. H. T. Ellerbeck.

Notts Photographic Association.

A meeting was held on the 4th inst., when a paper was read by the Treasurer, entitled "Cycling and Photography."

Illustrations were shown of several of the best known and most useful machines, and many very practical and appropriate hints given as to the difficulties and dangers likely to be encountered by making a bad selection of the same.

The paper was listened to with especial interest.

Arrangements are in progress by the Committee as to future summer excursions to places of interest in the neighbourhood.

Talk in the Studio.

Photographic Society of Great Britain.—The next ordinary meeting of this Society will be held on Tuesday next, May 12th, at 8 p.m., in the Gallery, 5a, Pall Mall East, when papers will be read by Capt. Abney, R.E., F.R.S., "On the Chemical Theory of the Photographic Image;" and by Mr. J. Werge, "On After Treatment of Negatives."

Edwards' Plate-Coating Machine.—Mr. Edwards informs us that the plate-coating machine referred to by M. Leon Vidal on page 247, is the machine patented by him, and figured on page 511 of our volume for 1884.

The Association of Amateur Photographers of New York.—At the last meeting the following officers were elected for the ensuing year:—President, Frederick C. Beach; Vice-President, Dr. John H. Janeway; Secretary, Chas. W. Canfield; Treasurer, Jos. S. Rich; Executive Committee, Henry J. Newton, Geo. H. Ripley, Robt. A. C. Smith; Committee of Arrangements, Henry V. Parsell, Gilbert A. Robertson, W. I. Scandlin; Committee on Gelatine Plates, Henry J. Newton, Dr. John H. Janeway, Dexter H. Walker, C. W. Dean. In accepting the office, Mr. Beach made an address on the future needs of a Photographic Society, and the substance of this address will be found on page 300. We also give on pages 289 and 290 the substance of other communications to the Society.

Death of Mr. Chaffin, of Taunton, and of Herr Haufstaengl, of Berlin.—Two gentlemen well known in photographic circles have passed away. Mr. Chaffin died last week, and Herr Haufstaengl expired at Berlin on the 8th of last month.

Electro-Chemical Equivalent of Silver.—By Lord Rayleigh and Mrs. Sidgwick (*Proc. Roy. Soc.*, 36, 448—450, and 37, 142—146.)—In these papers, an account is given of experiments made with a view of determining the electro-chemical equivalent of silver in terms of practical units. The final number expressed in C.G.S. units is $1·118 \times 10^2$, a value in accordance with that determined by Kohlrausch; thus in practical units the quantity of silver deposited per ampère per hour is 4·0246 grains. With a view of obtaining a convenient standard of E.M.F., the authors have made a detailed examination of Clark's cells, which possesses the advantage of standing ready for use, and not polarising greatly on the passage of small currents. The value for the E.M.F., that of the B.A. unit being 0·9867 ohm, is equal to 1·435 volt, with an extreme range of $\frac{1}{1000}$ during six months, although about ten days are required before the cell reaches its permanent condition.—*Abstracts of the Chemical Society.*

Composition of "Mystery Gold."—An alloy containing enough platinum to enable it to resist the action of nitric acid is now being extensively used as a means of defrauding buyers of trinkets, and Mr. W. F. Lowe, who has analysed the alloy in question, gives, in the *Chemical News*, the following particulars. The alloy, after the gilding had been scraped off, had about the colour of 9 carat gold. Qualitative analysis proved it to consist of platinum, copper, and a little silver; and quantitatively it yielded the following results:—

Silver	2·48
Platinum	32·02
Copper (by difference)	65·50
	100·00

Strong boiling nitric acid had, apparently, no action on it, even when left in the acid for some time.

Influence of Light on the Course of Chemical Reactions in the Bromination of Aromatic Compounds.—J. Schramm finds that bromine has no action on parabromotoluene in the dark at ordinary temperatures, but on exposure to light, converts it into parabromobenzyl bromide; the rapidity of the reaction is directly as the intensity of the light. On ethyl benzene, also, bromine has no action in the dark; on exposure to the light, *a*-phenylbromethane is formed. When a mixture of *a*-phenylbromethane with bromine (1 mol), or of ethylbenzene with bromine (2 mols.), is exposed to direct sunlight at the ordinary temperature, phenylbromacetole is formed; whilst if the mixtures are exposed to diffused daylight, the reaction is very slow, and the isomeric cinnamene dibromide, $CHBrPh.CH_2Br$, is obtained.—*Journal of the Chemical Society.*

Exposure to White Light before Fixing.—Mr. H. M. Parkhurst, writing in *Photographic Times*, says:—"In the early instructions we were told never to expose a plate to white light until after it was fixed. In order to test this matter, I developed a plate, washed it, placed a penny upon it, and exposed it to the fullness of a bright sun for some seconds. It was then put into the hypo, and when fixed I could not perceive any effect whatever from the sun's rays. I have never since feared exposure to white light after the developer is thoroughly removed."

One Thousand Photographs of Sculpture.—We learn in *The Nation*, from a letter of Mr. J. C. Rowell, that Mr. John S. Hittel has placed in charge of the University of California a collection of nearly one thousand photographs, normal size being 8 by 10 inches, of the masterpieces of ancient and modern sculpture, for the use and pleasure of the public. The fact that sculpture yields itself to the photographer's art readily and with fine results, and, further, that excellent photographs may be gathered at slight expense compared with the cost of casts, should lead to the formation of similar collections throughout the country.

Influence of Light on the Electrical Resistances of Metals.—By A. E. Bostwick (*Amer. J. Sci.* [3], 28, 133—145).—From a series of elaborate experiments made in the Yale College Laboratory on plates of platinum, gold, and silver, the author concludes that if light causes any diminution in the electrical resistance of metals, it probably does not exceed thousandths of 1 per cent.—*Journal of the Chemical Society.*

Photographic Club.—The subject for discussion on May 13th will be "Transparencies for Enlargements." The Saturday outdoor meeting will be held at Eltham.

To Correspondents.

*** We cannot undertake to return rejected communications.

Thos. Sansom.—A strong aqueous solution of sulphocyanate of ammonium will dissolve it in the cold.

H. Foss.—The address has been posted to you.

Rogation.—1. See vol. for 1884, page 563. 2. They are usually sunlight pictures printed on paper of a greenish tint (or what comes to the same thing, they are stained afterwards); but some working up of the original negative is required. 3. By giving a decidedly full exposure and developing accordingly.

A. T. G.—1. We should certainly consider that a person who engages to "assist generally" may fairly be regarded as a general assistant. 2. Heighway's "Posing and Lighting," published by Piper and Carter, will perhaps serve your purpose; but a far more comprehensive book is in the press, "The Studio, and what to do in it," by H. P. Robinson. 3. It is better to cast it on one side under the circumstances; but of course you will take care to recover any gold which may be present. 4. He is supposed to be able to take a negative, and if he make good use of his opportunities he may soon learn to do high-class work.

W. E. Price.—1. It is possible; but you will find it very much better to make a negative in the ordinary way, and then make a contact transparency from it. 2. As far as we know, it is a satisfactory instrument, and will serve for all the purposes you mention. 3. Yes, provided the light is moderately good.

Spots.—They arise from air-bubbles adhering to the paper in sensitizing. Lift the sheet from the sensitizing bath and replace it; this operation may be repeated if necessary.

Vero C. Driffield.—Thank you for the block, which we hope to use next week.

Chas. H. Grant.—This correspondent writes as follows:—"I shall be much obliged if any of your subscribers could give me their experience as to the best method of carrying my photographic gear (a whole-plate camera, three dark slides, and tripod) on a Singer's Challenge rear-steering tricycle of the old type." Perhaps some reader can speak from experience.

Lussac.—It is a well-recognised defect of the printing process you refer to, and we have an article in type which throws some light upon it.

W. F. Mitchell.—1. From Messrs. Houghton and Sons, of High Holborn, or Marion and Co., of Soho Square. 2. We do not know the price.

H. Field.—Nothing better than the ordinary Brunswick Black.

Belfast.—We would obtain it for you you with pleasure, but it is a rule with us not to take part in such agency business. Write to the photographic publishing house to which you refer.

G. George.—Cement them to the glass with the varnish known as "crystal paper varnish."

*** Several answers are unavoidably postponed until next week.

The Photographic News.

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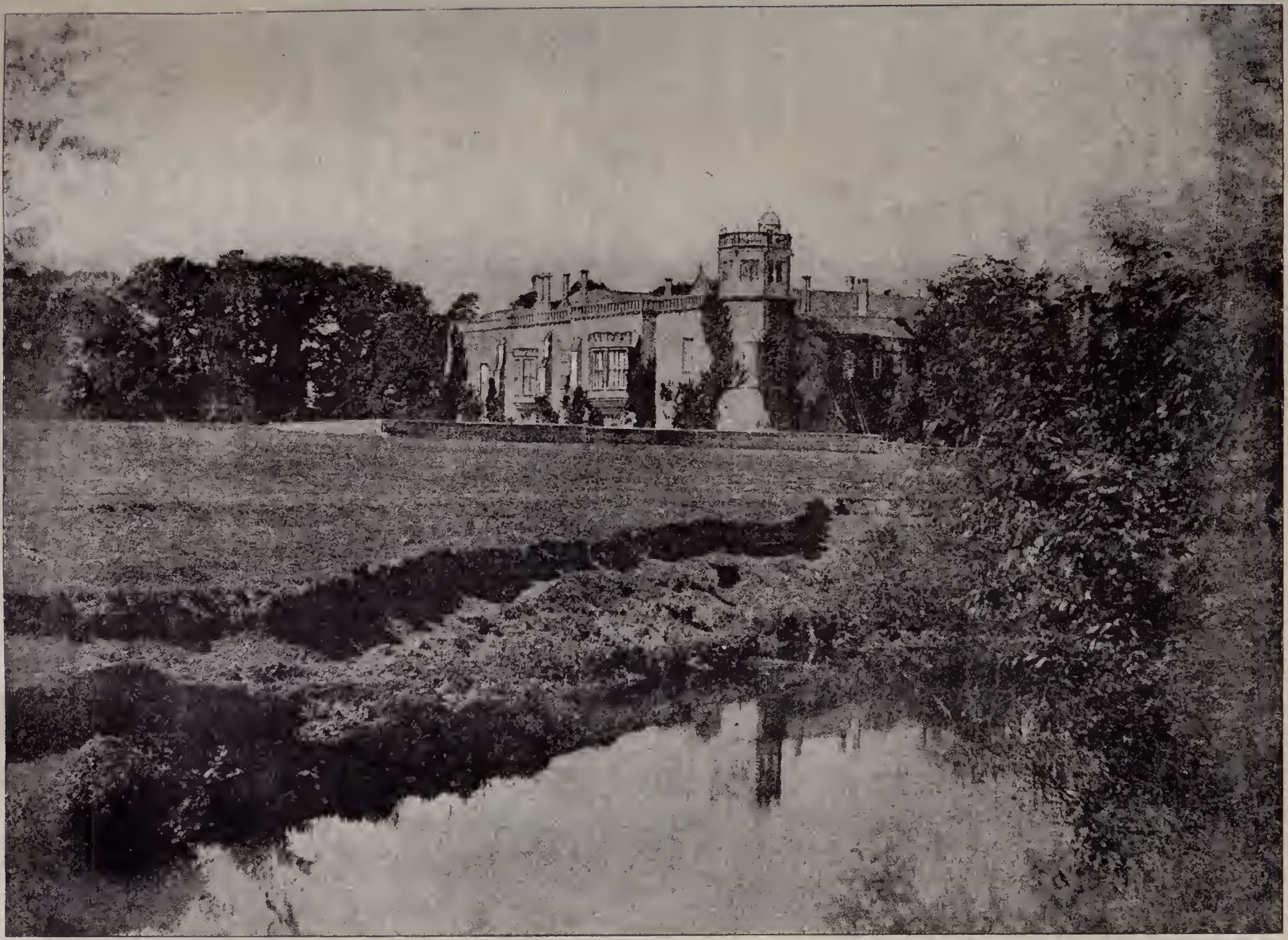
SUPPLEMENT TO "THE PHOTOGRAPHIC NEWS" 8TH MAY, 1885.



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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1393.—*May* 15, 1885.

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A FEW OPTICAL POINTS IN CONNECTION WITH COPYING AND REPRODUCING NEGATIVES.

In connection with the copying of photographs, the production of transparencies by the aid of the camera from negatives, and the reproduction of negatives by the same means, there are one or two purely optical points which should at all times be borne in mind by the operator, although but too often they are neglected, with the consequence that results are produced much inferior to such as could be got with no greater trouble were a few simple matters only attended to.

It is a very general impression among photographers, that when a picture is copied by the camera, there are the same objections to the use of a wide angle lens that there are in the case of taking an actual negative from the objects represented in the picture. That, for example, if the picture represent a building, and it be copied with a short focus lens, a wide angle being included, this copying will show the strained perspective which would result were the wide angle included in photographing the building itself. This is a complete mistake. However wide an angle is included, no alteration of perspective will take place unless the lens be not a rectilinear one. The *only* drawback to the use of a wide angle—if the lens has covering power—is that there is a falling off in illumination, and that greater care is necessary to ensure that the plane of the sensitive film be parallel with the plane of the picture to be reproduced. Be it not supposed that we are advocating the use of a wide angle lens in copying. We are merely pointing out that the objections to its use are not those popularly—or at least often—attributed to it.

But though the falling off in light is certainly objectionable in the case of copying a picture—a painting or drawing, we should perhaps rather say—it may be the very reverse in the case of reproducing a negative of any size, either smaller or larger than the original. In such a case, we have, in the ordinary manner of working, two courses open to us. We may take a transparency from the original negative by contact, and produce a negative from this in the camera; or we may take a transparency in the camera, and make a negative from this by contact. Now, it is well worthy of being noted that, whereas by pursuing the first-mentioned course, the falling off of exposure which a negative always shows to a greater or less extent towards the edges, *will be intensified;* by the second it will be reduced, or indeed may be altogether counteracted. In fact, it is only a question of selecting a lens of a certain focal length, and the falling off of this lens will, in producing the transparency, will precisely counter-balance the falling off which the lens gave in producing the original negative. This is a point worthy of far more attention than has, so far as we know, been directed to it.

Again, the two commonest forms of distortion which are to be seen in photographs may be cured in copying either from a negative or from a print—we refer to want of parallelism in lines vertical in the original, and the bending of straight lines, the latter a defect commonly known as barrel-shaped distortion.

In the first case, that of want of parallelism in the vertical lines, we have merely to incline the negative or print to be copied to or from the camera instead of keeping it parallel with the ground glass, to cure the defect. Thus, if, as is most common, the lines converge towards the top, we lean the picture to be copied towards the lens, so as to bring the top nearer to it than the bottom, when we can readily get the lines parallel on the ground glass. In the rarer case of divergence of vertical lines towards the top, we have to lean the picture away from the lens. Of course, in making this correction, we are necessitated to use a smaller stop than we otherwise might.

The curvilinear distortion is still more easily corrected than the other. It is, as all know, produced by the use of a single lens having a diaphragm at some distance in front of it. Most photographers are aware that if the single lens be reversed—if, that is to say, the lens be turned next the building to be photographed, the diaphragm towards the ground glass—the nature of the distortion will be altered. The lines will be curved inwards, instead of outwards. Now, in copying, we may take advantage of this inward curvature to precisely counteract any outward curvature which may exhibit itself in the original negative. It is well to have a lens with a diaphragm the distance of which may be altered. After focussing, an adjustment is then made between the lens and the diaphragm till the lines on the ground glass are shown to be straight by the application of a straightedge to them. Increase of the distance between the lens and the diaphragm increases the distortion when the lens is used in the ordinary way; when it is used reversed, it increases inward distortion, or, in the case of copying a picture showing outward distortion, increases the correction of this.

The only distortion that we know of no means of remedying, or even ameliorating, is that which is, in reality, no distortion at all, but is merely the strained perspective resulting from including too wide an angle of view.

The various points which we have touched on are, as of course we know, not discussed for the first time by many, but we fear they will have to be many more times referred to before all photographers will act upon them.

PHOTOTYPE BLOCKS BY MR. VERO C. DRIFFIELD.

Processes for obtaining photographs in relief, which can be used as printing blocks in the typographic press, are now attracting much attention, and among those who have worked successfully in this direction may be mentioned Mr. Driffield. This gentleman sends us several blocks of considerable excellence, and one of these is printed below.

It should be mentioned that some of Mr. Driffield's blocks are much finer in the grain, and better than that from which we print, but one with a coarse grain is selected as being more suitable for printing on the rapid newspaper machine which we employ.

Mr. Driffield says :—

As an amateur photographer and typographic printer, I have long been anxious to combine the two arts, so as to be able, by means of photography, to produce blocks capable of being worked in the printing-press in combination with type.

My ambition had been constantly stimulated by prints produced from time to time in the Photographic News, and notably by the beautiful productions of the Meisenbach Company, whose picture of Sarah Bernhardt I felt left nothing to be desired. For a long time I waited in the hope that some method of producing such blocks might be made public, but it became more and more evident that existing methods, being worked commercially, are kept strictly secret. This left me no alternative but to work out a process for myself. This I have done with some success, and at the invitation of the Editor, have sent him the block from which the accompanying print is taken. It is one of the first I made after completing details, and is somewhat coarse in the grain, but I was afraid to send a finer block lest there should be some difficulty in printing from it in an ordinary newspaper.

Of course I was aware of the existence of processes for the production of blocks by etching, and of others such as the process of Paul Pretsch; but none of these were what I aimed at. My predilection was all along in favour of a process by which the various gradations of the photograph could be interpreted into cross-hatching, and which would admit of stereotyping or electrotyping. The block I send was produced by stereotyping, which I prefer on account of its ease and speed.

How far my process may differ from others giving similar results, I do not know; I have, however, had to work out every detail for myself. Of course I have availed myself as far as possible of well-known facts. My process does not require a reversed negative, and I can produce a block and obtain prints in less than twelve hours from any subject capable of being photographed.

THE WOODBURY FUND.

We regret to inform our readers that a serious relapse in the health of Mr. Woodbury has occurred, necessitating present abandonment of business work, and causing grave anxiety to his friends. We publish in our advertising columns the third list of subscriptions to the "Fund," which testify to what we may term a wide geographical appreciation of Mr. Woodbury's services to photographic art and science, if the total amount received to date be scarcely adequate to the occasion. There are subscriptions from India, France, Belgium, and Germany, and more are expected from foreign and colonial sources. One gentleman, to our knowledge, handed in five guineas to the Treasurer, stating that he had been engaged for a year or two in working out a process of photographic engraving, that having the chance of one interview with Mr. Woodbury, in the conversation with him he had received so many hints of practical value regarding the process, that he felt to owe something, and was pleased to have the chance of contributing.

Mr. Woodbury was always communicative in ideas, and fruitful in suggestion of practical applications, and would probably have laboured to more profitable issues for himself by concentration of his powers on a fourth part of the problems at which he had worked. At the present time, misfortunes track him, and the failing condition of his health is the most serious of all.

At a meeting of the committee of the Fund, held on Tuesday evening last, it was resolved to keep open the appeal for subscriptions some time longer, and any sums had best be sent direct to the Treasurer, Mr. W. S. Bird, 74, New Oxford Street, W.C.

THE MAD PHOTOGRAPHER.

A DRAMA OF TO-DAY.

[Scene.—*The house of a well-known actress: other equally well-known actresses looking over a photographic album.*]

1st Actress. You've been photographed at Smiley's, I see, and in your last new hat, too.

Hostess. Yes, he insisted upon taking one of me in that. Said I looked charming. (*Laughs*). Of course, as he didn't charge for the extra negative, and gave me a dozen prints, I hadn't the least objection.

1st Actress. How curious; that is precisely what happened to me. I had on one of the fashionable high hats, and I thought I looked hideous in it. Smiley said no, and so to save being bothered—photographers now-a-days are so pertinacious—I allowed him to make a picture of it.

2nd Ditto. My dear, the man is perfectly mad on hats. What you have just said is my experience entirely.

3rd Ditto. Well, now you mention it, he enquired whether *I* would like to be taken in my hat, but I refused because it was an old one. He said I was quite right not to be photographed in it.

4th Ditto. Oh! but don't you know that he's only crazy on the very latest fashions? When I went, I happened to have on a hat which I'd bought in Paris the previous week, and he would not rest till he'd photographed me in it from three different points of view.

[*Enter 5th Actress flushed and hot*]

Hostess. My dear, whatever is the matter?

5th Actress (*excitedly*). I've just been very much annoyed. You know I went the other day to Smiley, the photographer—

Chorus of Actresses. Smiley, the photographer! Why, we were just talking about him. And he insisted on photographing you in your hat?

5th Actress (*surprised*). Yes; but how did you know? Have you seen—yes, of course you must! I never was so much put out; would rather have paid five pounds and not had the photographs, than be made ridiculous in this way.

Hostess. But, my dear, you are speaking in riddles. Do tell us what has happened.

5th Actress. Well, he asked me to allow him to photograph me in my hat. Not knowing what the man wanted it for, I consented; but judge of my astonishment when I saw it not an hour ago pinned on to a hat in a milliner's window in Regent Street, and the hat labelled with my name! And not only that, but I saw the photographs of you all exhibited in the same way.

4th Ditto. Really, I don't see what there is to make a fuss about. It's a very good advertisement. So far as I am concerned, I don't care one pin.

5th Actress. No, because yours is the newest style; but (*very bitterly*) *mine is one of last year's shape, and the photograph is pinned on to a dowdy thing in the back row!*

[*A light breaks in suddenly. It was clear that the perfidious Smiley had somehow a contract with the wholesale milliners to secure portraits of actresses to act as advertisements*—not of the fair sitters themselves, but of their hats! Smiley, after all, was not so mad as he seemed.]

◆

GELATINE EMULSIONS, AND HOW TO MAKE THEM.

BY W. E. DEBENHAM.

No. II.

In making emulsion on Dr. Maddox's plan, there was, with the proportions of silver and gelatine originally given, so much crystallization of the nitrate of potash retained in the film, that the process as it stood has been regarded by many as impracticable; and as it had been the practice in collodion emulsion to remove the by-product salts by washing, similar means was adopted with gelatine emulsion.

The method of removing the soluble salts from gelatino-bromide of silver that was first generally employed, was that of dialysis. This process depends upon the fact that solutions of crystalloid bodies, such as the nitrates produced by the double decomposition of silver nitrate, and the bromide of the metal or base employed in making to form bromide of silver, will pass through a membranous tissue; whilst colloid bodies in solution, such as gelatine, do not pass through. To dialyse an emulsion, a "septum" or piece of parchment, or parchmentised paper, is strained over a hoop or ring of glass, and into the tray thus formed emulsion is poured to the depth of about a quarter of an inch.

The tray is suspended in a vessel containing warm water, which water stands at about the same height outside the dialyser that the emulsion stands within it. Some prefer to keep the level of the emulsion inside higher than that of the water outside. In the course of a few hours the greater part of the soluble salts will have passed through the septum, and the emulsion will, in consequence of the prolonged digestion, have gained in sensitiveness. At one time, when the effect of digestion in increasing sensitiveness was not duly appreciated, the accelerative action was attributed to the removal of the soluble salts, and particularly of the excess of bromide. The plan of removing soluble salts from emulsion by dialysis is obviously unsuited for any but small quantities, and has been superseded by other methods.

The fact that gelatine emulsion is solid or liquid according to temperature, suggested the idea that the soluble matters might be extracted by exposing flakes or sheets of the set emulsion to the action of water. Since the action takes place from the surface, it is necessary that no part of the emulsion shall be far from the surface; that is to say, that the pieces must be small, or, if in sheets, that the sheets shall be thin. A plan at one time recommended was to place a small quantity of emulsion in a large bottle, which was to be turned about until the gelatinous mixture had "set" upon the sides of the bottle; this was then filled with cold water, and fresh water was kept running in to the bottom of the bottle, led there by a pipe of india-rubber, or the water was changed at intervals. This method sometimes called for the exercise of considerable patience during the "setting," and was only suitable for small quantities.

The plan of washing emulsions in general use is that which was published in 1878 by Messrs. Wratten and Wainwright. The essential feature of this method is the dividing of the set emulsion into fine shreds so as to present a large surface to the water. To accomplish this, the emulsion is removed from the dish or vesssel in which it has set, to a bag, or simply to the middle of a square of mosquito netting or canvas, such as is used for Berlin wool work. The mouth of the bag is then closed with one hand, or the corners and edges of the square brought together like a pudding bag. The sack of emulsion is now held under water—this is absolutely essential—and squeezed with the other hand until the emulsion has all passed through the interstices of the fabric. This must be done in a clean eathernware basin, and the water and shreds of emulsion are next poured into a hair-sieve. The water runs through, leaving the shreds of emulsion on the sieve. The sieve is now to be placed in a basin in which it will stand at such a height that the water in the sieve shall be at least twice or three times the depth that the emulsion alone would occupy. In placing the sieve in the basin, let the latter be first filled with water, and the sieve be rapidly forced down to its position. This will cause the air contained under the hair cloth to find its way through the interstices; without this precaution the sieve may be upset, and some of the emulsion spilt by the escape of the air at one side.

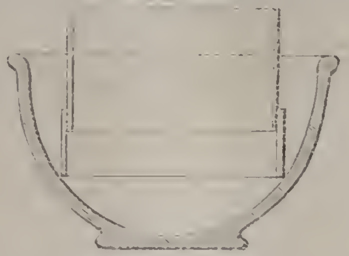

Fig. 1.

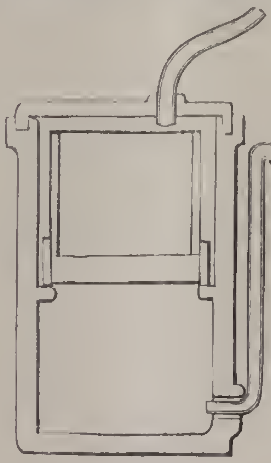

Fig. 2.

A very convenient appliance for those who have no water supply in the dark-room, has been exhibited by Mr. A. L. Henderson, and is manufactured at the Lambeth Potteries—perhaps only to order—and shown in fig 2. The sieve here rests upon a ledge formed in an earthenware vessel, which has an opening near the bottom for carrying off the washing water, and is fitted with a lid, the side of which drops into a channel formed for the purpose, so as to prevent light from entering the interior.

The supply-tubes and draw-off may be ordinary gas-pipes fitted through corks into the respective openings left for them. The supply tube is either connected with the main by an india-rubber tube, or is furnished with a funnel, into which water runs from a tap. In the latter case, however, the funnel should be kept out of strong light, or the supply-pipe leading from it should have one or two turns to prevent light from being reflected from the internal surfaces of the water into the emulsion. A piece of rubber tube snapped on to the supply inside the lid will serve the same purpose.

If there is a room which can be absolutely darkened, where is a supply of water, the basin and sieve may be placed under a tap through which water is allowed to dribble. There should be sufficient force of water to keep the shreds of emulsion in a tremulous motion, when a washing of two hours will generally be found sufficient. If there is no supply of running water, the emulsion must be frequently stirred, and the water occasionally changed, and in this case it is well to give longer time, say after a few changes, to leave the emulsion standing in water all night. Another plan that has been recommended for more effectually removing the salts is to pass the emulsion a second time through the canvas after it has been washing for some little time, and then to continue the washing. In this case it is well to have the mesh of the canvas large. There are two objections to too fine a division of the emulsion: it is liable to fill up the interstices of the sieve, and so prevent the ready flowing away of the water; and it retains more of the washing water between the shreds, so that the resulting emulsion is apt to be sloppy.

In place of the canvas or netting through which to force the emulsion, some recommend a sort of syringe, the end of which is covered with wire netting, and through this the plunger forces the emulsion. In addition, however, to the objection that this is a special appliance not easily procured, there is another: that with this plan the shreds of emulsion are very liable to agglomerate into a mass immediately after passing through the wires. Perhaps this might be overcome by making the end of the plunger and of the wire cap, cup-shaped instead of flat, as it is to be supposed that this tendency to agglomeration arises from the shreds being driven out in parallel directions instead of divergent ones, so that a very slight expansion is sufficient to bring them into contact.

The emulsion should be set so firmly for squeezing as is consistent with getting it easily through the canvas; and the water with which it is squeezed should be cold—say not above 60°; in very hot weather, therefore, it is desirable to put a lump of ice into the water in which the squeezing takes place; after the first washing the temperature is not so important, but it should never be high enough to render the emulsion slimy.

When the emulsion is washed, the water is poured off, and the emulsion left some time on the sieve to drain. It is well to leave it for some hours to get rid of as much water as possible. The importance of having a firmly-setting emulsion is very great, and in the experience of the writer many formulæ contain too little gelatine in the finished emulsion to give a satisfactory result. This will be referred to later on, but in the meantime it may be mentioned that in hot weather, or if the emulsion is inclined to be sloppy, it may, after draining an hour or so, have a few sheets of gelatine cut into strips stirred into the shreds of washed and drained emulsion, and after standing long enough to absorb moisture and become quite soft, the whole is melted up together.

When the emulsion is sufficiently drained it is collected with the help of a wooden or silver spoon, and placed in a vessel to melt. A jug is very convenient for the purpose. The jug is placed in hot water, and it is desirable not to make the emulsion hotter than is necessary for thoroughly melting it. The outer water may, however, be very hot without unduly raising the temperature of the emulsion, provided that the latter is kept stirred; and for this purpose a strip of glass, or a wooden or silver spoon, may be used. When melted, alcohol is added (methylated spirit will do) in the proportion of from five to ten per cent. of the emulsion. The emulsion must be well stirred while the spirit is being poured in, to prevent the formation of clots.

In order to prevent frilling, it is desirable generally to add a certain quantity of chrome alum to the emulsion. This is stirred in last of all, and with the same precaution referred to in the case of the alcoholic addition. The use of chrome alum has been asserted by some to cause slowness of the emulsion; the writer has not found this to be the case. He has commonly used for half a pint of emulsion containing 240 grains of gelatine, half a drachm of a solution of 200 grains of chrome alum to an ounce of water. Some gelatines will take much more than others without becoming thick or ropy; but it is generally desirable, when the emulsion is not to be coated at once, to defer the addition of chrome alum until it is melted for coating; otherwise the emulsion may require great heat to re-melt it.

Lastly, before coating, the emulsion is to be filtered. This is generally performed by pouring it through fine muslin; what is known as mull muslin is very close, and allows no large particles to pass. A circular piece of this material may have a piece of elastic sewn into a hem round the edge, and this hem stretched over the edge of a glass or porcelain funnel which is of such a size that the muslin hangs as a bag in it without quite reaching the neck.

The question of various formulæ for washed emulsion will be treated later on; but a simple and good emulsion for a slow one may be made nearly as the unwashed emulsion given on page 202.

Gelatine	240 grains
Bromide of potassium	90 ,,
Water	4 ounces
Nitrate of silver	120 grains
Distilled water	3 ounces

Mix as directed for the unwashed emulsion, and keep hot for from two to twelve hours according to the sensitiveness desired.

Note.—In the formula for unwashed emulsions (p. 202) the amount of water should read 2 and not 5 ounces. In cold weather the latter might answer, but the smaller quantity is to be preferred; quicker setting favours absence of crystallization.

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Reviews.

The Magic Lantern Manual.—(Second edition.) By W. I. Chadwick. Crown octavo, 154 pages. (*London: Warne and Co.*)

Now that the optical lantern is so generally used as a means of exhibiting photographs, the instrument possesses even a greater interest to photographers than was the case some years ago, and Mr. Chadwick is to be congratulated on having produced a practical and comprehensive handbook on the lantern and its belongings.

Tables of Conjugate Foci, with Explanatory Remarks. By J. R. Gotz. (*London: Blacklock, 75, Farringdon Road, E.C.*)

We have here tables showing at a glance the position of original lens and sensitive plate for reproductions, enlargements, or reductions, ranging from equal size to 1-300th, and for lenses from 3 to 36 inch focus. Analogous tables have appeared in the former Year-Books, and in the Photographic News, but owing to the circumstance that photographic lenses are seldom made to the exact focus by which they are known, such tables often mislead.

NOBERT'S RULING MACHINE.

BY JOHN MAYALL, JUN., F.R.M.S., F.Z.S.*

The ruling machine of the late Herr F. A. Nobert, in so far as its special applications for the production of microscopical test-plates, interference-plates, and diffraction gratings are concerned, must, I think, be regarded as of essentially original design.

Herr Nobert was extremely reticent as to the methods he employed in the production of his rulings. So far as I have been able to learn, he did not fully communicate his methods to anyone competent to convey the information to others. The description, therefore, which I shall present to your notice will consist almost wholly of notes made by Dr. Schroder and myself. after minutely examining every part of the machine, together with a few gleanings from the memorandum book, in which Herr Nobert jotted down, from time to time, fragmentary observations and data, hardly to be understood by anyone but himself.

But, first, for the information of those of my hearers who may never have heard of Nobert's rulings, permit me to make a few introductory observations as to the meaning and purpose of fine rulings, so as to lead up gradually to a comprehension of the problems which Nobert set himself to solve, and the methods he adopted towards their solution. In this way I hope not to have to draw too much on your imaginations when I come to speak of the difficulties of his work, of the mechanical resources he developed in grappling with these difficulties, and of the success he attained.

I have here an ivory scale divided to hundredths of an inch, the divisions of which are filled with wax and graphite, so that the lines appear black, and the interspaces white. Everyone present, who has normally good sight, will have no difficulty in resolving the lines; that is, in seeing by the unaided eye the spaces between the consecutive lines, provided the scale be suitably illuminated. Those among you who have not yet tried the experiments, will be surprised to observe how much more perceptible are the lines if illuminated by a condenser. If ivory scales were accurately ruled, so that each line was equal in breadth to the interspace, some of you would resolve, without much difficulty, lines as high as 150 to 200 to the inch with the unaided eye, whilst here and there exceptionally powerful sight would resolve lines even closer. These figures would be slightly augmented if the lines were ruled on glass, and viewed under the most favourable circumstances by transmitted light. I have met with one instance where lines on glass, slightly closer than 250 to the inch, were resolved by the unaided eye.

I have here a series of stage-micrometer rulings on glass, commencing with fifty to the inch, and progressing to 10,000 to the inch. They probably belonged formerly to the possessor of a microscope in the days when the measurements of objects were generally made by direct inspection and comparison under the microscope, and before the introduction of the modern methods of measuring by screw micrometers, either on the stage or in the eye-piece. These old rulings are of fair quality, and I show them with a view of fixing in your minds a stand-point from which the fineness of Nobert's rulings may be appreciated.

Early in the century, Fraunhofer gave a great impetus to fine rulings by the production of his diffraction gratings, in which he aimed at and achieved a standard of accuracy in division and perfect similarity as to depth, breadth, and symmetry of angles of the furrows, such as had never before been formulated. He succeeded in ruling lines much closer than those contained on the highest of the series of micrometers I exhibit—as high, indeed, as 30,000 to the Paris inch; but, according to Sir John Herschel, these fine lines were not sufficiently accurate to produce pure spectra, nor could he go beyond 8,200 lines to the inch when they were submitted to this most searching test of accuracy. Sir David Brewster mentions that Barton produced rulings on steel up to 10,000 to the inch, which gave excellent spectra in his hands. Some of you probably have seen the so-called "Barton's buttons," which were stamped from his ruled steel dies.

The foundation of Nobert's machine is a dividing engine, calculated to produce parallel divisions far finer than could be marked by any ruling point yet discovered. The division-plate is 12 inches in diameter, and has twenty rows of "dots," by means of which two bands of silver imbedded near the circumference have been graduated with extremely fine lines to every five minutes in arc. These graduations are viewed by two compound microscopes, each provided with eye-piece screw-micrometers of special construction. The microscopes can be fixed at various points in the main iron bed of the machine, so as to check the rotation of the graduations of the division-plate; and the eye-piece screw-micrometers in the microscopes enable the observer to subdivide the graduations by inspection, and to correct the movement of rotation, within very narrow limits. The rotation of the division-plate is effected by a tangent-screw acting upon a worm on the edge of the division-plate. The tangent-screw is controlled by a large milled head, and a graduated drum shows the amount of motion. A screw adjustment is provided, by which the tangent-screw can be disconnected. from the division-plate. In order to equalize the pressure of the tangent-screw against the division-plate it is mounted to swing between conical bearings, and a counterpoise on a lever arm beneath keeps it in contact with the worm. The method employed by Nobert for obtaining the minute divisions of his test-plates was, to utilise the radius of the division-plate as a lever to move the glass plate on which the rulings were made at right angles to the motion of the ruling point. For this purpose he attached to the centre of the division-plate a bent arm, on which slides a bar faced with silver, having at one end a finely-steel point which can be adjusted with a scale and vernier so as to project more or less beyond the centre of the division-plate or axis of rotation. The radius of the division-plate thus becomes the long arm of the lever, whilst the radius of the projection of the polished steel point beyond the axis of rotation forms the short arm, the centre of the division-plate being the fulcrum. The motion of the short arm of the lever is communicated by contact with an agate plate to a polished steel cylinder adjusted to slide at right angles to the movement of the ruling point in V-shaped bearings of agate. The steel cylinder carries a circular metal table, on which the glass plate to be ruled is fixed by wax and clamps. To diminish the friction of the steel cylinder on the agate bearings, a counterpoise is provided, to lift it on a roller, whilst a weight attached by a silk cord to one end, keeps the agate plate in perfect contact with motor steel point. The motion of the lever arm is, of course, in arc, and hence the divisions would not be strictly equidistant unless compensation were made for the difference in length of arc and its sine; but since the actual space included between the first and last lines of the test-plates hardly exceeds 1-50th inch, this difference would be inappreciable. It may be assumed that Herr Nobert used the arc motion during the process of division only, and that for moving the plate over the spaces of the blank bands between the rulings he utilized the fine screw connected with the agate plate in the steel cylinder, by which a motion of the plate of about $\frac{1}{2000}$th of an inch can easily be effected; in this way he would reduce the total motion of the division plate in arc to about one-half. It would be possible to increase or decrease the successive divisions of the bands by increasing or decreasing the length of the short arm of the lever; but in view of the risk which such adjustments would involve, it is highly improbable that such a plan was adopted. There are other possible methods of effecting the divisions, all involving risk of large errors; the most probable conjecture is that Herr Nobert used the greatest possible eccentricity of the short arm of the lever, so as to utilise the smallest motion in arc required for his subdivisions.

The arrangement for carrying and adjusting the diamond point is specially ingenious. The questions to be solved were—(1) to provide means to adjust a diamond edge to any angle within required limits; (2) to balance it truly so that the weight pressure for ruling could be perfectly controlled; (3) to raise and lower it strictly in one plane—that is to say, mechanically free from lateral play, so that the consecutive divisions of the ruling depended solely on the motion imparted to the glass plate by the dividing engine; (4) to cause the diamond to oscillate freely in one plane; (5) to control the length of the line to be ruled; (6) to connect the whole with mechanism to insure an even rate of speed in the ruling movement of the diamond.

These matters have been worked out by Herr Nobert with extraordinary perseverance, as evidenced by the elaboration of the adjustments. I should despair of making myself understood on these points by mere verbal description; I shall, therefore, ask you to inspect the mechanism at the close of my remarks, for, to be understood, such complex adjustments need to be seen "in the flesh."

It would be an easy matter to suggest simplifications and possible improvements in this part of the machine. But it must be noted that Herr Nobert had always to work with very limited means, and under the great disadvantage that he thought it necessary not to disclose his methods of working. Judging the mechanism by the work he did with it, there can be but one feeling among all who are familiar with his ruled test-plates—a feeling of intense admiration for the inventiveness and extraordinary dexterity he brought to bear on the subject under the circumstances.

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* Abstract of a paper read before the Society of Arts.

For the production of diffraction gratings, interference-plates, and micrometers, where the equidistance of the lines would be of extreme importance, and where the breadth of space covered by the lines is so large that the lever motion in arc would have produced errors in the evenness of the division, Herr Nobert removed the bent arm from the centre of the division-plate, and substituted a vertical cylinder, on which he coiled an extremely thin, flat steet spring, having a hook at the free end. This hook he attached to a stud beneath the polished steel cylinder which carries the glass plate to be ruled under the diamond, and which takes the place of the carrier used for the test-plates. The rotation of the division-plate caused the vertical cylinder in the centre to rotate, coiling the steel spring, and thus, after the manner of a windlass, hauled along the diffraction-plate carrier at right angles to the ruling motion of the diamond.

The preparation of the diamond points has long been considered as the grand secret of Nobert's success. Beyond the admission of the bare fact that he did use diamonds, he kept the secret of their preparation. When the machine came into my hands, I expected to be able to explain the preparation of the ruling points immediately by inspection with the microscope; but the matter was far more difficult than I had supposed. My appeal to diamond "experts" brought me face to face with absolute contradictions. There were ten diamonds with the machine. Two of them were technically termed "points," pyramidal fragments of diamond terminating in points. All were agreed that these were untouched by the polishing mill. The other eight diamonds each presented the general form of two faces meeting in an "edge;" the difficulty was to decide whether the faces were in some cases (1) both polished, (2) both cleaved (cleavage-faces unpolished), or (3) one polished and one cleaved. The opinions of the diamond experts could not be reconciled, for in two instances they were wholly opposed, one party affirming that both faces were polished, whilst the other party were equally positive that both faces were due to cleavage alone, and were not polished.

Under these circumstances, it appeared to me essential to submit the diamonds to the test of the goniometer, with a view to determining whether the angles of the natural cleavage-planes had been altered, any such alteration being necessarily due to artificial polishing of one or both faces. I thought it would be most satisfactory to ask the assistance of a professional mineralogist, and, therefore, applied to Mr. Lazarus Fletcher, of the Mineralogical Department in the British Museum, who very kindly undertook to examine the diamonds, and measure the angles with Fuess's goniometer. In Mr. Fletcher's opinion the two "points" were untouched by the polishing mill; diamonds No. 4 consisted of two cleavage-faces meeting in the edge, and was untouched by the mill; in each of the seven remaining cases one of the faces meeting in the edge was an untouched cleavage-face, and the other had been polished, and in some cases an additional facet or two developed on that side. The goniometer showed that in the polishing the angles had been altered from the natural cleavage-planes by quantities varying from a few minutes up to about six degrees, and as no two were exactly alike, it might be assumed that, as Mr. Fletcher suggested, "the alteration of the angle is merely an incident of the polishing," and not a condition distinctly aimed at by Herr Nobert. I had previously stated (at the Royal Microscopical Society) that some of the diamonds appeared to have two polished faces meeting in an edge. On closer examination in Mr. Fletcher's presence, I found that certain striations on the faces, which I had regarded as imperfectly polished, were more probably untouched, and hence I have given my adhesion unreservedly to his judgment.

Nobert's original rulings appear to have been made on artificially polished surfaces. Later on, he experimented with thin cover-glass, ruling on the natural or melted surface. More recently, Dr. Schroder called his attention to a kind of glass technically termed mild glass, and instructed him in a method of polishing, which induced him to revert to artificial surfaces again. The plates ruled since 1869 are probably all of "mild" glass, thinned down to suit high powers. In 1869, he adopted a plan suggested by Dr. Woodward, namely, to rule on thin glass, and mount the ruled plate on another thin glass, the whole dropping into a countersunk opening in a brass plate 3 by 1 inch, on which the data of the rulings were engraved. Dr. Woodward suggested this plan in order to facilitate the employment of an achromatic condenser of large aperture and short focus.

The memorandum-book shows that in ruling a 30-band plate, Nobert commenced with the coarser lines, using a weight-pressure of 30 grammes of the diamond, which was gradually diminished until for the highest band he used only 3 grammes. A later entry seems to imply that he reversed the order of the ruling, commencing with the finest lines and the lightest pressure.

In conclusion, I may express my conviction that the publication of the data obtained from the examination of the machine, and especially of the diamonds, will further the interests of micrometry. Several ruling machines exist in Europe and America capable of dividing space as minutely and accurately as Nobert's machine; but most, if not all, of them refuse to rule lines at all comparable to his when the closeness exceeds about 50,000 to the inch; and this is, I believe, mainly, if not wholly, due to imperfection in the diamond, or in the method of regulating its pressure on the surface to be ruled.

I venture to predict that when the history of the mechanical inventions of our time comes to be written, a large measure of credit will be assigned to the mechanical genius of Herr Nobert, as embodied in this ruling machine.

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VIGNETTING.

Having obtained a negative in which the background is neither too light nor too dark, how should it be vignetted? Seeing that the whole principle which underlies vignetting consists in permitting a dominant light to act upon the face and so much of the figure as is required to be shown, and shielding the light from all other portions, it will be at once evident that an opaque mask having an oval or other form of aperture interposed between the negative and the light will not serve the intended purpose unless the light falls upon the negative from all directions. Such a mask interposed in the path of the direct rays of the sun would cause the print to have a sharp, hard edge, which would be fatal to artistic effect. But if an arrangement of this nature were exposed to a cloudy sky, or to the sun's rays previously broken up by having a diaphanous screen interposed, then is the light distributed with a softness of margin dependent upon the distance between the vignetting screen and the negative.

One of the most common methods of vignette printing is to place at a short distance in front of the negative a sheet of thin cardboard or opaque paper having an aperture cut into it of about the same dimensions as the portion of the figure that is required to be shown in the print. If the printing is to be done in the shade, this mask will answer without further preparation; but if the direct rays of the sun are to be utilized, then must the aperture in the mask be covered over with thin tissue paper. This causes such a distribution of the light as to prevent it from forming a hard line. But in any case the distance at which the vignetting mask is mounted in front of the negative determines whether the vignette is to have a hard or soft margin. From half-an-inch to one inch between them will answer every purpose, unless in the case of very large pictures, when the distance may be increased with advantage.

Vignetted portraits are to be met with everywhere, but this is not so with regard to landscapes. If photographers could only realize what a degree of beauty could be imparted to otherwise rather commonplace landscapes by the simple act of vignetting, they would adopt this method of printing to a greater extent than they do at present. Whether from a want of covering power in the lens, from defects at the ends and corners of the plates, or from other causes, it not unfrequently happens that in many cases the marginal defects are such as to necessitate a cutting down of the print to a serious extent.

Seeing the remedy is so easy, why limit the dimensions of the picture in this manner? By the judicious application of the vignetting mask not only may the defects referred to be cut off, but a positive charm be imparted.

The fact also ought not to be lost sight of, that a photograph, if skilfully vignetted, may be printed upon a much larger sheet of paper than the negative. We have portraits which, to the observer, have apparently been made on a 10 by 12 plate, the paper being trimmed only a little smaller than these dimensions, t which, in reality, were taken on a 4-4 plate, the head being ced well up to the end of the plate and the rest managed by gnetting. So with landscapes; a negative of any given size, y, by exercising judgment, be made to produce prints aprently one or two sizes larger.

Concerning the best means for viguetting, it is not altogether sy to speak dogmatically. In the case of a negative in which ere are such marginal defects as to render it out of the estion to print it entire, the way we adopt is to take an oil be of burnt umber and paint an oval of suitable form all und the plates, then apply the end of the finger as a dauber so to diffuse the paint inwards and in such a manner as to gently d almost imperceptibly obscure the subject within a suitable stance of the extreme margin, which must be left quite opaque. is, when dry, forms a vignetting mask that yields a good ect, and which possesses this advantage that, when prints are quired, there is no further trouble to be encountered in fitting asks.

In portraiture, excellent effects are obtained by double vigtting, that is, first printing the subject with a vignette mask the usual way, and then, having removed the negative, exsing the paper to the light under such conditions that the int is shielded from the light by means of an opaque mask, e margin of which is guarded off into transparency. This ves a dark margin to the picture, but none the less is the rtrait vignetted, only in this case it is vignetted into darkness stead of into light.

This principle may be applied also to landscapes, often with a od effect.—*Photographic Times.*

THE RAPID CONTACT PRINTING PAPER.

BY MORGAN AND KIDD.*

HROUGH the courtesy of your Secretary, it is our privilege to ldress you a few words on "Rapid Contact Printing Paper," hich, since its recent introduction, has strongly engaged the tention of photographers, and has been deemed of sufficient portance to attract more consideration than any of the lvances in photography since the introduction of dry plates. is not our province as manufacturers to try to define the ue value of the process, nor is it necessary, considering the ry elaborate criticisms to which it has already been subjected critics who know a great deal about it, and critics who do not. he process has been particularly liable to hasty criticism. It s not been constrained to win its way gradually into notice; it its promise was so brilliant as to command immediate tention. This brilliancy of promise consisted mainly in its rfect freedom from two of the greatest drawbacks of the old ocess—its absolute dependence on a long exposure to daylight, d its distressing instability. By the newer process the exsure is brought down to the shortest period advisable, and ere are the strongest assumptions that its results are solutely permanent.

It has been complained that the manufacturers have underated the very short exposure necessary. As far as we are conrned, we do not find our exposures as originally require odification, but we have in some cases found failures arise from improper estimate of the very great decrease of illuminating wer of artificial light as the printing-frame is moved farther om its sources, and also from insufficient allowance for the lour of the negative, a negative of a non-actinic yellow colour metimes taking as much as fifty times the exposure of a negave of a blue colour. We can hardly imagine practical workers iling to attach sufficient importance to either of these facts, ut we have found it is generally to miscalculations of this kind e are indebted for accusations of understating the necessary exosure.

Exposure must always be a matter of judgment; but a trial or wo is generally sufficient to estimate it. Once decided, there no further difficulty with prints from the same negative, if our light does not vary in power. It is therefore wise to trust little as possible to a power so uncertain as daylight; and fter trials we ourselves have decided to use magnesium ribbon, nd we recommend this as a very convenient and inexpensive ght. Two inches of it burnt four inches distant from the egative is sufficient for an average exposure, lasting less than second. We have always found a short exposure to a very owerful light such as this, gives better results than a longer exposure to a lower power. It may be always ready, as a supply sufficient for a gross of prints may be carried in the waistcoat pocket, and it is certainly not expensive when two inches is sufficient for the exposure of at least four prints, if the printing-frames are arranged in a a square facing the light burnt in the centre. And we may here draw your attention to the economy of lighting power chemicals, &c., practicable by making single operations suffice for batches of prints. It is sometimes complained that the operations are cumbersome, and that a print takes an unreasonable time before it is produced; but this complaint applies even more to albumenized paper when single prints only are produced. It is only by toning, washing, and fixing in batches that the slow progress is bearable, and in the newer process it is as easy to work prints in batches as singly. It is the exposure, however, which is the prime drawback in the manipulation of the old process. While the rapid contact printing paper is totally free from this objection, it has not been able to reduce the much smaller period taken by the subsequent operations, and in these the time necessary to both processes does not differ materially, and in both they are simple and nearly mechanical operations. Perhaps of the two the development necessary to the newer process requires a little extra judgment; but any extra attention required is amply repaid by the power the process gives of humouring the negative. Many negatives useless with another process may be made to give good results by treatment in development. To obtain the very best results, intelligent working is certainly required; yet in this, as in many other processes, average care will give average results. It must also be considered that the labour is so greatly reduced that men of superior intelligence may be employed without extra expense, as they would be able to do the work in a tithe of the time required formerly. It will, however, be the aim of manufacturers to render the process as simple as possible, and we think it reasonable to look for great improvements yet in matters of detail. In such a new process discoveries are made day by day, trivial enough in themselves, but greatly improving the convenience of working. We have just found an improvement of this description in a more efficient "mountant." The mounting at one time threatened to prove a difficulty, the high surface produced on the prints by being squeezed and mounted while on glass was destroyed if damped on the back with paste for mounting, and we find the only mountant which does not have this action is the preparation known as "Giant Cement," which may be made with Nelson's No. 1 gelatine, with acetic acid sufficient to cover the bulk, dissolved with heat. A small quantity of chrome alum may be added to make the mixture insoluble.

In making these few remarks we have not thought it necessary to describe the working of our process in detail, as our formulæ and method have been frequently published in the photographic journals, and are no doubt familiar to you; but we have placed in the hands of your Secretary a number of our printed instructions and formulæ for distribution, and these describe the whole process very fully. We may also call your attention to our specimens which were all produced with short exposures to magnesium wire and daylight, and we think it will be agreed are in no way inferior to good albumenized paper prints. We beg to thank you for your very kind permission to submit them to you.

Notes.

The isolation of the hitherto disputed argentous chloride, Ag_2Cl, seems to have been effected in a very satisfactory manner by Dr. W. R. E. Hodgkinson, who has been experimenting in conjunction with Captain Abney.

Normal chloride of silver or argentic chloride was exposed to light, and after it had become thoroughly darkened the unaltered argentic chloride was dissolved out by copious washings with a solution of sodium chloride or of ammonium chloride, the argentous chloride being left behind.

Not only did the argentous chloride give good analytical numbers, but the following circumstances point very decidedly to its being a definite compound and not a mechanical mixture of metallic silver and argentic chloride. Nitric acid of such a strength as will dissolve finely-divided silver readily, has no action on the sub-chloride of silver (argentous chloride); that is to say, it does not remove silver and leave the normal chloride; but ammonia splits up the argentous chloride into argentic chloride, which latter dissolves, and finely-divided metallic silver remains behind; this metallic silver being freely soluble in the same nitric acid which failed to exercise any action on the argentous chloride.

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* A paper read at the Edinburgh Photographic Society.

One point connected with the action of light on chloride of silver is well known, but hardly sufficiently recognized, and this is the fact that when pure and absolutely dry it may be exposed to light for years without any trace of darkening being noticeable. In order to demonstrate this the material must be sealed in an exhausted tube, and careful precautions, which every chemist will understand, must be taken to ensure perfect purity and the elimination of every trace of moisture.

New uses for photography are being continually found. If rumour speaks correctly, a plan, said to have been inaugurated by a well-known London surgeon, of exchanging with his foreign professional correspondents photographs of the most exceptional cases which came under their notice, is being largely developed. The notion is not a pleasing one, but if the circulation amongst medical men of cartes of cancer, cabinets of complicated compound fractures, &c., be of any practical use in assisting in the advance of the healing art, any sentimental objection to the practice would indeed be unseemly and out of place.

There is, at any rate, one popular physician in London, who, in the note-book he keeps of his patients, has space reserved for the insertion of the photograph of every one who consults him. He finds the portraits thus preserved of great assistance, in conjunction with his MS. notes, in recalling individual cases.

On Tuesday last, the hasty rush at the meeting of the Photographic Society to procure proper chalk for blackboard purposes, and the anxiety of the members lest anything serious should happen if it were not forthcoming, reminds us of a story told, if we recollect rightly, of the late Edmund About. There was a cabal got up against a certain celebrated *danseuse* by the friends of a rival, and the refinement of ingenious malice was reached when on one occasion, just as the young lady was about to go on the stage, not an atom of chalk for the soles of her shoes could be found in the theatre, the whole stock having been carefully removed by the enemy. Consternation reigned, and the *danseuse* almost went into hysterics, for it was late, and the shops were shut. Suddenly About, who was present, uttered an exclamation, slapped his forehead wildly, and rushed from the theatre. At first it was thought the accomplished writer had gone to commit suicide out of sympathy with the distressed *artiste*; but in a few minutes he returned, wiping his brow, and triumphantly holding up a couple of pieces of chalk, which he had surreptitiously purloined from a neighbouring billiard saloon. We do not know whether anybody has a design against a well-known member of the Society, and desires to destroy his peace of mind by denying him his piece of chalk, but it is certain that no inveterate billiard player was present on Tuesday evening, or chalk would have been instantly forthcoming.

We had occasion to call the other day on a photographer who was complaining bitterly of the badness of the times and the absence of sitters. A glance at his studio and reception room seemed to some extent to furnish the reason. Anything more depressing and uncomfortable cannot be imagined. The reception room was but half furnished, it was littered in every direction, and everything was thick with dust. The studio, a very well-appointed one structurally considered, was in confusion, and dirt reigned supreme. Ladies—who now-a-days amount to two-thirds of an average photographer's sitters—like neatness, and let the photographs be ever so good, will not patronise a dirty and slovenly-kept establishment. It is a pity that some photographers are so shortsighted in this respect.

We regret to announce the death of Dr. J. E. Carpenter, the poet and author who, though not a photographer himself, was well known in photographic circles. Dr. Carpenter's songs, though written for a past generation, are still "household words," and the popularity of his "Beautiful Venice," and "What are the Wild Waves saying," has not been excelled, and rarely equalled by the productions of later times. Dr. Carpenter was a most prolific writer of lyrics, and the constant recurrence of his name on the music sheets of the past half century testifies to his fertility.

A curious case in which photography played a part came before Mr. Justice Kay last week. It was necessary to prove the death of a Bristol gentleman named Trix, who was supposed to have died in Spain, but whose body was not identified. It was afterwards discovered that a gentleman, answering the description of Mr. Trix, but travelling under the name of Evans, had shot himself in Spain. On a photograph of Mr. Trix being shown to a fellow-traveller of Mr. "Evans," the former instantly recognised it; and as this was coupled with one or more trinkets found on the body, and recognized by members of the family, the evidence of death was held to be satisfactory.

Among the objects of interest in the historical collection which the Photographic Society exhibits at South Kensington, are the original Nièpce photographs which were recently in the possession of the late Dr. Bauer. They are thus described by him in the first edition (1844) of "Hunt's Researches on Light":—

1. A design 5½ by 4 inches longways, on a pewter plate 6½ by 5½ inches; it is stated to have been taken from a print about 2½ feet long. The picture represents the ruins of an abbey: in

a proper light it is very distinct. 2. A view 7½ inches by 6 ins. longways, on a pewter plate 8 by 6¼ inches; it is stated on the back to have been M. Niepcé's first successful experiment of fixing permanently the image from nature. The view is of a court yard seen from an upper window. It is less distinct than the former; the outlines of the black portions are bordered by a white fringe, whiter than the adjacent parts.

Our further notice of the exhibits at South Kensington must stand over for this week.

There are one or two points in a concisely-written article on photography in this month's *Cornhill* worth noting. The writer points out that in spite of the boasted rapidity of dry plates, all these surprising achievements have been equalled in the past. "Breese and Blanchard long ago secured upon 'wet' plates those surprising effects of breaking waves and fleeting clouds which we are apt to believe have only recently been obtained," while in 1851 "Talbot successfully photographed a page of print attached to a revolving wheel by the light of the electric spark from a Leyden jar; the duration of such a spark being less than the twenty-thousandth part of a second." The progress of the art is well indicated by the Census returns, which, in 1881, showed that there were in Great Britain 7,614 photographers, only 51 having been recorded in 1851.

The Free Church Synod of Lothian and Tweedale is terribly exercised over the conduct of one of its ministers, the Rev. Dr. Stuart Moir. The rev. gentleman, besides being charged with other offences, is accused of having committed the heinous sin "of being photographed in priestly attire, and holding a crucifix in his hands." This is truly awful! But what would the Synod have said if Dr. Moir had been taken after the style of a photograph we noticed the other day in a shop window in Holborn of a well-known catholic clergyman, who is represented in his robes with a crucifix on the table beside him, and holding a picture of the interior of his church, at which he is gazing with evident admiration?

A lady, accompanied by three children, went the other day to a suburban photographer. While the latter was talking to her in the reception room, the printer came in and said in a low voice, "I wish you'd come and look at these prints on the new paper. The measles, if possible, are worse than with the sample we tried the other day." There was nothing in the remark, but the lady, overhearing it, took alarm at once. "Have you measles in your establishment, Mr. ——? Really, you ought to have told me. I must take my children away at once, for they have not had them." In vain the photographer tried to explain what a "measly print" meant; he only made matters worse, for the lady triumphantly pointed out that measles might be communicated by contaminated paper, and gathering up her skirts and her children under her wing, she precipitately fled!

Vanity Fair makes a scathing onslaught on the pictures at the Royal Academy. It remarks: "The plain truth is that of these two thousand pictures, drawings, and statues, a large proportion are utterly bad, and ought to be broken up or burned by the common hangman." The "hanging committee" is probably what our contemporary means. However, we are inclined to agree with him when he says "there are scores and scores of big pictures which, though good as portraits, are utterly uninteresting," but not when he observes that "British artists are rapidly developing into something not much better that amateur photographers." Rather rough this, on the amateurs!

Photographers ought to be interested in everything that concerns the sun. Perhaps they will be grateful to Mr Swinton, author of *The Almanack of Solar Physics*, who says, "Spots on the left-hand side of the sun's disc mean fine weather, spots on the right-hand mean foul."

Now that collodion is no longer an essential to every photographer, and alcohol only a factor in a minority of photographic processes, the photographer is not so deeply interested in the extra duty of two shillings a gallon on spirits as he otherwise might have been. A well-known firm of wholesale druggists gives the advance in price as follows:—Spirits of wine, 56 O.P., 3s. 2d. per, gallon; absolute alcohol, 6d. per pound; tinctures, 6d. per pound; chloroform, and ether from pure spirit, 6d. per pound; French essences, 6d. per pound.

It was stated a short time ago that the Blenheim Raffaelle and the Vandyck purchased for the Nationa Gallery had been photographed by Mr. Morelli. It would be interesting to compare Mr. Morelli's work with that of Messrs. Braun. So far as we are aware, Mr. Morelli does not use a secret process.

A voluminous report on colour blindness has just been presented to Parliament, together with details as to the tests used in examining candidates for nautical certificates, and a chromo-lithographic test-card. Considering that so very many persons are colour-blind, one can hardly be surprised at the fact that much difference of opinion should exist as to the extent to which photography reproduces colours in the relative order of their intensity. Out of the detailed reports on nearly a hundred cases it is interesting to quote from a few:—

"C. K." named the black card green, and the red card green and brown. Also described the dark green glasses as red and yellow. "W. J." described the dark green and yellow glasses as red, and the light blue glasses as green. "W. E. M." described the dark green glasses as red, the light blue glasses as green, and the yellow glasses as red. "A. R." named the red card green, the green card yellow, and the black card green or brown. Also described the dark green glasses as red, the light blue glasses as green, and the yellow glasses as red.

Photographs of Abdul Rahman, taken at Rawul Pindi, are on their way to this country. His Highness, as we stated a week or two since, did not at first fall in with the desire of the numerous photographers to "take him." But his views must have undergone a considerable modification, for it is now stated that before leaving Rawul Pindi he selected a photographer to return with him to Cabul. The position of this honoured artist is not, on the whole, however, envied by his brethren.

Patent Intelligence.

Applications for Letters Patent.

5523. Eugen Himly, 22, Gt. St. Helens, London, for "Improved method of, and apparatus for, taking photographs by artificial light."—[Complete Specification.]—5th May, 1885.

5527. Alfred Julius Boult, 323, High Holborn, Middlesex, for "Improvements in, or relating to, holders for photographic films."—(*George Eastman and William Hall Walker*, United States.)—5th May 1885.

5677. William James Lancaster, 6, Livery Street, Birmingham, for "Improvements in portable stands for photographic camera work, and for various other purposes."—8th May, 1885.

5725. Alfred Julius Boult, 323, High Holborn, Middlesex, for "Improvements in photographic film holders."—*George Eastman and William Hall Walker*, United States.—[Complete Specification.]—9th May, 1885.

Patents Sealed.

7606. Duncan Campbell Dallas, 12, Crane Court, Fleet Street, London, Engraver and Printer, for "Improvements in obtaining printing and other surfaces."—Dated 12th May, 1884.

8566. George Wilson Morgan, Photographer, 5, Crimon Place, Aberdeen, Scotland, for "Improved multiplex photographic backgrounds."—Dated 4th June, 1884.

424. Alexander Lamont Henderson, 9 and 10, Southampton Buildings, Holborn, for "Improved method of, and apparatus for, coating glass or other plates, paper, cardboard, or other material, with liquified gelatine or other fluids, particularly applicable for coating plates for use in photography."—Dated 12. January, 1885.

Patent on which the Fourth Year's Renewal Fee of £10 has been Paid.

2783. C. Sands.—"Regulating instantaneous photographic shutters."—1881.

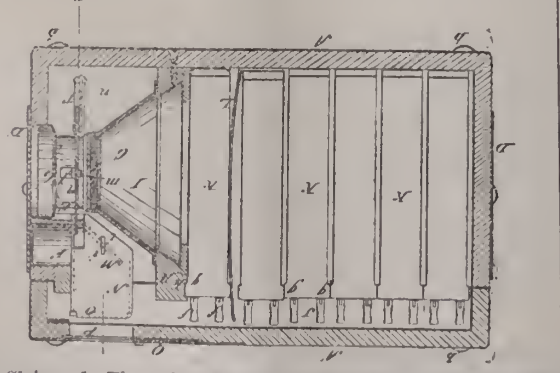
Specification Published during the Week.

3185. Alfred Julius Boult, of 323, High Holborn, in the county of Middlesex, Engineer, for "Improvements in apparatus for applying photographic emulsion to photographic plates."—(A communication from Eli John Palmer, of Toronto, Canada, Manufacturer.)—Dated 11th March, 1885.

The arrangement is described and figured on page 199 of our present volume.

Patents Granted in America.

316,647 Henry V. Parsell, and Henry V. Parsell, Junr., New York, N.Y. "Photographic camera."—Filed Jan. 31, 1885. (No model).



Claim.—1. The swinging apertured shutter, R, for controlling the main lens-tube, in combination with the link *n*, the spring T, and the trigger V, arranged for operation in connection with duplicate stops c' c^2 on the shutter, for giving a "time" on an instantaneous exposure of the sensitive plate, as desired, substantially as described.

2. The combination, with the swinging shutter that controls the main lens-tube, of the spring, T, for actuating the shutter, the intermediate fulcrum, *r*, to said spring, and the tension-regulating nut *s*, arranged to bear on or against a backward extension of the spring, substantially as described.

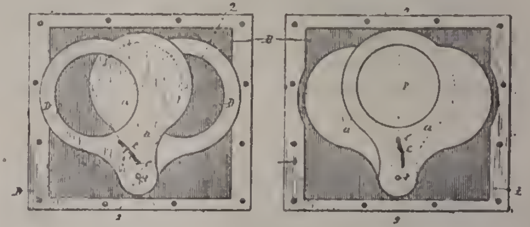
3. The combination of the spring-button b', the trigger V, and the spring-actuated shutter R, having duplicate stops c' c^2, essentially as described.

4. In the finder of a photographic camera, the adjustable reflector M, pivoted intermediately at its height to vary its angle relatively to the tube and ground glass of the finder, and whereby said reflector is or may be balanced, and be restrained from shifting or dropping by gravity, and be more readily adjusted, substantially as specified.

5. In combination with the box N of the finder, its ground glass O, lid or slide Q, and tube F, the angularly-adjustable mirror M, provided with a pivot, *i*, constructed to form a spring for holding said mirror when adjusted, essentially as described.

6. In a camera-box provided with a finder-tube, the pivoted and swinging cap D′, arranged to control both the main lens-tube and finder tube, essentially as described.

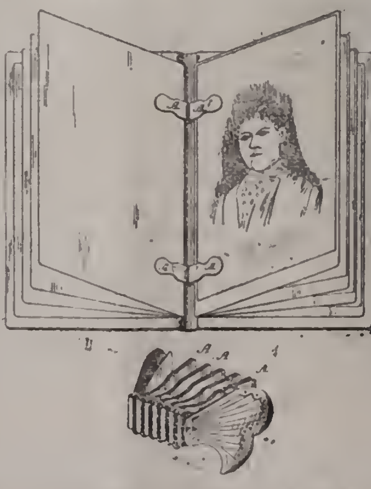
316,561. Cullen C. Packard, Kalamazoo, Mich. "Photographic shutter."—Filed Feb. 17, 1885. (No model.)



Claim.—1. In combination with a photographic camera-box, the shutter-case B, attached to the inside of said camera-box, back of the tube containing the lens, said shutter-case containing shutter-plates *a*, adapted to open or close apertures in the sides of the shutter-case B, the shutter-plates *a*, provided with slots *c*, adapted to be operated by means of pin *r*, passing through said slots, and a vertical slot *v*, in the side of shutter-case, all in combination, as shown and described.

2. In combination with a photographic camera, the shutter-plates having apertures near their edge, and pivotally connected to shutter-case, as shown, the slots in said plates being placed at an angle to a line passing through the centre of apertures in said plates, and the points of pivoting the pin passing through said slots and the slot in one side of the shutter-case, as shown and described, and for the purpose set forth.

316,586. William Verbeck, Oakland, Cal. "Photographic and card file."—Filed March 20, 1884. (No model.)



Claim.—1. A holder or file consisting of a series of metal strips olded upon themselves, so that a card may be held between the lastic open ends, and having the closed ends or bights conected with each other by links or cords, substantially as herein escribed.

2. A holder or file consisting of a series of metal strips folded pon themselves, so that cards may be held between the open nds, the closed ends or bights being united by cords or links, n combination with covers, within which two sets of clamps re secured near the top and bottom, substantially as herein escribed.

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STAINING TISSUES FOR PHOTOGRAPHY.

BY GEORGE A. PIERSOL, M.D.*

SATISFACTORY results in photographing histological tissues epend largely upon two conditions :—

1. Having a section too thin, and even that little more than a ingle layer of cells is included.

2. Having such thin section properly stained—especially ufficiently differentiated.

Regarding the first condition, but little difficulty is experienced n these days of sliding microtomes, whose advent has marked a ew era in section cutting.

The successful completion of the second condition for photography is not always as readily accomplished. By most workers, robably, the stains ordinarily employed and valued for general se are borax-carmine and hematoxylin ; of the two, the latter s usually the more highly prized—the simple manipulations required and the unsurpassed results justly giving hematoxylin a ecognized pre-eminence.

These sections stained with borax-carmine (properly used) ield often excellent negatives ; in their strata the red colour eing sufficiently non-actinic to give a vigorous contrast on the late. In well-differentiated carmine staining, however, little else han cells is coloured, and frequently delicate details of the connective-tissues are wanting, on account of their transparency.

Hematoxylin stainings, in very thin sections, while all that an be desired under the microscope, are usually very disappointing when photographed ; the delicate layer of tissue offers lmost no actinic contrast when monochromatic sunlight is obained by the ammonio-sulphate of copper cell.

Since hematoxylin is so extensively employed in all lines of ork, a ready modification of this staining to meet the needs of hotography is of advantage. Such a result is obtained by a odified use of a formula of Wiegert, already commended by r. Councilman for the study of the brain and spinal cord. While especially intended for nervous tissues, the modified use urnishes specimens of all organs admirably adapted for photography.

No especial formula for hematoxylin is needed, using one which is capable of staining deeply and giving standard results. n the usual course of work the sections are stained ; a few very hin ones, however, are allowed to remain in the solution, after hose for ordinary preparation, until they are of an intense dark urple, when they are transferred, one by one, to a capsule conaining a solution composed of the following constituents :—

Borax...	1.
Potassium ferricyanide	2.5
Water	100.

In this they are kept moving until the intense colour is radually discharged, and the purple tint is replaced by a bronzeellow, shading to saffron. Before the sections reach the latter olour, they should be washed in water ; the further usual steps n mounting are then completed.

Sections so stained, and mounted in balsam, will be found to ossess all the differentiation given by hematoxylin, with a hange from the puplish-blue colour to the subdued tones of rown—a substitution often most pleasing and grateful to the ye.

While in general appearance these sections resemble successful ismarck brown staining, there are differences in colour, the odified hematoxylin possessing a peculiar greyish brown tint, n addition, the differentiation being better marked, and much ore readily obtained than with the Bismarck brown, which is ometimes rebellious.

For photography, these modified stainings are well adapted, ince the thinnest possible layers are sufficiently non-actinic to ield a vigorous picture. A comparison of the results obtained from delicate sections stained with carmine or hematoxylin, as usually employed, and ones coloured as suggested, will convince that in the modified hematoxylin we possess a really useful and very convenient method of preparing tissues for photography.

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Correspondence.

ANOTHER SODA-POTASH DEVELOPER.

SIR,—In spite of the number of formulæ that have lately been given in the PHOTOGRAPHIC NEWS of a more or less similar nature anent the above-named developer, I venture to add one more. I had used with some success the Hoover formula as recommended for Inglis' plates, though I must say the results obtained with Carbutt plates were far more gratifying than those with the former. It may be that they contain more bromide of silver, but of that I am not sure, though perhaps some American amateurs have been, or will be, able to decide. Although thinking Hoover's formula left little to be desired, it struck me that a union of carbonate of potash with carbonate of soda in the B solution would produce rapid work with good colour and density, and so far my anticipations seem verified. I have tried the "combined developer" with plates made by Wratten, Edwards, Rouch, Carbutt, Monckhoven, and Inglis, and the resulting negatives have been highly satisfactory. The following are the proportions :—

Solution A.

Sulphate of soda crystals... ...	2 ounces
Bromide of ammonium	20 grains
Citric acid	60 ,,
Pyrogallic acid	1 ounce
Water, make up to	16 ounces

Solution B.

Sulphite of soda crystals... ...	2 ounces
Carbonate of potash	2 ,,
Carbonate of soda...	1 ounce
Bromide of ammonium	20 grains
Water, make up to	16 ounces

Some, no doubt, would prefer to lessen the citric acid a little, and omit the bromide altogether in the B solution ; but with the varified air at this altitude (7,800 ft.), it is necessary to restrain more carefully than at the sea-level, or even three or four thousand feet above it.

I noticed in a late number an assertion of Dr. Eder's to that effect, but I have found it by practical experience, and the spoiling of a good many plates. For, when in Nassau (Bahamas) I got capital results with plates exposed for three or four seconds, and even as many as fifteen seconds, from five to six o'clock in the afternoon, yet these same plates here were hopelessly over-exposed by three or four seconds under similar conditions during the day, and six seconds in the afternoon.

But to go back to the developer. I add four ounces of water to two drachms of solution A, and—if I am sure the plate is not under-exposed—flood the plate with it, returning it at once to the developing glass, and adding one drachm of solution B before again pouring it on to the film. This ought to start the image, but in any case I keep another drachm of B in the measuring glass, and add a few drops at a time till all the detail is satisfactorily out. If I think the plate over-exposed, I only mix half a drachm of B at first, and then add a few drops at a time, whatever more may be required. The developer works very cleanly, and with plates exposed under similar conditions it is by no means necessary to discard the fluid after every plate. With a little ready mixture several plates can be satisfactorily developed with more or less of the same solution used for the first.

On my return to England, which I hope will be before long, I intend to make further experiments ; but in the meantime should feel glad to hear if any of your numerous readers find this developer satisfactory. I may state that

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* Quoted in the *Science Monthly*, from the *American Microscopical ournal.*

I had tried it some time previous to the publication of the red prussiate of potash solution which I saw advocated a few days ago in *Anthony's Photographic Bulletin*, but which I have not yet employed. Curiously enough, however, I tried to develop the other day a plate of Wratten's and one of Rouch's by an ammonia formula very similar to their own, and could get no result, but on washing the plates well, and treating them to the solution given above, they came up fairly fast, and behaved altogether most satisfactorily. ERNEST BILBROUGH.

Mexico City, *April* 20, 1885.

DISTORTION IN PAPER POSITIVES.

DEAR SIR,—As albumenizers of long standing, we have read with interest the article on the above subject by Mr. J. Harris in your last issue. We have always condemned any previous coating of the paper with gelatinous substances or any "mixtures" with the albumen of any kind, because it prevents the perfect coagulation of the albumen by the silver bath, and this, to a certain extent, must help the distortion. We do not know, of course, whether the paper manufacturers are treating their papers as formerly. We would willingly make trials and send samples to anyone who would correspond with us on the subject.—We beg to remain, sir, yours, &c.,

A. RIVOT & Co.

ABNORMAL BEHAVIOUR OF GELATINO-BROMIDE PLATES.

DEAR SIR,—In your last issue you report a member of the Chicago Amateur Photographic Club to have dropped two 8 by 10 plates out of their holder on to the floor of a well-lighted room, which plates had previously been exposed in the camera for one second on a out-door subject, and were found on development to yield perfect pictures. The phenomenon is a very curious one, and may appear to many incredible. I may say, however, that I have had many experiences which, if not identical, certainly have a strong leaning in the same direction. I have many times found plates which had received a very long exposure—say ten times what was required—almost incapable of yielding any image whatever. The development has been continued for a long time with a developer at first normal, but afterwards gradually increased in strength until, after a great deal of forcing, the picture would suddenly flash out, to be quickly followed by a reduction of silver all over the plate. In such cases, one might expect fog to ensue, but hardly that greatly-diminished sensitiveness under the action of the developer, which has invariably occurred in my experience.

I ought to say that these effects have only been observed in the case of very rapid plates where the emulsion has been carried far into the blue stage, and suggest to my mind the existence of a sort of neutral zone somewhere between the point of maximum sensitiveness and that at which complete reversal of the image takes place.

At any rate, the matter is one of interest, and ought to be of practical utility to those who occasionally use plates the sensitiveness of which is carried further than is usually deemed expedient for ordinary work.—Yours truly,

J. W. HUNTER.

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE ordinary meeting of this Society was held on Tuesday, the 12th inst., at the Gallery, 5A, Pall Mall East, Mr. JAMES GLAISHER, F.R.S., President, in the chair.

The minutes of the previous meeting were read and confirmed. The following gentlemen were then elected members of the Society:—Major-General J. Preston, Messrs. J. Francis Leese and George Walter Tyser.

Captain W. de W. ABNEY, R.E., F.R.S., read a paper entitled "On the Chemical Theory of the Photographic Image." He commenced by saying that when light was allowed to act on silver chloride, chlorine was given off, and if silver bromide be similarly acted upon, bromine would be liberated. Taking the silver bromide as an example, two atoms of bromide of silver after exposure would be represented thus:—Ag_2Br+Br. Text-books, and some other sources of information, stated that silver was a monad, one atom of silver uniting with one atom of bromine. The opinion, however, that silver was a monad, was not confirmed by many able chemists. Captain Abney then touched on the theory set up in 1839 regarding the supposed action of light on the iodized Daguerreotype plate.

Methods of forming argentous oxide were then spoken of, and Captain ABNEY said if it be granted that argentous oxide did exist, then it was possible to admit the sub-bromide and sub-chloride theory. Now the question arose whether the same effect could be brought about by the action of light. Tubes containing chloride and bromide of silver respectively both in the presence of nitric acid and water were shown, which had been exposed to light for some days. Those containing acid were found to be unaffected by light, the acid proving a solvent for the metallic silver. Captain Abney then mentioned the early experiments of Guthrie, wherein it was found that metallic silver was formed in every case by a blackening of the tubes, which was afterwards amenable to the influence of nitric acid. Also that ammonia, acting on Ag_2Cl, takes up one equivalent of silver and leaves the other behind. Some people, he thought, had not seen sub-chloride or sub-bromide of silver, so he had brought some prepared by Dr. Hodgkinson. Sub-bromide had been prepared by means of argentous citrate, and examples of each were passed round for inspection. The speaker, continuing, said it was usually considered that silver bromide, exposed to light, remained in the same physical condition—some thought a chemical action, and others a voltaic disturbance took place. Neither could take place without the other. With a delicate galvanometer it was thought possible to observe a deflection of the needle when the film was acted upon by light, and in some cases the deflection would be sufficient to cause the needle to swing out of the sphere of electric action. The use of bromine absorbents in collodion emulsion plates was then spoken of, whereby density was more easily attainable, as in the case of tannin, beer, and other similar substances. Plates were passed round showing the effect of heat on a sensitive plate, by which an image of the iron used for the purpose was produced. When, in other cases, the plates had been allowed to cool, no difference was observable, the normal condition having become again established. It was necessary for those who hold to the physical theory to explain why the increased amplitude of vibration dies away, and he would be glad to hear of any experiments that would explain the vibratory theory, which could not be explained by the chemical. The effect of the silver haloids on the spectrum was alluded to, and their power of absorption pointed out when mixed, as in the case of bromide and iodide. The keeping qualities of plates was also dealt with, before and after exposure; in the latter the images had completely disappeared, in some cases, in two months.

At the conclusion,

The CHAIRMAN said that if anyone present had been working in a similar direction, he should be glad to hear of their results.

Mr. W. E. DEBENHAM thought the results with all three haloids were nearly equal. If films were of sufficient thickness to be opaque, they would absorb all the light in every part of the spectrum. Some experimenters had found a difference between iodide and bromide in certain parts of the spectrum, and others had found certain additions appeared to act as optical sensitizers. Drs. Vogel and Eder had been working in that direction.

Mr. T. SEBASTIAN DAVIS spoke of the changes which are effected in development. So far as wet collodion was concerned, an exposed and fixed but undeveloped plate was undistinguishable from a plate fixed without exposure to light.

Mr. A. SPILLER mentioned that an Italian professor had shown that silver chloride was not acted upon by light at very low temperatures; about 12° F. he thought.

Capt. ABNEY, in reply, said that Mr. Debenham was perfectly correct. Absorbtion in the case of a thin film would give the true colour in the spectroscope; with a thick film it would be of a deep red. With regard to the colour of objects, white light bore a large percentage over any other. He did not quite follow Mr. Davis, but with regard to the fixing bath, there would be some thing left behind which will not dissolve away; he had not, however, touched on the theory of development in this paper, as that was reserved for a future occasion. The experiment mentioned by Mr. Spiller he intended to repeat.

The Chairman then called for a vote of thanks to Captain Abney for the interesting experiments included in the paper.

This having been accorded,

Mr. J. Werge was called upon to read a paper, "On the After-Treatment of Negatives." Owing to the lateness of the hour, Mr. Werge preferred offering a few remarks on the subject, his chief object being to elucidate further discussion on Mr. Bird's recent paper, as well as to show what could be done by a careful after-treatment of the negative without recourse to eosine and other compounds for a like purpose. Negatives not retouched, and others of the same subject carefully and skilfully worked, together with prints from the same, were handed round, likewise an example of working pictorial effects into figure subject negatives with plain backgrounds. Regarding the translation of colour by photography, he did not think much more could be done than at present by chemical means, but he rather relied on mechanical manipulation. Heraldic engravers worked to rule; mezzotint engravers were guided by a series of tints. This was illustrated by a chart containing a number of colours placed in the order of their luminosity, forming such a scale as an engraver would use. Mr. Werge was of opinion that it was only by some means of after-treatment that photographers could get a true translation of colour. He approved of the suggestion to illuminate with complementary colours, and showed an excellent photograph from a gorgeously-coloured print which had been partially treated in that manner. Summarising, he said photography could never reach the perfection and beauty of line engraving; the most that could be hoped for would be an approach to good mezzotint; until that is done nearly all reproductions of colour by photographing would be unsaleable. He did not think eosine helped very much; even if it did, the result would be much the same as the print shown.

The Chairman said the pertinent question put by the last speaker to Mr. Bird as to his having seen the negatives produced by Braun and Co., seemed still more pertinent after an examination of the negatives which had been passed round.

Mr. Debenham referred to the excellent results obtained by Ives, of Philadelphia, Drs. Vogel, Eder, and others, wherein they had been assisted by the use of certain substances in the film; dodging negatives was occasionally advantageous, but if good results could be obtained without resorting to mechanical skill so much the better. The idea of illuminating with a complementary colour would be out of the question when a large number of colours had to be included; practically, only the blue and violet needed diminishing, and pale yellow glass would do that. One of Mr. Werge's examples, which had been stumped at the back might be considered brighter by some, but the flesh looked to him as though it had been blown out.

Mr. J. R. Sawyer was about to address the meeting, but at the request of the Chairman he agreed to re-open the subject at the June meeting.

The Chairman agreed with Mr. Debenham that it would be better to obtain good results by chemical means. He was glad Mr. Sawyer was not about to condense his remarks, as the door of enquiry was now opened and they were anxious not to lose anyone's experience; moreover, it would be satisfactory to have the negatives before the meeting so that they could judge how much retouching had been done. They all did a little, he thought.

It was then announced that the next technical meeting will be held on the 26th inst., and the next ordinary on June 9th, after which the meeting adjourned.

South London Photographic Society.

The ordinary meeting of this Society was held on Thursday, the 7th inst., at the House of the Society of Arts, John Street, Adelphi, W.C., Mr. T. Bolas (Vice-president), in the chair.

The minutes of the previous meeting having been read and confirmed,

Messrs. G. M. Satchfield and Alfred Warner were elected members of the Society.

It was announced that the subjects for competition at the June meeting would be: "I See You," and "An Interior." The prints sent in for the May competition were then passed round, and the votes of members taken thereon. It was subsequently announced by the chairman that Mr. J. A. C. Branfield had been successful with both subjects—"A Newspaper Boy," and "A Country Lane."

Mr. C. Hussey, Junr., then exhibited and explained "Sargeant's instantaneous shutter and automatic exposing apparatus." He considered that a shutter, to be useful, should possess the four following advantages: Portability, certainty of action, simplicity, and must be completely under control; all these characteristics he had not previously seen fulfilled in any other form of shutter. An instantaneous exposure could be given, or by adjusting a screw the exposure could be prolonged to several minutes. It could be made to work in the diaphragm slot, between the lenses, or on the hood. It was actuated pneumatically, and in the case of slow exposure, the aperture would remain open so long as pressure was exerted. He thought it especially useful for the studio, as it enabled an exposure to be made without the sitter being actually aware of it.

The Chairman remarked that the principle was by no means new in its application to shutters. Mr. Cowan had shown a similar action at the Photographic Club about two years ago.* In that case the drop was made of wood, and was lifted by a pin working round a slot as in the models now shown. He must say that the models which had just been exhibited were extremely well made. It was an advantage to be able to expose from between the lenses, and they would agree that it was the most compact exposing arrangement that had been shown there.

The Chairman having thanked Mr. Hussey for bringing the subject before the meeting, invited remarks on shutters generally.

Mr. F. A. Bridge said the principal difficulty attending all pneumatically worked shutters was leakage in the tube or bellows, which caused them to fail when prolonged exposures were required.

The Chairman replied that there need be no difficulty in stopping any leakage at the joints.

In response to the Chairman, Mr. W. M. Ashman said he used an electrical exposing arrangement inside the camera, which took up very little room, not much more than the diameter of the lens employed. He gave a description, and promised to show it at a future meeting.

The following questions were then read:—"Is it desirable to form a central photographic society as recently proposed?" "When a plate is developed is the amount of reduction in exact proportion to the amount of light which has acted upon the plate?"

In reference to the first question a letter was read inviting the Society to appoint one or more delegates to discuss the matter, if the members were in favour of the scheme.

The Chairman explained the nature, and proposed functions of the scheme which required all the existing photographic societies to become contributors. A paid secretary would be appointed whose duty among other things would be to watch over photographic interest in bills before Parliament, such as the Poisons Act, Copyright, &c., Preservation of Commons, cheap railway fares, and the general interests of photographers throughout the country. He thought that the credit of the scheme was due to Mr. G. Smith, and he thought it a pity that gentleman was not present to expound his own views on the subject. The question was now before the meeting, "Is it desirable to form a great central society for the purposes named?"

Mr. C. Poirson. Cheap railway fares are desirable.

Mr. W. M. Ayres could not see that a central society was likely to be useful.

After a few desultory remarks, the proposition was put to the meeting and lost.

The second question was then discussed.

The Chairman said if reduction was strictly proportionate to the amount of light falling upon the plate, then with the excess of light they would never get in parts so-called reversed action.

Mr. C. Poirson: Suppose there has been only just enough exposure, would there be a point reached when all action ceased with the developer?

Mr. Poirson then enquired if there would be any reduction if bromide of silver had not been acted upon by light.

The Chairman replied that AgBr, in the presence of gelatine, would be very slowly reduced, except when light has acted upon it. If the gelatine was not present, it would be acted upon quickly by the developer. Gelatine did not exert a proportionate restraining influence on an exposed plate.

Mr. E. Clifton mentioned that he left an under-exposed negative in the soda developer for two hours without getting any further detail; the density was enormous.

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* Photographic News, 1883, p. 305.

Mr. F. A. **Bridge** made it a practice to employ a strong developer, and little of it, for subjects known to be under-exposed. He diluted largely with water in the case of over-exposure.

Mr. **Ashman** said that the majority of Mr. W. **Cobbs** instantaneous London street views occupied from one to two hours in development.

The **Chairman** suggested that a paper should be read on developers shortly, which Mr. Bridge promised to do.

The meeting then adjourned till Thursday, June 4th. when a paper will be read by Mr. W. M. Ashman, entitled "Hints for Summer Work."

Sheffield Photographic Society.

The monthly meeting was held on Tuesday, the 5th instant, in the Masonic Hall, Surrey Street, Mr. W. B. **Hatfield** in the chair.

After the usual business of the Society,

Dr. T. H. **Morton** gave an interesting report of the members' first trip of the season, which took place on the 20th of April, to Eyam, Midderton Dale, and Froggat. The day was very fine, and a good coach load of ladies and gentlemen, well equipped for picture hunting, left the Masonic Hall at an early hour, and after a cool but beautiful drive, arranged their battery at Fox House for the first shot, when the journey was again resumed. Many lovely pictures were noticed and wished for as we passed along the road; but no further work was done until the whole force took up positions in the entrance corner of Eyam Churchyard, and in a short time the sacred pile, with its interesting surroundings, was imprinted in at least a dozen cameras. The interior, the cross, and other notable portions, were also secured, and then the members spread about and made their way to the Midderton Dale, working as they went, till all met at the "Moon" Inn, and partook of a very well-provided dinner, at which plates, variously sensitized by Mrs. Tricket, were developed and cleared in the members' best style. After dinner the coach then conveyed the party to Froggat, where more pictures were taken, though the place would have been better a few hours earlier. There were about seventy good pictures brought home, and many were on the table for inspection at this meeting.

The May competition pictures were then brought on for judgment, the subject being "Interiors," and was won by a very beautiful one of Trinity Church, Highfield, by Mr. J. W. Charlesworth, an amateur; the second in position being W. B. Hatfield.

Dr. **Morton** showed some beautiful interiors of Newark Cathedral, which were of high quality, and were very much admired, but were not for competition.

Mr. F. **Barber** exhibited a new and ingenious camera-holder to attach to either tricycle, boat, gate, wall, &c., or anything to get a picture in an awkward position. It was much admired, but considered dear.

Mr. J. **Bennett** showed a number of photographs of Zulus from Africa, which were very interesting.

The meeting was then adjourned.

London and Provincial Photographic Association.

The usual weekly meeting of this Society was held on Thursday, the 7th inst., Mr. G. **Squire** occupied the chair.

The **Chairman** mentioned a curious experience of spots appearing on a negative after drying. The plate was fixed and washed in the usual way. The negative was handed to the members for inspection.

Mr. A. **Haddon**, referring to the recent discussion on the merits of washed and unwashed emulsions, had repeated his experiments of the previous week, using a fresh sample of gelatine and the diminished amount of water in Mr. W. E. Debenham's corrected formula. He brought three plates to the meeting: two were handed to the Chairman, one of which had been exposed and developed. In this undeveloped plate crystallisation was scarcely apparent in the film, the other had developed quite clear with no trace whatever of insensitive patches, or indication of stoppage of light from crystallisation. He then developed the remaining plate on the dark-room of the Association; this was also found to be quite clear.

Mr. J. **Barker** had made experiments with unwashed emulsions some time back, he found that filtering the emulsion several times materially reduced the tendency to crystallize; he had used a larger proportion of silver than that given in the formula by Mr. W. E. Debenham in the News.

Mr. W. E. **Debenham** said if only sufficient gelatine was used to absorb the nitrate, it would result in a form of bromide, giving a vigorous image, but the plate would be slow.

Mr. A. L. **Henderson** referred to some negatives that he had exhibited at one of the meetings. He had only used 30 grains silver to 37 ounces of emulsion. The exposure was five seconds, No. 2 stop, 2B lens, in a moderate light; this could not be said to be a slow plate.

Mr. W. K. **Burton** handed round for inspection some prints from negatives of views taken from his window; the same subjects were printed both in silver and platinotype. The opinion of the members was asked as to the relative merits of the two methods of printing; the platinotype prints were much admired; at the same time, it was generally conceded that, in some cases, the silver prints showed more and clearer detail in the shadows, with the same subject, than the platinotype.

Mr. J. B. **Wellington** also passed round some platinotype prints.

A question was asked for a reliable method to remove silver stains from negatives.

Several members recommended cyanide of potassium if the stains were not too old.

Mr. A. **Mackie** stated that rubbing the negative with a little turpentine would be found to be effective and it had the merit of being safer than cyanide.

Mr. A. **Cowan** thought the removal of the silver in this case would be due to the friction.

Mr. H. **Trinks** had effectually cleared a plate of green scum by dipping his finger in turpentine and rubbing it over the plate.

Mr. J. B. **Wellington** referring to the yellow stain that followed development with potash, remarked that this was due to the make of plate; as a proof he passed round two negatives; both had been developed with potash; one was of the ordinary colour, the other showed the yellow stain; he explained that they were from two different emulsions—one boiled, the other ammonia.

Mr. C. P. Cembrano was elected a member of the Association.

Photographers' Benevolent Association.

The adjourned annual general meeting took place at the offices of the Association, 181, Aldersgate Street, on the 6th instant, Mr. W. S. **Bird** presiding.

Messrs. Hy. Dixon, F. Francis, W. M. Garner, J. O. Woodley, Alfred Benjafield, and E. S. Baker were elected members of the Association.

The action taken by the committee since February (see News, February 13th) was reported to the meeting. It was pointed out that the good work done by the Society was greater than generally supposed, considering that its operations could not be published in detail. After thoroughly discussing the Association in its various aspects, it was finally resolved "That although the response to the advertisement (see News, March 6th) was disappointing to the wishes of the Board, the additional membership (24) was encouraging; and reviewing the utility of the actual benevolent work done, the efforts on behalf of the Association would be continued."

The officers for 1883 would remain in office.

The next meeting will take place on June 3rd, at 8 o'clock.

Photographic Society of Ireland.

The last meeting of the session was held on the 8th inst., at the Royal College of Science, Dublin, Mr. **Greenwood Pim** in the chair.

A letter was read from Mr. Magee expressing his just regret that unavoidable absence from town prevented him giving his paper on "Collotype."

Dr. **Scott** presented two tables for verifying the correct time of exposure, at various hours and various periods of the year, as compared with that of mid-day in May or June, which he adopted as a standard. Thus, if under given conditions of lens, plate, and subject, a certain view at or about mid-day in June would require one second's exposure, the same subject at 4 p.m. in March would require three seconds, or at 8 p.m. in February ten seconds.

Messrs. J. V. Robinson, Woodworth, T. A. Bewley, and Mansfield, took part in the subsequent discussion.

Dr. **Scott** introduced a discussion on "Pictorial Effects in Photography," in the course of which he drew attention to the various principles which should be kept in view by those who desire to produce not merely portraits of places, but veritable pictures. Numerous diagrams were shown illustrative of the various effects of the same object taken from slightly different points of view, and different conditions of light and shade. The necessity of keeping such figures as are introduced, subordinate to the main subject of the picture, was also touched upon, together with many other points discussed in Mr. H. P. Robinson's work on "Pictorial Effects."

After a few remarks from Mr. Conan,

Dr. **Pearsall**, an amateur artist of some note, who has recently called in photography to his aid, proceeded to criticise Dr. Scott's views at some length, and somewhat unsparingly expressing the opinion that from an art point of view, photographers were almost without an·exception complete Philistines, and there was too much "brutal truth" in photography for it ever to be possible to produce anything really deserving of the name of art.

The evening being now somewhat advanced, the discussion was closed with a few words in reply from Dr. Scott.

Mr. Richard Millar was elected member, and Mr. Semple proposed for election.

Dundee and East of Scotland Photographic Association.

The annual general meeting was held in Lamb's Hotel, Dundee, on Thursday, 7th May, when Mr. W. D. **Valentine** presided.

The office bearers for 1885-86 were elected, and the list is now as follows :—

President—J. C. Cox.
Vice Presidents—Messrs. W. D. Valentine and D. Ireland.
Hon. Treasurer—John Robertson.
Hon. Secretary—D. Ireland, Jun., Rockhill, Broughty Ferry.
Council—Dr. Tulloch, Messrs. A. C. Lamb, G. D. Macdougald, V. Baird, J. Geddes, and A. Guthrie.

The Society's dark-room was then brought under consideration, and it was decided to throw it open to all members of the Association. Keys to be supplied by the Secretary at one shilling.

Mr. G. D. **Macdougald** then gave a most interesting lecturette on "The Detection and Estimation of Minute Quantities of Hyposulphite in Photographic Materials."

Mr. Macdougald's apparatus consisted of a Wolff's bottle for generating hydrogen by the action of pure hydrochloric acid and pure zinc; the apparatus being so arranged that the gas impinged on a piece of paper moistened with a solution of a lead salt. It was shown that the hydrogen had no action on the test paper; but on hyposulphite being added sulphuretted hydrogen was set free, the result being that the paper was darkened by the formation of sulphide of lead. In order to show the delicacy of the test, the lecturer added to one of the sets of apparatus a few drops of an excessively dilute solution of hypo, and after the action had proceeded for some minutes, he passed round the lead paper, which showed a distinct discolouration; he estimated the quantity of hypo added to be $\frac{1}{500000}$ of a grain.

Mr. **Macdougald** stated that a print had been handed him to test which had undergone the following treatment after fixing:—Washed in six changes of water, washed for twelve hours in an automatic washer, boiled for half an hour, and washed under a tap. This print he had cut up and macerated in water, and on testing in the manner described a distinct trace of hyposulphite was found.

On the motion of the Chairman, a very hearty vote of thanks was awarded to Mr. Macdougald.

Edinburgh Photographic Society.

The seventh meeting of the current session was held in 5, St. Andrew Square, on Wednesday evening, 6th May, Mr. **Norman Macbeth**, R.S.A., presiding.

After the minutes of the last meeting had been read and approved,

Messrs. Joseph T. Carmichael and George Gilchrist were elected ordinary members of the Society, and Dr. James Fowlis, was proposed by Dr. James A. Sidey for election at next meeting.

Several notices of motions for next meeting having been tabled,

The **Secretary** read a paper by Messrs. Morgan and Kidd on their rapid contact printing paper. A large number of remarkably fine prints were submitted to illustrate the paper.

Mr. T. G. **Whaite** expressed his admiration of the beauty of the prints submitted, stating they were the finest he had yet seen. He would like to see them compared with the very finest albumen prints from the same negative.

In reply to questions as to certain defects found in the working of certain brands of rapid contact paper, Messrs. Jameson, Turnbull, and Whaite thought that the peculiar "bloom" or "foggy haze" occasionally met with, and which is fatal to small work, was largely due to some quality of the gelatine employed. The defect was generally made less apparent by finishing with an enamel surface.

Mr. **Whaite** next described with demonstrations several ways by which home-made bellows for cameras could be produced. The adhesive material he employed, and which he recommended above everything else, was the ordinary shoemaker's paste as obtained from the dealer in shoemaker's materials.

An interesting photograph by Mr. **Tomkin**, taken by artificial light, was examined with much interest.

Bradford Amateur Photographic Society.

The ordinary monthly meeting of this Society was held in the Law Institute, on May 7th, the President, Mr. **Duncan G. Law**, in the chair.

After the minutes had been read and confirmed, Mr. Sutcliffe was elected a member.

The first out-door meeting of the season was arranged to be at Peckover, near Bradford, at half-past two on Saturday, May 16th; to be followed by a trip to Bingley on May 30th, and Hardcastle Craggs on June 2nd.

Mr. **Scorah**, the Hon. Secretary, showed a patent camera by Billcliff, of Manchester, which is built on the Kinnear principle; there is also a clever arrangement for putting the dark slide into the back, either way up, without a reversing frame. The Secretary also showed some very fine coloured photographs done by the Cundall photo-tintograph process, which were much admired.

A new brass triangle, with billiard cue tips fixed on the top, to prevent scratching the camera, was also shown.

Talk in the Studio.

Derby Photographic Society.—The May Meeting of this Society was held at the London Restaurant, Irongate, on Wednesday last, May 6. Mr. Richard Keene occupied the chair, and after the ordinary business was transacted, Mr. J. Mayle, of Parliament Street, gave a practical demonstration of the process of enlarging by means of the lantern. Placing an ordinary carte-de-visite negative of the Chairman in the lantern, Mr. Mayle threw an enlarged image of it on a screen of white paper, and after carefully focussing the image he substituted a sheet of prepared paper for the white paper, and exposed it for a short time. He then developed it before the meeting, the result being an excellent enlargement of Mr. Keene. Mr. Mayle then enlarged from a positive picture, producing an enlarged negative, which was also very successful. A cordial vote of thanks to Mr. Mayle was carried by acclamation on the motion of Mr. Keene, seconded by Mr. Henry Bolden. The Hon. Secretary (Mr. Fred W. Simpson) announced that a special meeting will be held at the London Restaurant on Thursday, May 11, at 7.30 p.m., when Captain W. de W. Abney, R.E., F.R.S., will read a paper; also, that an out-door meeting will be held at King's Mills, on Saturday, May 16. Seven new members were elected, bringing the total number up to seventy-seven.

The Exhibition of the Dundee and East of Scotland Photographic Association.—An International Exhibition of photographs, photographic apparatus, and appliances will be held in the Galleries of the Albert Institute, Dundee, and the exhibition will be opened on the 18th February, 1886, to continue open six weeks. All pictures, apparatus, and contributions of any kind will be insured at the expense of the Association; and especial care will be bestowed on the hanging, so that all pictures shall, as far as possible, be done justice to. *Conditions*:—An entrance fee of five shillings to be paid by each exhibitor, for which 15 square feet of wall space will be allowed; for extra space, 6d. per square foot will be charged. All pictures for exhibition must be sent mounted and framed. On the back must be affixed the artist's name, address, title of subject, process by which produced, and price (if for sale), frame included. On no consideration will any name, title, or other particulars be permitted on the front, as such will appear in the catalogue, and no pictures in Oxford frames will be admitted. The council undertake to unpack, re pack, and return all exhibits remaining unsold; all carriage must be paid by the exhibitor. The utmost care will be taken of the exhibits, but at the same time the Society will not hold itself liable for any untoward accident that may occur, with the exception of loss by fire, which is specially provided for. The council will undertake the sale of exhibited pictures at a comission of 10 per cent. Photographs coloured by hand may be exhibited, but will be excluded from competition. Photographs mounted on glass may be exhibited, but will also be excluded from competition. The hanging committee reserve the power of rejecting any pictures. Each exhibitor must fill up a form, which can be obtained from the Hon. Sec., and forward it to him not later than December 31st, 1885; and all pictures must be sent carriage paid, so as to arrive not later than February 4th, 1886, addressed:—International Photographic Exhibition, Albert Institute, Dundee. Apart from photographs for competition, the council will esteem it a favour if those who have any interesting examples of the progress of photography will kindly lend them for exhibition. Medals will be awarded in the various classes by the judges. All communications must be addressed to the Hon. Secretary, D. Ireland Jun., Commercial Street, Dundee, N.B.

RELATION BETWEEN THE MOLECULAR STRUCTURE OF CARBON COMPOUNDS AND THEIR ABSORPTION SPECTRA.—By PROFESSOR W. N. HARTLEY, F.R.S.—In the preparation of solutions of certain compounds, a miligram-molecule—that is, the molecular weight in miligrams—was dissolved in 20 c.c. of a diactinic solvent, and made up to a given volume, generally 20 c.c. In this way, molecular weights were made to occupy equal volumes. Photographs of the absorption spectra were taken through definite thicknesses of solution. The lines of tin, lead, and cadmium were used as references; the positions of the bands were measured on the photographs by means of an ivory rule divided into hundredths of an inch, and those measurements were reduced by means of two curves to oscillation, frequencies, and wave-lengths. As far as possible, the absorption curves are drawn to a uniform scale. These curves indicate the molecular actinic absorption of each substance. The following deductions are drawn:—When an atom of nitrogen is substituted for an atom of carbon in the benzene or napthalene nucleus, the property of selective absorption is stilll retained. When the condensation of the carbon and nitrogen in the molecule of a benzenoid compound or tertiary base is modified by the addition of an atom of hydrogen to each atom of carbon and nitrogen, the power of selective absorption is destroyed. When the condensation of the carbon in quinoline is modified by the combination therewith of four atoms of hydrogen, the intensity of the selective absorption is reduced, and is not destroyed.—*Chemical Society Reports.*

COMPOUNDS CONTAINING NITRO-CELLULOSE, SUITABLE AS VARNISHES, AND FOR MAKING LEATHER CLOTH.—William Virgo Wilson and Joseph Storey claim the use of acetate of amyl as a solvent for nitro-cellulose. Such a solution can be used as a varnish for an infinite variety of articles. When 200 parts nitro-cellulose are mixed with 600 parts acetate of amyl, a mass of a doughy consistency is obtained, which can be used for any of the purposes for which celluloid is used. With the addition of castor oil, China clay, and a small proportion of certain essential oils, a compound suitable for the production of artificial leather may be produced.—*Journal of Chemical Industry.*

PAPER labels for acid bottles should be fastened on with strong glue, and afterwards soaked with melted paraffin, which can be easily applied with the aid of a hot glass rod.—*American Druggist.*

PHOTOGRAPHING A BULL.—A photographer went into the country to take a bull from life. For two miles—and three pairs of bars—the chances seemed good for the bull taking the artist from life. Photographer now takes his bull from the hen-roost. —*The Eye.*

PHOTOGRAPHIC CLUB.—The subject for discussion on May 20th will be "On the Preparation of Backgrounds." The Saturday out door meeting will be held at Bushey, near Watford, Herts. Trains from Euston at 1·35.

To Correspondents.

*** We cannot undertake to return rejected communications.

LEICESTER.—Under the circumstances the best method is to empty the vessel periodically, and refill.

WM. MARK.—The information has been posted to you.

E. E. B.—1. The communication you are good enough to send appears in the present number. One can only conclude that they were not alike; but for all this both may have been equally good.

J. D. WEBSTER.—It is extremely improbable that you will have any trouble whatever if you explain the nature of the packages. It is well, however, to put them at the top of your bag, and to call attention to them yourself. When Custom House officers insist on examining dry-plate packages, one can usually arrange for the examination being made under such conditions as not to spoil the plates.

PERCY SHEARD.—Write to Messrs Carl Norman and Co., Tunbridge Wells.

A. T. NEWINGTON.—Thank you for the paper; you will receive a proof in the course of a few days.

INTERIOR.—1. We should be inclined to think it will render the results less satisfactory; but you can easily determine this by a trial. 2. Take away either and use the remaining one without shifting it. 3. We should prefer A; but a longer exposure would be required. This is, however, a very trifling drawback in the case of such work as you refer to.

J. W. K.—When added in moderate quantities it does not lower the sensitiveness, and the decomposition to which you allude will not take place when the solutions are dilute.

TEINBRIDGE.—It can be obtained from the Sciopticon Company, 26, Colebrooke Row, Islington, N.

COLONIST.—Call at our office when you come to England, and we will endeavour to assist you in obtaining what you wish for.

J. A. KAY.—The address of the former is 31, Farringdon Street; and of the latter, Martin's Lane, Cannon Street.

S. J. MURPHY.—It is quite unnecessary to employ a patent agent, as by consulting the index volumes at the Patent Office Library, Southampton Buildings, Chancery Lane, you can ascertain the numbers in a very short time. If you remit the price, together with a sufficient sum to cover the postage, to Mr. H. Reader Lack, Comptroller-General of Patents, 25, Southampton Buildings, London, W.C., you will receive the specifications by post; but the Patent Office will not make any selection for you. There are three volumes of abridgments of specifications relating to photography, published by the Patent Office. Vol. I., price 10d.; vol. II., price 11½d.; vol. III., price 10½d.; all post free from Mr. Lack. These abridgements extend from 1839 to 1876.

A. ACKERMANN.—Take the instrument to the reputed maker, and ask him if it is a genuine one. From what you say, we are inclined to regard it as a forgery.

W. T. G.—The shutter described by Mr. H. Chapman Jones in the last YEAR-BOOK will answer very well.

V. L.—Use citrate of soda.

VICTOR.—Mount the print in the usual manner, but taking care that there are no lumps. Roll well, and then sift on finely-ground pumice powder. If you now rub gently with the palm of the hand, you will be able to obtain a very pleasing matt surface.

P. AND S.—Unless you dry it first, there will be a constant liability to break up under the strain.

W. ATKINSON.—Carbon is not always used, although it is usually the base of the pigment. A mixture of lampblack, crimson lake, and indigo gives a pleasing tint, but the crimson lake is liable to fade.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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SURVEYING BY THE AID OF PHOTOGRAPHY.

The German photographic press has been greatly taken up of late with the subject of "Photo-grammetrie," the matter having been brought prominently to the front by a discussion in the Prussian Parliament on the grant of 10,000 marks for photogrammetrical purposes.

A long report of the discussion is given, but we are bound to say that exceedingly little light is thrown on the subject by any of the "learned members" who took part in it. Indeed, it almost seems as if there were some confusion in the minds of certain of them as to what the subject at issue is.

"In our schools our youth are sorely harassed with instruction in various languages. Only lately have I heard that even girls, desiring to become teachers, must be able to speak French and English *accurately*. In short, in this direction their welfare is more than sufficiently looked after. But that language which comes to us from past time through our monuments—this speech remains untaught. There is no minister to give it his attention."

The Parliamentary eloquence here is doubtless of the highest quality, but the hearing on this subject in hand—surveying by photography—is somewhat oblique. On the whole, we gain little advantage from the perusal of the report of the discussion. It is far otherwise, however, concerning the communications which have been drawn from various individuals learned in the subject of photo-grammetry, and which appear in the German photographic periodicals.

The most important attempt to make an actual survey by photography seems to have taken place during the war of '70-71, when photographs of the fortifications of Strassburg were taken, and plans were constructed from these photographs. An attempt was, it appears, first made to get plans from photographs taken from only three different points of view. This attempt failed signally. Meantime, Strassburg capitulated; but the survey was continued, presumably merely for the sake of discovery whether or not useful results could be got. About twenty points of observation were taken, and from these points no less than 116 plates of 12 inches square were exposed, with the result that, after working on these for four or five months, a plan was produced which was so inaccurate as to be practically useless. The plates were wet, the camera was without a dark slide, and had to be taken bodily into the dark room after each exposure, when it was found to require a very thorough cleaning before it was ready to receive another plate; so that, altogether, the labour connected with the survey must have been something prodigious.

This is the gist of the report drawn up by those who had been engaged in the survey, and certainly the impression left by it is that for purposes of surveying, photography is of little or no use. On reading, however, a communication by Herr Von F. Stolze, in the *Photographisches Wochenblatt*, the matter assumes a vastly different aspect. It appears that Herr Stolze was the inventor—or rather, perhaps, we should say the elaborator—of the particular system of surveying which was adopted; that he had been retained to supervise the construction of the apparatus, and that it was intended that he should have the direction of this survey. The apparatus was prepared with great haste; but at the last moment Herr Stolze withdrew from the expedition—because he had no taste for going under fire, his enemies said; because he could not make satisfactory terms with the military authorities, he most conclusively proves—and the survey was conducted by those who were new to the work, and who had even confessed their ignorance of the correct method of procedure. There is, therefore, at any rate, no need to assume, from the report, that photo-grammetry is in itself useless. Herr Stolze, in his communication—which is, in fact, a defence (and a very able one) of his own conduct throughout the matter—and Dr. H. W. Vogel, in an article on the subject of photogrammetry, both bring forward many points of interest in connection with the particular subject, and also with photographic optics in general.

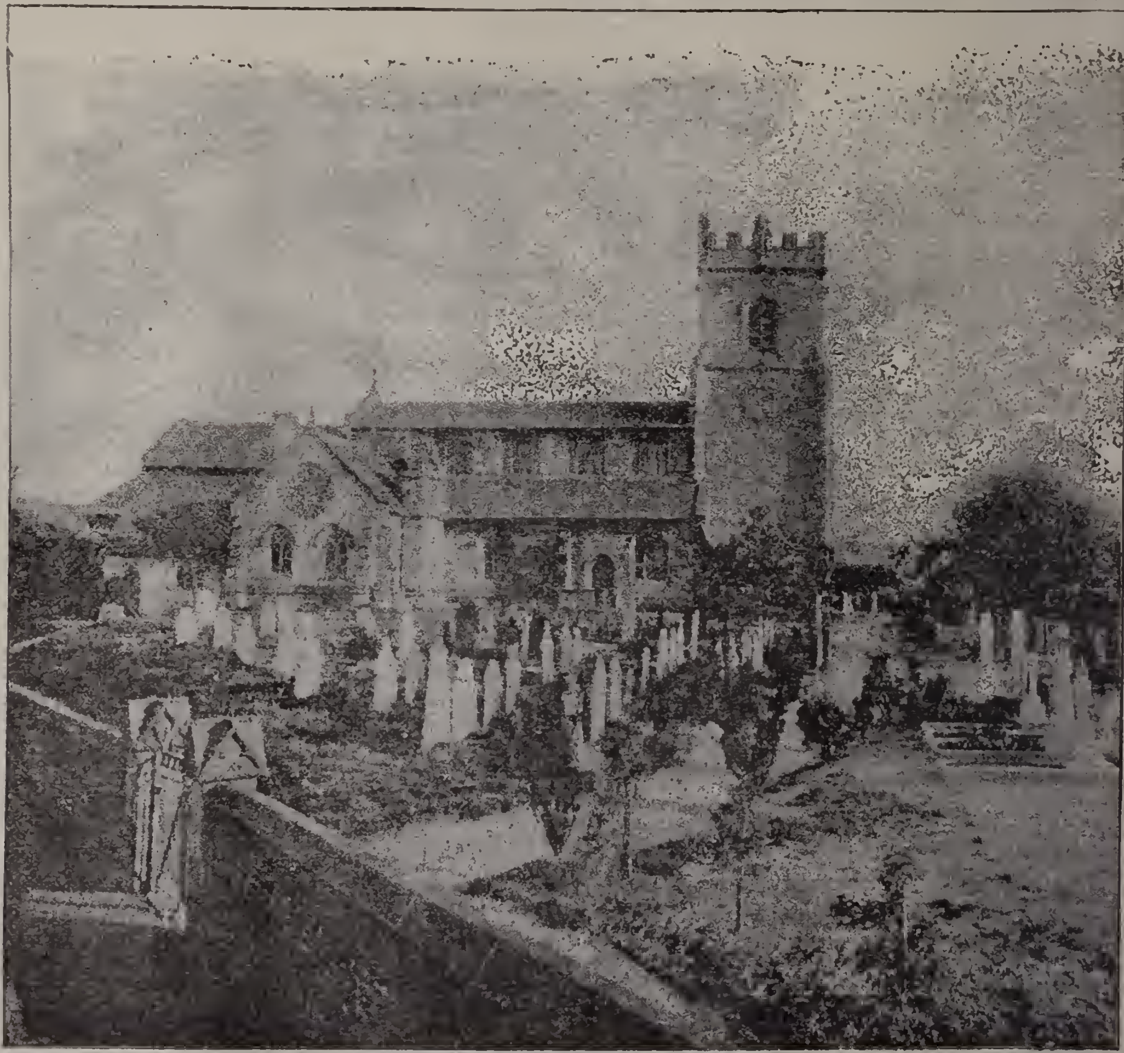
Before placing a few of these points before our readers, it may perhaps be advisable to say a few words on the subject of the use of the camera in survey work. To describe completely and in detail the method whereby a plan—that is to say, a map—of a portion of country may be made from photographs taken from two or more different points of view, would occupy more space than we can spare; but the general principles on which the survey is carried out may be very briefly indicated.

Our best method will be to imagine an actual case, the simplest possible. We shall suppose that it is desired to make a plan or map of a garden enclosed with straight walls, and having straight paths and beds bounded by straight lines. We shall farther suppose that these are outside the garden at such a height as to overlook it, two points of vantage at a considerable distance from each other, at such a distance, in fact, that two distinctly different views of the garden can be got. A photograph is now taken from each of these points, the plate being kept in a vertical plane, and means being adopted to mark on it a vertical and a horizontal line, each passing through the axis of the lens. The distance between the two points of view is accurately measured in the usual manner with a chain, and the line thereby got forms the base line from which the plan is drawn. That is to say, the line is drawn to whatever scale is desired on the plan, when, by means that will be readily comprehended by all who have any knowledge of surveying, the points forming the angle of each wall, the end of each walk, and the corner of each bed may be readily plotted down. This shows the matter in its extremest simplicity. It will be evident to all that in practice the work must be in all cases far more complicated than that indicated in our typical case, and that, moreover, the greatest accuracy is necessary in the apparatus and in all points of manipulation.

(*To be continued.*)

BORLAND'S PHOTOTYPE PROCESS.

From Mr. Borland, of Wilmslow, Cheshire, we receive samples illustrating a method of making a stippled transfer which can be the basis of a typographic or lithographic printing process, and our supplement of this week illustrates its application to lithography, while the subjoined block shows how the process can be applied to the production of blocks for printing with type.



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NOTES ON A DAY IN THE NEIGHBOURHOOD OF SANDBACH.

BY JOHN H. DAY.*

Sandbach is a quaint, neglected-looking, and not exactly a pretty old place; I won't call it ugly whatever I may think; but its great redeeming feature to a camera man is, that it is pretty full of broken-up picturesque bits—just the thing we were in search of, and we soon got into harness in right good earnest. An admiring crowd rapidly gathered near the formidable battery of instruments as they arrayed themselves round about the old crosses, at which several harmless shots were fired—would that most shots were as inoffensive. These old relics are evidently of a very hoary antiquity, and bear evidence of having had a very rough and tumble time of it from "the days of their youth," dating from out of the mists of the past; they consist of two shafts of red sandstone exquisitely carved from base to summit, and are said to be "the most perfect, and probably the oldest remains of Christian antiquity in the kingdom." The carvings consist mainly of Scriptural subjects, deeply and boldly cut, representing the Salutation of Elizabeth by her cousin Mary, the Annunciation, with the Holy Ghost figured descending upon the Virgin in the shape of a bird with extended wings, the Birth of Christ, the Crucifixion, and various other most interesting matters—some of a non-Scriptural character—very pleasantly described in a little sheet (the chief fault of which is that it is not satisfying enough); while those who thirst for more detailed information may obtain it from a local stationer, whose place of business occupies a site in the square in which the crosses are situated. From this little leaflet we gather that the crosses, as they now stand, are a restoration, one portion having been utilized to protect the sides of a neighbouring well, others as steps for doorways; some, again, were taken from the churchyard wall, with which it had been built; while the middle part of the larger cross, and several portions of the smaller one were transported a long time ago from Sandbach to Tarporley, thence to Oulton, where they served to adorn a grotto at the bottom of a private garden. The inhabitants of Sandbach, however, wishing to have the crosses restored as far as was possible, carefully collected together all the fragments they were able to discover; and a Mr. Palmer, of Manchester, ably assisted by the great Cheshire historian, George Omerod, in the year 1816, set about fixing up the relic in its present position.

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* Read before the Birkenhead Photographic Society.

The light here was bad, and long exposures were consequently necessary, if the detail upon the columns was to be brought out at all, and as there was no sunshine, I cannot say exactly what would be the best time of day to photograph these objects; but probably from early morning up to noon would be about right on a fine day. I don't know with what measure of success my companions met with, but no doubt prints will be here to-night for comparison, which will give you a better idea of the picture than the one I hand round, as it is a trifle under-exposed; but the crosses, being composed of a dark red stone, and the light being anything but bright just at the moment, made it very difficult to estimate whatever the approximate exposure should have been.

From this point, down a side lane close by, were one or two characteristic street pictures, gabled, timbered houses, jutting out here and there in a most erratic and extraordinary way, "all over the shop," as one might appropriately say, and one especially dilapidated old cottage, somewhere about the bottom of this lane seemed to come in for an extra share of attention, and there ought to be some good pictures of it here to-night, judging by the number of cameras I left hard at work after I had had a shot, the result of which is no great achievement, as the light had now begun to mend. It does not make a bad picture, although a figure or two would have been a wonderful improvement. Still farther down the lane, and round by the end of the churchyard, we came suddenly upon the fine and profusely-timbered "Old Hall," now an hotel, and this being a morning view, is accordingly secured forthwith, while your humble servant is making commissariat arrangements with the proprietor, who rather dashes his enthusiasm by informing him that the gigantic party of nine would so tax the resources of the town that he was afraid the demand would exceed the supply as regarded the usual necessaries for dinner, but that he would do his best for us; so there being no choice in the matter, he was left to solve the problem, which he did in a right royal way, as I am sure several of you will be able to testify.

The sun now gave us a friendly peep, but was too shy to stay out long, and we drove away direct to the fine old Elizabethan mansion at Brereton, built in 1586, the first stone of which is stated to have been laid by "Good Queen Bess." Here, I am sorry to report, as we wandered about the churchyard, which closely adjoins the Hall, it began to rain rather heavily, and looked more threatening than it had done all the morning; but it was April, and in a very short time the clouds broke and cleared away, the sun came out once more, this time with a little more determination to have a will of his own, and a number of good views of the front and side of the Hall were (or should have been) secured; the light was, I think, almost at its best when we arrived about noon, and would have served very well for the rest of the day. The proprietress very kindly gave the party a special permit to photograph the apartments which, however, though spacious and exceedingly comfortable in appearance, did not warrant our drawing too lavishly upon our limited supply of plates, although I believe one individual had a shot at the drawing-room fireplace, with what success he will perhaps let us know. Although but one photograph was taken of the interior of this Hall, it may perhaps be as well to mention that Murray makes special allusion to the ornamentation of the dining-room, with its freize with the arms of the sovereigns of Europe, and several curious inscriptions here and there; the fireplaces, too, were most elaborately designed.

Leaving Brereton, we next procceded to Illage Green, singular as almost irresistably suggesting the word village without the V; here is a perfect gem of an old Cheshire wayside inn, bearing date 1615 over its portal. Tearing ourselves reluctantly away, we hurried away to Holmes Chapel, which, although not quite up to expectations, nevertheless supplied a very fair picture of what appeared to be the main street, blocked half across the end by an ancient ivy-mantled church.

And now it began to be a fight against time; we had more work to do, and our President had to catch an early train on to London; we couldn't frustrate his object, and yet the work must be done somehow. Not a moment was to be lost, watches were consulted, and away once more through a very pleasantly undulating park, across the river Dane, which here meandered lazily through the pretty meadows—a genuine English landscape—up a steep hill, and we finally found ourselves at Swettenham Church; unfortunately I have been unable to collect any information respecting it of any interest; its tower is draped in ivy to its very summit, not a portion of the stonework being visible. I daresay, however, one of "us," whose blushes I will spare by not disclosing his name, will be better posted, as I noticed him in the distance, apparently busily engaged, taking instantaneous snaps at the rector's cows, and making himself particularly agreeable to the reverend gentleman's better-half. The church, however, is nicely situated, and one or two plates were well spent upon it; the west side struck me as being especially quaint, with its curious black crest in a niche over the doorway, and its dormer window jutting oddly out of the side of its old tiled roof, grey with the mosses of ages. I was tempted to expose a plate upon it, and although almost dead in the teeth of the light, the result will give you some sort of an idea of what I have roughly tried to describe.

The President here fired off his last shot at a group ranged about the stile in front of the old tower, our friend abovementioned being still far too busily engrossed with the rector, his wife, and the cows (no doubt collecting information) to be included in the picture; and now, having expended nearly the whole of our stock of ammunition we packed up, and turned our horses' heads homewards. Arrived at Sandbach Old Hall once more, hungry and tired, we happily found our worthy caterer had not failed us—a delicious aroma (surely the most delightful odour that had ever saluted our nostrils up to that hour) of ham and eggs pervaded the air. In almost less time than I can say, the odour had disappeared, together with its cause, and that justice had been done to that memorable repast was fully evinced in the well-developed interiors, which ultimately rose from round about the table of our hospitable and kindly hostess.

Tea over, two more groups were taken in front of the Hall, making up a total of eighty-two plates exposed on the day, and with a hearty good-bye to our entertainers, we shouldered our traps, and strolled leisurely along to the station, duly reaching Birkenhead once again at a comfortably early hour, none the worse for the first pleasant official introduction to one of the many, as yet unexplored, beauty spots of our charmingly picturesque old county—Cheshire.

Patent Intelligence.

Applications for Letters Patent.

5895. George Percival Smith, Beech Holm, Tunbridge Wells, Kent, for "Improvements in photographic cameras and camera stands."—13th May, 1885.

5909. Ernest de Pass, 68, Fleet Street, London, for "A process for copper-plate and relief engraving from photographs and tinted drawings."—(*Arthur Simon Joseph Miron*, France.)—13th May, 1885.

5965. Edwin Underwood and Thomas Albert Underwood, 97, Camden Street, Birmingham, for "An improved photographic camera."—15th May, 1885.

5999. Benjamin Joseph Barnard Mills, 23, Southampton Buildings, Middlesex, for "Improvements in photographic apparatus."—(*Ferdinand Denis*, France.)—15th May, 1885.

6076. Richard Rayner, 1, Queen Victoria Street, London, E.C., for "A new cheap stereoscope."—18th May, 1885.

Patent Void through Non-payment of Duty.

481. Harry Robert Newton, of 43, Seymour Street, Hyde Park, London, "Preparing materials for, and for imparting to Photographs and other illustrations of all kinds the tones and tints of natural colours for rendering their representations more real and life-like, and for improvements in mounting them together, and in enclosing them in or between glass, metal, leather, wood, vulcanite, and other frames, or cases, or ornaments, parts of all of which are applicable to other useful purposes."—Dated 5th February, 1878.

With regard to this (now void) patent, the patentee says:—

My invention also consists in stretching such photographs or other illustrations on or between perforated metal, or other frames, and mounting them on, or in front of, or between them, and fixing them on to similar, or other naturally or artificially-coloured or tinted photographs or other illustrations, materials, or substances, as before described; and also for taking and printing photographs on paper, as before described, mounted on similar perforated metal, vulcanite, or other frames, and for using such perforated or other frames for forming thin folding albums fixed on continuous lengths of woven substances, ribbon, leather, parchment, paper, or other flexible materials, and for applying the method of mounting the photographs or other illustrations to metal and other lockets, or ornaments, or cases, designed to show by means of double continuous rollers, or revolving centres, one, two, or more photographs or other illustrations, and for the ready changing them with or without opening the metal, or other ornamental enclosures or cases within which they are contained, the varying parts of all of which are applicable to other useful purposes; thus, for instance, the prepared papers and woven substances, and the method of mounting, provide a new medium or ground capable of being toned as required for the better luminous production and preservation of pictures and paintings, generally in oil, water, or other colours, and for drawing, and tracing, and transparent uses.

Specification Published during the Week.

3778. Alexander Melville Clark, of the firm of A. M. and Wm. Clark, of 53, Chancery Lane, in the County of Middlesex, Fellow of the Institute of Patent Agents for "Improvements in photographic paper and in sensitive emulsions therefore." A communication from abroad by E. and H. T. Anthony and Company, New York, United States of America. Dated 25th March, 1885.

In carrying out the invention, the gelatine bromide of silver compound, it is preferred to employ, is a previously known and peculiarly prepared one, which consists in first softening the gelatine in water and adding bromide of ammonia, or an equivalent bromide in suitable proportions, say about 150 grains of good gelatine, 60 grains of bromide of ammonia, and about 5 ounces of water, then dissolving the gelatine by heat, and adding gradually nitrate of silver, say about 100 grains dissolved in about 5 ounces of water; then subjecting the whole to a continued heat for two or three days, more or less, at about 80° or 100° Fahrenheit, then, after allowing it to cool and set, cutting it into fragments and washing out the soluble matter, then melting it by heat and adding about its weight of water. To this or other like emulsion is then added for each 4 fluid ounces thereof, about one tea-spoonful, more or less, of the insoluble toothing substance, and thoroughly incorporated therewith. To produce a very coarse grained or toothing surface, double the quantity specified of the insoluble graining or toothing substance may be incorporated with the sensitive material or emulsion. Different toothing substances insoluble in said emulsion might be used including the sulphate of baryta, pumice stone powder or emery powder of different grades, and the paper to which said sensitive emulsion is applied, may either be sized or unsized, and said gelatine bromide of silver emulsion, having the insoluble toothing substance incorporated with it, may be applied to the surface of the paper on which the positive photographic printing is to be done in any suitable manner known to the arts for applying other or simple emulsions.

If the graining or toothing substance used be sulphate of baryta, which gives a superior finish to the white portions of the picture, then said sulphate may be used in a wet state, as when used in a damp state it readily assimilates with a gelatine emulsion, and is held in suspension therein. It might, however, be used in a dry state, in which case the proportion may be about 1 dram of sulphate of baryta to each ounce of the sensitive emulsion, first mixing it, however, in a weak solution of gelatine and water, and afterwards mixing and incorporating it in any suitable manner with the sensitive emulsion. Said sulphate of baryta will be held in suspension just as the bromide of silver is held, and does not affect the sensitiveness of the emulsion.

By incorporating an insoluble graining or toothing substance with the gelatine and bromide of silver, all special or mechanical means for producing a grained or toothed surface upon the paper are dispensed with, and by means of a gelatine bromide of silver emulsion having a toothing substance incorporated with it, as described, the usual method of producing a mat or roughened surface upon the paper, by rubbing down the surface of the print with cuttle-fish bone and pumice powder is dispensed with, and it is practicable to quickly prepare a surface superior in uniformity to that heretofore produced for the purposes specified.

9461. Alexander Melville Clark, of the firm of A. M and Wm. Clark, of 53, Chancery Lane, in the County of Middlesex, Fellow of the Institute of Patent Agents, for "An improved panoramic photograph camera" (a communication from abroad by Paul Moëssard, of Paris, France. Dated 26th of March, 1885.

This apparatus is described on page 97 of our present volume, and the claiming clauses of the specification are as follows:—

1st. A folding panoramic camera in combination with a compass having a movable graduated limb for adjusting the position of the camera as described.

2nd. A panoramic camera, constructed of a semicircular top and bottom a b, frame d, and flexible front, axis f carrying an apertured plate, the hooks and hinges connecting the frames, the whole as described in reference to the annexed drawings.

3rd. In a panoramic camera the means of adjusting the lens, consisting of the screws j actuating the lens carrier i, as shown and described.

9612. Alfred George Brookes, of 55, Chancery Lane, in the County of Middlesex, Fellow of the Institute of Patent Agents for "Improvements in the preparation or manufacture of photographic plates or surfaces for use in the production of etched or printing surfaces."—Dated 30th March, 1885.

These improvements have reference to an invention for which I have obtained Letters Patent, having previously lodged a complete specification fully describing the said invention, dated the 29th day of January, 1884, No. 2312, and the present invention has for its object to enable an existing photographic negative or picture on a plate or film to be utilised for the preparation of surfaces for printing or etching with by applying to such existing plate or film, having the image or picture upon it, a sensitive film or layer, upon which added layer the desired graining or hatching has been produced in the manner already described in my said former complete specification.

In the case of negative or positive plates or films bearing pictures or images, the surfaces of which have been varnished, it is necessary to remove (say) by means of caustic potash or other suitable means that varnish, and then having treated that plate or film with an insulating film or coating, the sensitive layer to be hatched, or grained, or prepared with like markings, is applied and treated as described in my said former complete specification for the like end.

What I claim is, the production of a grained or stippled surface upon a film or layer of chrom gelatine, or other similar substance, applied on an existing photographic picture or image substantially as and for the purposes hereinbefore described.

10,334. James Sturrock, Bank Street, Dundee, Forfarshire, N.B., for "Improvements in washing baths for photographic purposes." Dated 30th of January, 1885.

The claim is:—

Washing baths or tanks fitted with one or more tipping or falling buckets in combination with one or more shut-off taps or valves, and flexible, or partially flexible syphons, and time regulating taps, or with a combination of one or more floats, with or without tipping or falling buckets and time regulating taps, whereby the filling and emptying of the bath, with a period of slow action or rest between these operations, may be automatically obtained, substantially as and for the purposes described.

Patents Granted in America.

316,933 Willis A. Bannister and Louis H. Bannister, Rochester, N.Y., assignors to the Eastman Dry Plate and Film Company, same place. "Roller-holder for photographic films. Filed October 13th, 1884. (No model).

Claim.—1. The combination, in a roller-holder, of the measuring-roll G, and detachable spindle c', passing through the wall of the holder and carrying the indicator e', substantially as described.

2. The combination, in a roller-holder, of the measuring-roll G, detachable spindle c', indicator e', casing p, and transparent plate f', substantially as described.

3. In a roller-holder for exposing photographic films, and in combination with the inclosing-case and rollers, the removable end or side supporting the corresponding ends of the rollers, substantially as described.

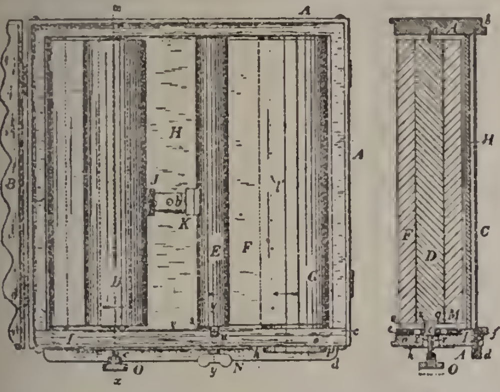
4. The combination, in a roller-holder, of the measuring-roll G, removable end I, spindle c' and indicator e', substantially as described.

5. The combination, in a roller-holder, with one of the film-carrying rolls, of a friction pad or brake arranged to act on the

verse or unsensitized side of the film, substantially as scribed.

6. The combination, in a roller-holder, of the film-carrying lls D and E, friction-pieces J and K, and springs *b* substanti-y as described.

7. The combination, in a roller-holder, with the film-carrying lls, of a measuring-roll provided with a series of film-perfor-ng devices arranged longitudinally of the roll, and the latter ving its circumference equal to the length of the film quired for a single exposure, substantially as described.



8. The combination, in a roller-holder, of the film-receiving ler E, provided with mechanism which prevents its reverse tion, and the film-carrying roller D, having connected there-th the spring *x*, arranged to operate as a film-straining device, bstantially as described.

). The combination, in a roller-holder, of the removable film-rrying roller D, sliding spindle *c*, and spring *r* substantially as scribed.

10. The combination, with the film-receiving roller E, ovided with ratchet *h′* and spring-pawl *u*, of the film-carrying ler D, provided with spring *x*, the outer end of which revolves ainst a friction-resistance, substantiallly as described.

11. In combination with the inclosing-case and the measuring-ler contained therein, the removable end piece carrying the dicator, the latter when the said end piece is applied to the case ing brought into operative connection with said measuring-ler, substantially as described.

12. The combination, with the roller D, of the spring *x*, collar and ratchet M, the inner end of said spring engaging notches the collar *z*, and the outer end resting in frictional contact th the teeth of ratchet M, substantially as described.

13. The combination, with the roller D, of the spindle *c*, llar *z*, spring *x*, and a frictional piece, M, attached to the lder, substantially as described.

14. The combination, with the roller D, of the sliding spindle and the collar *z* and spring *x*, arranged within a suitable recess the wall of the holder, substantially as described.

15. The combination with the roller E, of the sliding spindle *s*, d ratchet *h′* provided with a spring-pawl, and arranged thin a recess in the wall of the holder, substantially as de-ribed.

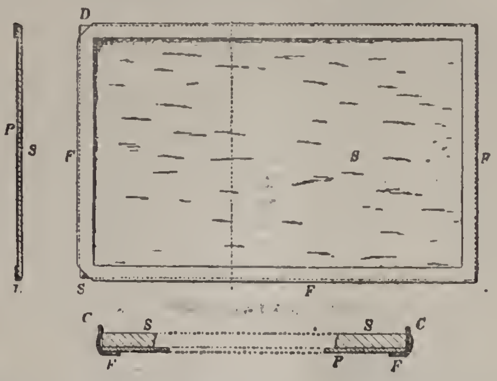
16. In a roller-holder for exposing photographic films, the mbination, with the winding and unwinding rollers located in e inclosing case and provided at one end with the fixed arings therein, of the removable side or end piece, and the vices mounted thereon for engaging the ends of the said llers and affording bearings for the latter, substantially as scribed.

17. In combination with the supporting-frame of a roller-lder, a rotary tension device independently mounted or pported upon said frame, and a spool upon which the film is ound detachably applied to said tension device, substantially as scribed.

18. In a roller-holder for photographic films, the combina-on with the frame, of the spindle supported therein and pro-ded with means for engaging the end of the spool, and a elding tension device applied intermediate the said spindle and c frame, substantially as described, whereby the spool can be moved, or applied to the tension device and spindle at will.

19. In a roller-holder such as described, wherein the film pply is wound upon a spool and drawn therefrom at intervals expose a limited surface, and in combination with said spool, a longitudinally-adjustable spindle provided with a means for engaging the end of the removable spool, and a yielding tension device applied to said spindle, substantially as described.

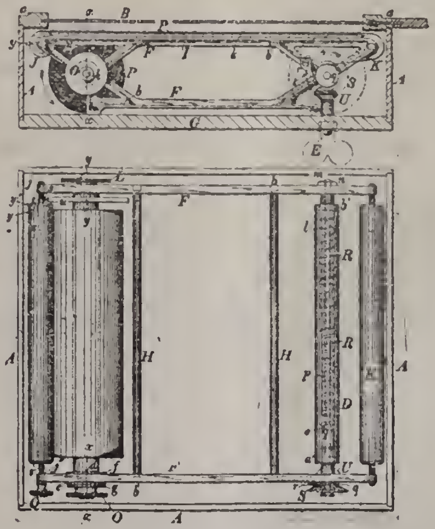
316,952. George Eastman and William H. Walker, Rochester, N.Y., assignors, by mesne assignments, to the Eastman Dry Plate and Film Company, same place. "Photographic film-holder."—Filed August 8th, 1884. (No model.)



Claim.—1. The herein-described photographic film-holder consisting of the plate or support S, and open frame F, provided with clips C C, adapted to fit over two opposite sides of the support, and to hold the film against against the face side of the support, substantially as and for the purposes set forth.

3. The herein-described photographic film-holder, consisting of the plate or support S, and open frame F, having one or more truncated corners, D, and provided with clips, C C, adapted to fit over two opposite sides of the support, and to hold the film against the face side of the support, substantially as and for the purposes set forth.

317,049. William H. Walker and George Eastman, Rochester, N.Y., assignors, by mesne assignments, to the Eastman Dry Plate and Film Company, same place, "Roller-holder for photographic films."—Filed August 8, 1884. (No model.)



Claim.—1. The combination, in an apparatus for exposing sensitive flexible photographic films, of two parallel rollers for operating the film, one of which is provided with a brake or friction device, while the other has applied to it a spring, which maintains the film in tension, substantially as described.

2. The combination, with the frame F F, of the spool C, having friction device applied thereto, film-support I, reel D, spring R, and ratchet and pawl *q r*, substantially as described.

3. The combination, in a roller-holder, for exposing photographic films, of the spool C, reel D, film-support I, and guide-rollers J and K, with a device acting to maintain the film in a tense condition during exposure, substantially as described.

4. In a roller-holder for exposing photographic films, the reel

D, provided with swinging clip *v*, for fastening the end of the film to the reel, substantially as described.

5. The combination, with the reel D, provided with means for attaching the film thereto, of the shaft *m*, spring R, and collar T, substantially as described.

6. The combination, with the reel D, provided with means for attaching the film thereto, and for preventing the reverse motion of the reel, of the shaft *m*, spring R, and collar T, substantially as described.

7. The combination, in a roller-holder for exposing photographic films, of the spool C, film-support I, reel D, and bevel-gears S U, substantially as described.

8. The combination, with the casing A, adapted to be attached to a camera, and provided with the exposing shutter B, of the removable back G, carrying the frames F F′, spool C, film-support I, and reel D, substantially as described.

9. In a roller-holder for exposing photographic films, and in combination with the spool and reel, as described, a measuring-roll in contact with the film, and provided with an alarm device, in combination with a film support and devices for feeding the film across the said support and roller, substantially as described.

10. The combination, in a roller-holder for exposing photographic films, of the measuring-roll J, provided with lug or pin *s*, and the spring *u*, arranged to operate substantially as and for the purposes set forth.

11. The combination, in a roller-holder for exposing flexible photographic films, of the measuring-roll J, and removable film-marking point *y*, substantially as described.

12. The combination, with the measuring-roll J, of the film-marking point *y*, arranged to be adjusted lengthwise of the roll, substantially as described.

13. The combination, with a roller-holder for exposing photographic films, of a measuring-roll in contact with the film, anp provided with an alarm attachment and a film-marking device, substantially as described.

14. The combination, in a roller-holder for exposing photographic films, of the spool C, pins *c* and *d d*, collar N, and nut O, substantially as described.

15. The combination, in a roller-holder for exposing photographic films, of the spool C, pins *c* and *d d*, collar N, nut O, reel D, spring R, shaft *m*, and pawl and ratchet *q r*, substantially as described.

16. In a roller-holder, the removable film-carrying spool C, provided at its end with means for attaching it to a revolving journal provided with a friction device, substantially as described.

17. In a roller-holder, the removable film-carrying spool C, provided on its ends with recesses for the reception of the pins *c* and *d d*, and slot *e*′, substantially as described.

18. The combination, with the casing A, adapted to be attached to a camera, and provided with the exposing-shutter B, of the removable back G, carrying the frames F F′, spool C, guide-rolls J and K, and reel D, substantially as described.

19. As a new article of manufacture, the herein-described roll of flexible sensitive photographic film, having its inner end attached to a spool, provided with means for inserting the spool and roll in a roller-holder, and inclosed in a suitable light-tight case or wrapper, substantially as described.

20. The combination, with spool C, reel D, and guide-rollers J K, arranged substantially as described, of the flexible photographic film wound upon the spool and reel with its sensitized face inward, and passing over rollers J K, with its sensitized face outward, substantially as indicated.

21. In combination with the light-excluding case and the roller or reel for winding the film after exposure, arranged within said case, the devices for actuating said reel from the exterior of the case, and a tension-regulator intermediate the actuating devices and reel, whereby in winding the film upon the reel the power is transmitted to the latter through the said tension-regulator, substantially as and for the purpose described.

22. In combination with the spool carrying the film-supply, a yielding brake mechanism applied thereto, a winding-reel and actuating mechanism therefore, an elastic tension device intermediate the reel and its actuating mechanism, substantially as described.

23. In a photographic film-holder, and in combination with the inclosing-case, film-supply, spool, and winding reel, a brake applied to the spool, a tension device applied to the reel, and an actuating device having a detent, and operating through the tension device to turn the reel, substantially as described.

24. In a photographic film holder, and in combination with the light-excluding case provided with a shutter, as described, the removable back, and the film-carrying and reeling mechanism, supported wholly upon said back, whereby the reeling and carrying devices may be withdrawn from the case to facilitate the operations of removing the film after exposure and inserting a new film, substantially as described.

25. In a photographic film-holder, and in combination with the inclosing-case and the reel D, provided with means for detachably securing the end of the film, the spool C, grooved as described, and the film wound upon said spool with its end inserted and fastened within the groove therein, substantially as described.

26. In a photographic film-holder, and in combination with its inclosing-case, a film carrying and straining mechanism independently mounted and inserted within the said case, and removably attached thereto, substantially as described.

27. In a photographic film-holder, and in combination with the inclosing-case, a spool carrying the sensitized film, a reel for unwinding the film from the spool and winding it up after exposure, and an adjustable friction-brake applied to said spool, whereby the degree of tension to which the film will be subjected when drawn from the spool is determined, substantially as described.

28. As a new article of manufacture, the herein-described roll of flexible sensitive photographic film consisting, essentially, of a spool provided with means for detachably applying it to a holder, and a strip or roll of flexible sensitive film attached at one end to the spool, and wound with its sensitive face inward, substantially as described.

29. In a photographic film-holder, and in combination with a film-supply holder, and a feeding mechanism for transferring the film from the holder and into position for exposure, a tension-regulator applied to the film and acting to supplement the pull of the feeding mechanism, substantially as described.

30. In a photographic holder, wherein are embodied an inclosing-case with exposing-aperture, a film-supply holder, and a feeding mechanism such as indicated, and in combination with said supply-holder and feeding mechanism, a supplemental tension-regulator applied to the film and operating, after the requisite feed has been effected, to maintain a constant pull upon the film lying between the supports and in front of the exposing-aperture, substantially as described.

31. In a photographic holder, and in combination with a film-supply holder and a feeding mechanism for withdrawing a portion of the film from the holder and sustaining it in position during exposure, a brake affording a determined resistance to the pull of the feeding mechanism, a detent for preventing the recoil of the feeding mechanism, and a tension device acting upon the film to supplement the action of the feeding device and produce a tension of the film, substantially as described.

32. In a photographic-film holder such as described, and in combination with the film carrying and feeding devices, an elastic tension-regulator adapted to draw upon and strain the film between its supports and to continue such action during the feeding of the film and independently of the feeding devices, substantially as described.

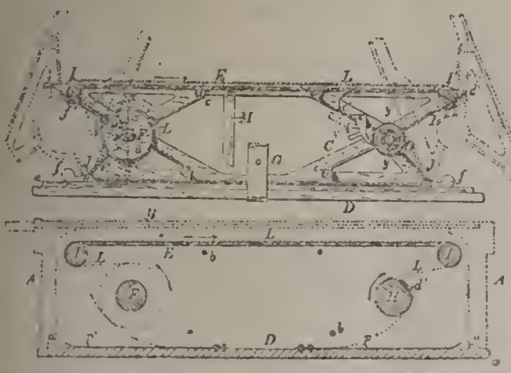
33. The combination, with the spool carrying the film-supply, the reel, and a spindle for actuating the reel, an elastic tension-regulator intermediate the said spindle and reel, whereby the motion to feed the film is transmitted through the said tension device, substantially as described.

34. In a photographic holder such as described, and in combination with a device for holding the film-supply, a winding-reel to which one end of the film is attached, and an elastic tension device applied to said reel and operating to rotate the latter, substantially as described.

35. In a photographic-film holder, and in combination with its inclosing-case and shutter, a frame detachably secured within said case, and provided with bearings to receive the detachable film-supply spool and reel, substantially as described.

36. In a photographic-film holder, and in combination with its light-excluding case provided with a shutter, as described, a removable frame inserted within said case and provided with a film-support, guide-rollers, and adjustable bearings at either end to receive the detachable spool and reel, whereby the entire film holding and actuating mechanism can be detached from its inclosing-case and held in operative position for adjustment, removal, or inspection, substantially as described.

317,050. WILLIAM H. WALKER and GEORGE EASTMAN, Rochester, N.Y., assignors to the Eastman Dry-Plate and Film Company, same place, "Roller-holder for photographic films." Filed December 12, 1884. (No model).



Claim.—1. In a roller-holder for exposing photographic films, e combination of the spool F, reel H, film-support E, and ards T, substantially as described.

2. In a roller-holder for exposing photographic films, the comnation of the spool F, reel H, film-support E, and guards T, ached to the casing of the holder, substantially as described.

3. In a roller-holder for exposing photographic films, the comnation of the spool F, reel H, guide-rolls I I′, film-support E, d guards T, substantially as described.

4. The spool wound with sensitized photographic film and proled with a socket at one end, and a socket and cross-groove the other, whereby it is adapted to be inserted between the justing-screw and the stud, and connected so as to be rotated the latter, substantially as described.

5. The combination, with the casing of a roller-holder for exsing photographic films, provided with a removable back, of a table frame supporting the film-carrying rollers detachably xed thereto, substantially as described.

6. The combination, with the casing of a roller-holder for exsing photographic films, of a removable back having a frame apted to support the film-carrying rollers hinged thereto, bstantially as described.

7. The combination, with the removable back D of a rollerlder, of the frames C C′, plate E, spool F, reel H, and catches J, substantially as described.

8. The combination, with the frames C C′, plate E, spool F, d reel H, of the projecting ends *d d* at one or both ends of the me, substantially as described.

9. The combination, with the casing and film-carrying roll of oller-holder, of the light-tight key-connection P, substantially described.

10. The combination, with the casing A, of the reel H, oved ratchet O, and key-connection P, substantially as scribed.

11. In a roller-holder, and in combination with the inclosingc and the film-carrying spool and winding-reel located therein, e guide-roll I, provided with a longitudinal groove *g′*, subntially as and for the purposes set forth.

12. The combination, in a roller-holder, of the guide-roll I, ovided with longitudinal groove *g′*, and film-marking point *i′*, bstantially as described.

13. The combination, in a roller-holder, of the guide-roll I, ovided with longitudinal groove *g′*, and a locking device, subntially as described.

14. The combination, with the reel H, provided at one end th a grooved collar O, having a central threaded opening, of e light-tight perforated key-connection P, arranged to slide rough the casing of the holder, substantially as described.

15. The combination, in a roller-holder, of the reel and spool ovided with a spring tension device and means for preventing e uncoiling of the spring during the operation of inserting the m in the holder, substantially as described.

16. In a holder for photographic films, and in combination th the inclosing-case provided with a shutter, as described, a novable film carrying and feeding mechanism hinged or pivoted its supporting-frame, whereby the film-actuating mechanism n be removed from the case and turned up, as and for the rpose set forth.

17. In a holder for photographic films, and in combination h the inclosing-case provided with a shutter, as described, a film carrying the feeding mechanism detachably secured to the back, and the latter removably applied to the inclosing-case, substantially as described.

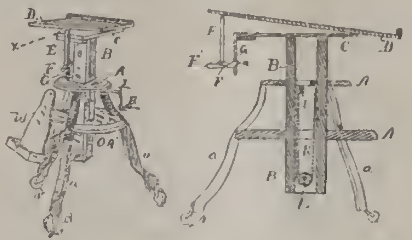
18. In a holder for photographic films, the frame supporting the film-carrying and feeding mechanism, secured to the base or back board by transverse movable bolts at each end, whereby the said mechanism may be detached at either end and swung or turned back upon the bolts at the opposite end, substantially as described.

19. In a roller-holder such as described, and in combination with the stud or spindle adapted to engage the film-supply spool and a tension-regulating device applied to said spindle, a key adapted to engage the end of the stud or spindle to wind up the tension device, and a series of detents to engage the said key, and thereby lock the stud or spindle in position, as and for the purpose set forth.

20. In a roller-holder for photographic films, and in combination with the reeling devices arranged within the inclosing-case, and adapted to be operated from the exterior of said case, the light-excluding socket or tube projecting through the case and engaging the end of the reel-operating mechanism to which the key is applied, substantially as described.

21. In a roller-holder, and in combination with the inclosing-case and a removable film carrying and reeling mechanism applied thereto, a light-excluding socket engaging a portion of the reeling mechanism, and provided with an opening for the passage of the operating-key, substantially as described.

317,230. James H. Smith, Chicago, Ill. "Camera Stand. Filed Nov. 10, 1884. (No model.)



Claim.—1. A tilting or locking device, consisting in hinged or folding leaves, to the free side of one of which leaves is fixed a notched rod or plate, and to the corresponding side of the other leaf is pivoted an arm, to which is hung a pawl adapted to engage the notches of said fixed plate, as herein described.

2. In a camera-stand, the top C, notched pendant G, hinged leaf D, pivoted arm E, pivoted pawl F, handle F′, slot *e*, and tooth *f*, as set forth.

3. In combination with the main frame A A′ and the elevating device H I K L, the vertically movable frame B, having a bevilled face B′, the block O, trigger P, and spool Q, as herin set forth.

4 A camera-stand consisting of the frames A A′, legs *a a a*,′ furnished with casters formed of the plate R, having screw-holes *r′ r′ r′*, shoulder M, guides *r r*, stem S, journal-crotch S′, wheel N, groove T, and pin *t*, the elevating apparatus B B H I K L,′ the lock O P Q, top C, leaf D, pendant G, arm E, pawl F, having the handle F′, slot *e*, and tooth *f*, as herein described.

317,389. Charles S. Lockwood, Albany, N. Y., assignor to the Bonsilate Company (Limited), same place, for "Process of treating alkaline silicates." Filed August 13, 1884. (No specimens).

Claim.—1. The process herein described of treating an alkaline silicate, which consists in, first forming a solution of the silicate; second, adding thereto a resineus material; and, third, comminuting the compound and subjecting it to heat and pressure, substantially as described.

2. The within-described process of treating an alkaline silicate, which consists in forming a solution, adding thereto a resinous material and camphor, and then desiccating, comminuting, and moulding the compound, substantially as described.

3. The use of a resinous material for the purpose of facilitating the treatment of an alkaline silicate, substantially as described.

4. The use of a resinous material and camphor for the purpose of facilitating the treatment of an alkaline silicate, substantially as described.

Notes.

The Amateur Society of Manchester has made a good beginning, and the President, in his inaugural address, pointed out the value of photography in making records. Rapidly and almost imperceptibly, our old cities change until they become new. Photographic records, to be useful, should be dated, and none but permanent prints deserve the name of records.

Yet another Photographic Club is in the course of formation in London (see page 335). It is to be called the Amateur Photographers' Club. Perhaps it would have been better to have selected a name less likely to lead to confusion with existing organizations of a similar kind, such as The Photographic Club, The Amateur Photographic Association, or The Amateur Field Club.

The Lords of the Admiralty ignore photography altogether; but, as for many years past, the Home Secretary's department will again most extensively pratronize the camera. This is, of course, because it is a standing rule to photograph all convicted prisoners. During the current year no less than £600 will be spent in what may be called criminal photography.

In Ireland only £90 were required for the above purpose in 1884-5; but this year, seemingly, it is expected that the number of "sitters" will be reduced. As a consequence only £72 are to be asked from the House of Commons, and it is to be hoped that the anticipated falling off in the numbers of prison "*cartes*" will be realized.

There is to be considerable activity at the South Kensington Museum in a photographic direction. The photographing of art objects in the various collections is to be assiduously continued, and no less than £1,000 will be placed in the hands of the S. K. authorities for the above purpose, coupled with the preparation and circulation of chromos and etchings.

The Industrial Exhibition, which is to open at Paris in July next, includes photographs and photographic apparatus (Class V.). Those who wish to exhibit should write to the *Administration*, *Exposition du travail*, 31, boulevard Bonne Novelle, Paris.

A vertical, or dipping, bath is strongly recommended by M. Lugardon, of Geneva, for the development of dry plates with ferrous-oxalate; as the tendency of the solution to oxidize is much less than when an ordinary dish is used. In order to preserve the developer between-whiles, an air-tight cover is used. Photographers may welcome this suggestion as a means of utilizing the almost discarded baths which were employed in the wet collodion process.

The hydrocarbon anthracene has been suggested by Mr. F. A. Gooch as a filtering medium in analytical work. The fine, fluffy crystals are felted together at the bottom of a perforated platinum crucible fitted to a vacuum flask, and the precipitate is collected on the felt thus obtained. Heat or a suitable solvent is employed for getting rid of the anthracene.

"Amateurs here continue to lose plates through defective packing," writes Mr. F. C. Beach, President of the New York Amateur Association; "and the subject will be discussed at our next meeting." Bad packing of plates has done much mischief in this country, and any discussion is likely to do good.

One of the photographic curiosities of the day is the portrait of Mrs. Langtry at the age of sixteen. These portraits, which are being offered for sale, show the lady as a slight girlish figure, with a decidedly plain face. But photography was always a little unkind to Mrs. Langtry's type of beauty. The camera is powerless where fascination of manner and charms of conversation are concerned.

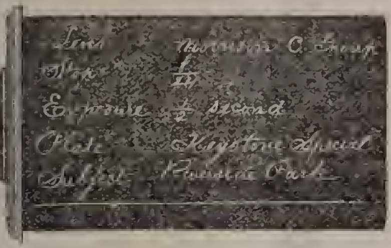
The reported arrest by the Russian authorities of the British Consol at Batoum, while sketching at a port on the Caspian, suggests the advisability of using some kind of concealed camera when pictures of fortifications are required. The hat camera, recently described in these columns, ought to be invaluable; or should the act of uncovering the head be deemed suspicious, a combination of a camera with an umbrella could be easily effected. We have heard it suggested that if a lady were employed on such an errand, the "dress improver" would make an efficacious and unsuspected receptacle for the camera, but we scarcely approve of the notion.

Freckles annoy the portrait photographer, and even when scarcely visible to the eye they sometimes are very distinct on the negative. The *Archive* suggests that it is an excellent plan to dust the face of the sitter over with violet powder tinted yellow with some harmless colouring matter. Turmeric would probably answer the purpose.

At the last meeting of the Russian Photographic Society, the question of taking life-sized heads was discussed, and Lieutenant Pavoffski advocated the use of a landscape lens with the diaphragm placed behind it. Lieutenant Pavloffski supplemented his remarks by showing some excellent results.

The *Referee*, writing on the Drawing Room held by the Queen last week, says that "in Regent Street there was quite a block of ladies going to be photographed in their Court dresses, and the Johnnies and their bouquets waiting outside the photographer's came in for more chaff." It is a pity the Court regulations are so rigid. What a boon it would be if a studio were fitted up at Buckingham Palace for the photographing of *débutantes!* A collection of portraits of ladies after their having been sitting in a carriage for a couple of hours or so exposed to the east wind, would not be particularly pleasing; but it might induce the Queen to effect a much-desired reform—the holding of the Drawing Rooms later on in the season, when the weather is more genial.

When the shutter of a dark slide is covered with a roughing composition, which enables one to write upon it with slate pencil, it is very easy to make full memoranda as to exposure or other matters, and we have to acknowledge the receipt of such a slide from the Scovill Co., of New York. The shutter is of a light, flexible material, like the cover of a book.



A rough varnish for making the "artificial slate surface" may be made by dissolving about 40 grains of gum dammar in an ounce of benzole, and mixing in a little finely-ground marble dust and lamp-black.

A correspondent who signs himself "Ignoramus," writes :—"I should be glad if you could tell me where I could buy some of the plates used by the member of the Chicago Amateur Photographic Club, and referred to by Mr. Hunter in your last issue. These plates, after being exposed for one second, dropped out of the carrier on the floor of a well-lighted room, yet upon development yielded perfect pictures. I have had plates drop from the dark-slide, and I have several times left the lid of my dry-plate box open, but in every instance fog utter and complete was the result. I think that plates which may be freely exposed to light without danger are the want of every beginner in photography." We coincide in the opinion of our correspondent. Unhappily the want is one not at all likely to be gratified.

A prominent clergyman, according to a contemporary, calls the face "the playground of the soul." We don't quite understand this, but if it be so, is the nose the *scenter* of the playground ? Anyway, the matter is one for portrait photographers to *con* over.

Beware of bichromate poisoning. A well-known photographer recently injured one of his hands through immersing it in a hot solution containing bichromate of potash when developing some carbon prints in a hurry. The symptoms are very disagreeable, and the poison is difficult to irradicate thoroughly from the system.

A TOURIST'S WASHING AND DRYING RACK.

BY T. G. WHAITE.

It is very desirable when travelling to have some means of perfectly washing and drying negatives that have been developed *en route*. The difficulty of finding space in the hotel bedroom for such necessary operations is very great. The little contrivance here sketched answers every purpose admirably ; placed in a stream or river, and left all night, ensures a thorough washing. Taken out in the early morning and left in a good current of air I find them generally dry by breakfast time (Continental), 11 o'clock. There is no trouble removing from rack after washing ; the rack being open at sides and bottom allows the air to circulate freely amongst the negatives. It is very light and portable, and the same rack can be made to take two or more sizes of plates ; if required to hold one size only the bottom framework should be made rigid, not sliding, and will be firmer and less troublesome in making.

The sides and crimped pieces should be of zinc, the framework of brass wire and brass tubing. Fig. 1 shows rack set for receiving negatives ; Fig. 2 shows same folded. The top bars, AA, have two or more slots to allow the rack to be extended for different sized negatives ; mine is made for 8½ by 6½ and 7½ by 5 plates ; the bottom tubes, CC, slide one into the other, the top bars, AA, hinged at D, and the notches, EE, retain the crimped sides erect and firm. In Fig 2 the top bars, AA, fold back as at O in packing up. The two rods, BB, are brass wire covered with feeding-bottle tubing for resting the negatives on. It will be observed that one side is hinged with a J-sort of hinge on the thick, or bottom tube, and the other on the thinner one ; the former will conveniently lie flat over the latter. Zinc tubing, if for a large sized plate (say 15 by 12), would be less expensive, and should then be made rigid, not sliding ; but for small plates I find the brass wire and tubing makes a much neater affair.

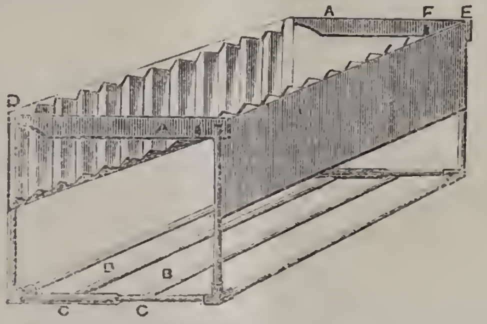


Fig. 1—SET UP FOR LARGEST SIZE NEGATIVES.

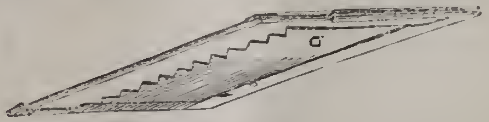


Fig. 2—WHEN FOLDED

ON THE DAGUERREOTYPE PROCESS.

BY THOMAS GALLOWAY.*

For softness and delicacy of detail no photographic process has ever equalled the Daguerreotype. In 1839 the process was published by Daguerre, and within a short time many establishments were opened in London and throughout the provinces for the practice of the art. The first studio in Newcastle was opened by a lady in the Arcade, about 1845; others quickly followed, and I have here a specimen by a Mr. Brown, of Grainger Street, and who produced very fine examples of the Daguerreotype process, another by Lanri, of Edinburgh.

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* Read before the Newcastle-on-Tyne and Northern Counties Photographic Association.

At the period of the introduction of Daguerreotype, miniature painting in England stood very high. There were many artists who realised great prices for their work. Sir William Ross, the greatest miniature painter England ever produced, was at the height of his fame. Amongst others, Thorborn, Sir W. Newton, who, although a landscape artist, also did part miniatures; and I mention his name as he was one of the first Vice-Presidents of the Photographic Society of London, for some years presided at most of the Society's meetings, and one of the largest contributors to the photographic literature of that day. There was Thomas Carrick, a north country artist, who went into the first rank of miniature painters. Soon it was found that the Daguerreotype process was competing with, and driving out, miniature portrait painting. The *Art Journal*, in 1846, says of the process:—"The improvements which science and skill have brought to bear upon this interesting art, becomes almost daily more and more manifest; we have during the last few months recorded our favourable opinion of the several specimens submitted to us by those parties who are known as the most successful practisers of this extraordinary invention. We have still to notice its advancement, as shown in some portraits we have recently seen by M. Claudet. We confess we had no idea of the possibility of producing anything so artistic and elegant on a metal plate. These pictures can scarcely be distinguished from the most highly-finished miniatures for delicacy and effect; while with regard to the accuracy of representation they, of course, far surpass the most successful efforts of the pencil alone. They are truly works of art, or we would rather characterise them as the beautiful results of nature and art combined. They may be equalled, but we scarcely think they can be surpassed."

But as the Daguerreotype process had in a great measure superseded miniature painting, so the discovery of the collodion process by Archer very quickly took the place of the Daguerreotype. Looking at the difference between a Daguerreotype and collodion positive, it was not the survival of the most beautiful, but of the cheapest and most easy process. As showing how rapidly collodion superseded the Daguerreotype process, I find in looking through the numbers of the Journal of the Photographic Society for 1853, only three years after the discovery of the collodion process by Archer, I cannot find a single advertisement relating to Daguerreotype materials. In reference to cheapness, the price of Daguerreotype plates 4 × 3, is 27s.; and $3\frac{1}{4} \times 2\frac{3}{4}$, 18s. per doz. The cost of collodion on glass is well known.

Then, as to the difficulty of obtaining good results on silver plates. A contributor to *The Photographic Journal* says:—"I was agreeably surprised to see a letter from Mr. Monson complaining of the almost total neglect of the Daguerreotype process, and wishing for more attention to be paid to it. I think, if Mr. Monson was to enquire amongst amateurs why they did not practise it, he would receive the same answer as they have done, 'It's no go—all polishing plates and no pictures; with the collodion there is no trouble to produce a picture, but with the silver plate there is no chance of doing so.'"

As showing the labour attending the process, I will give you a direction for cleaning plates from one of the hand-books of the day:—"When the plate is placed on the polishing board, it should be powdered over with fine emery; then add some drops of olive oil; then, with a pledget of cotton, it is rubbed in a circular direction during the space of from five to ten minutes; the same operation is repeated, two, three, or four times, or even more, according to the state of the plate"—*i.e.*, from twenty to forty minutes for the preliminary cleaning; and yet, with all this cleaning, Mr. Monsou states that nine out of ten failures are from insufficient *cleaning*. My practical knowledge of the process was very limited—confined to operating on some half-dozen plates. I have here the apparatus used, and some historical value may attach to it from its being the apparatus that our first President, Mr. Joseph W. Swan, operated with; and here also is, I believe, the first photo-Daguerreotype that he took. It is rather faint—I don't know it ever was much better—but it remained some years after being developed before it was fixed with gold.

In 1845 I saw Fox Talbot's *Pencils of Nature*, and also in several publications of that time descriptions of the process. However coolly we look at photographs now, at that time, when we saw the impression of what we saw in nature recorded by the light of the sun, independent of pencil or brush, it was a matter of surprise and wonder, and, in looking for apparatus, got this at an optician's in Newcastle. I think they were from Berlin.

The Daguerreotype process is more permanent than silver prints; the plates become tarnished (but that can be removed by hypo soda); they do not, I believe, fade. I have here a Talbotype of about the same date as those Daguerreotypes, and you can see the difference in them. In describing the process I shall have to depend mostly on memoranda I made about forty years ago.

The plates are made of copper and silver rolled together, the silver about one-twelfth the thickness of the plate. They are first placed in the plate-holder and rubbed for some time with emery or tripoli powder and oil. In large establishments they had revolving drums, covered with velvet, with precipitated chalk made into a paste with spirits of wine, and allowed to dry on the plate, then cleaned off with cotton-wool; or the plate was held over a flame and burnt, as all remains of the oil that got into the interstices of the plate had to be removed. They had not only to be bright, but chemically clean. Before sensitizing they were placed in what answers to the carrier in the dark slide, and then and there given the finishing polish with rouge on a velvet buff. Neither plate nor buff had to be touched with the fingers, and everything had to be perfectly dry, moisture being as great an enemy to the Daguerreotye process as it is now to the platinotype.

They are then ready to be sensitized. Here is the box; cotton-wool is placed on the bottom, and sprinkled with a solution of iodine, a piece of cardboard is put over it, and turned as each plate is put in; the shutter is drawn, and so the plate is exposed to the fumes of iodine. You look at the colour in daylight and judge of it by reflecting a piece of white paper in the plate. When it has become yellow, you remove it to the box containing bromine or chloride of bromine until it becomes of a rose tint. It is then put again over the iodine box for about half the time it was first exposed, and then put into the dark frame.

The whole of the sensitizing operation is conducted in daylight, it only being requisite not to expose it to light on the last removal. If a plate was exposed in the camera, it is only necessary to place it for a few seconds over the iodine or bromine box, and its sensitiveness is restored—nay, M. Claudet states, that if exposed to white light, its sensitiveness may be restored if it is exposed to light through red glass. In Daguerre's original description only iodide of silver was formed. This of course was slow, and needed a long exposure; but in 1840, the use of bromine and chloride of iodine was discovered, and increased the sensitiveness greatly. Lerebour states that, "On a fine summer day, with a cloudless sky, at noon, a fraction of a second will be necessary with a one-sixth size single lens; whilst at six in the evening it will take about three or four seconds." After exposure it is placed in the developing box. No change was made from the original discovery by Daguerre in the development of the image. Mercury is placed in the pan of the box in which is the bulb of a thermometer, and a spirit lamp applied underneath until it indicates about 150° Fahr. (45° centigrade), or just so that the fingers can touch without burning. The lamp is then withdrawn, and, after a minute or so, you can examine the development by placing a light against the yellow glass at the side of the box, looking through the glass at the front. When sufficiently developed, it is placed in a solution of hypo soda until the iodine has entirely disappeared; it is then washed in distilled water, then placed level on the fixing stand, and covered with a solution of chloride of gold and hypo soda. The lamp is then held under the plate, and the image begins first to assume a dark appearance, and then one or two minutes after it acquires a greater degree of intensity—this last effect is accompanied by the appearance of little bubbles—you then take away the lamp, wash copiously, and dry by again holding the plate by one corner over the lamp, and blowing on it. The plate is then finished. To preserve it, a mat is placed between it, and glass the same size, and fastened round the edges with gold-beaters' skin, to preserve it from the air.

CITY AND GUILDS OF LONDON INSTITUTE FOR THE ADVANCEMENT OF TECHNICAL EDUCATION.

THE Technological Examination for 1885, in Photography, took place on Wednesday evening, the 20th inst., at the various centres which have been organized in connection with the above Institution.

It is interesting to note that the number of candidates who present themselves annually for examination in this subject continues to increase, showing that it is no mere whim of those who seek a superficial acquaintance with every branch of science, but a desire by those engaged in the practice of photography to obtain that technical training which the Council have placed within the reach of all.

The examination consists of two grades, Ordinary and Honours, certificates (first and second class) being awarded in each grade.

Prizes.—Honours:—1st prize, £5 and a silver medal; 2nd prize, £2 and a bronze medal. Ordinary:—1st prize, £3 and a silver medal; 2nd prize, £3 and a bronze medal; 3rd prize, £2 and a bronze medal; 4th prize, £1 and a bronze medal; 5th prize, bronze medal.

The following are the questions given by the examiner, Captain Abney, R.E., F.R.S.

The results will be made known in August next.

INSTRUCTIONS.

The Candidate must confine himself to one grade only, the Ordinary or Honours, and must state at the top of his paper of answers which grade he has selected. He must *not* answer questions in more than one grade.

If he has already passed in this subject in the first-class of the Ordinary grade, he must select his questions from those of the Honours grade. The number of the question must be placed before the answer in the worked paper.

Three hours allowed for this paper.

ORDINARY GRADE.

(Not more than eight questions to be answered.)

1. Give an account of the Daguerreotype process.

2. A print on sensitized albumenized paper on being taken from the printing-frame is immersed in ordinary spring-water, which thereon becomes milky. What is the cause of the milkiness in the water? Put your answer into chemical symbols, if you can.

3. When choosing a camera (1) for the studio, and (2) for landscape work, what special characteristics should guide you in your choice?

4. What is a "view-meter?" Describe any one with which you may be acquainted.

5. During development, how can you distinguish between a properly-exposed, an under-exposed, and an over-exposed gelatine plate?

6. In a photographic print from a cloud negative, the sun appears as a black instead of as a white disc, all the rest of the print being in proper gradation. What is the cause of this peculiarity in the appearance of the sun?

7. Wishing to convert half-a-sovereign into chloride of gold ($Au\,Cl_3$), how should I proceed? If the gold in the half-sovereign weighs 60 grains, how many grains of chloride of gold should I obtain? $Au = 197$, $Cl = 35 \cdot 5$.

8. Why are the apertures in the stops of lenses round and not square? Illustrate your answer by a diagram.

9. On what phenomenon does the possibility of producing a powder picture depend? Give an outline of any powder process you may know.

10. Give a detailed account of the method you would adopt to make a lantern slide from a whole-plate negative.

HONOURS.

(Not more than eight questions to be answered.)

1. A certain light consists mainly of blue-green rays. Its spectrum has to be photographed. What compound of silver would be the best to use on the photographic plate, and why?

2. Write an account of a process for printing by development, commencing with the preparation of the paper to the mounting of the print.

3. It has been said that a gelatino-bromide plate, in comparison with a wet plate, is more sensitive in winter than in summer. On what grounds has this statement been made, and give your opinion as to the soundness of the argument?

4. Discuss the question of "depth of focus" in a lens.

5. Give an outline of a method of producing from a photograph, in which there are half-tones, a printing surface to be set up with type, and discuss the merits and demerits of such a process.

6. What is the action of the addition of a small quantity of sodium hyposulphite to a ferrous-oxalate, or ferrous-citrate developer? You should state your own idea as to the chemical reaction that takes place.

7. Wishing to make a star map, by photography, of some small portion of the heavens, how should you proceed to carry out your idea? Give some details of the apparatus you would employ.

8. Give your own opinion as to the best form of sensitometer as regards construction, range, and graduation. You are not required to describe any particular form which can be obtained commercially, but rather to discuss the subject.

9. A platinotype print is said to be "developed," as is also a wet plate. In what respect does the development differ in the two cases?

10. A negative is intensified with mercuric chloride, followed by ammonia; another with mercuric chloride and silver cyanide; another by ferrous sulphate and silver nitrate. Explain chemically what takes place in the three instances.

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AN ELECTRICAL STANDARD FOR MEASURING LIGHT.*

OUR engraving represents a new form of arranging an incandescent electric lamp with reference to its use as a standard light for photographic purposes, and is the outcome of a long series of experiments by Mr. Thomas A. Edison and his assistant, Mr. John Ott, in charge of Mr. Edison's laboratory.

The strength of the light required was to be equal to one candle power. When the matter was first introduced to Mr. Edison, he was of opinion there would be no difficulty in obtaining a means of accurately measuring and controlling the resistance of such a small lamp if a battery was employed.

The original plan was to interpose a known resistance in the main circuit with the lamp, which could be varied, and also an amperemeter or a voltmeter for measuring the variations of the current; but, after a large number of experiments, it was found impossible to make an instrument delicate enough to accurately measure the very low resistance in the lamp, which is said to be equal to about three-fourths of an ampere.

Mr. Edison then turned his attention to the utilization of the electrical compensation balance invented a few years ago by Prof. Poggendorf, which is generally recognised as being the most delicate method of measuring electro-motive force of batteries, and at the same time has the advantage of being entirely free from any detrimental polarization.

In this method of measurement the currents from two batteries are so balanced by the insertion of a variable resistance that, if a galvanometer is inserted in the circuit, no traces of a current can be perceived.

The arrangement as shown consists of a standard constant battery, a galvanometer, a key, a rheostat or resistance wire made in two sections, two parellel brass rods arranged directly above each section of the wire, provided with adjustable collars, which connect the bars to the sections of wire and a switch, all fixed upon a base which rests upon a photometric testing box. Within the latter, supported upon a sliding board, is the standard electric lamp.

Hinged to this board is a long wood rod, which, when the side of the box is closed, as it is intended to be for actual work, permits the operator to move the lamp at the open end to different distances from the sensitive plate, held in a plate-holder slide, shown at the opposite end. The lamp is connected by flexible cords to the binding posts leading to the main battery, and one of the section of the rheostat wire.

The apparatus is intended to be used in the photographic dark room. The cell of the standard battery, S, is the standard by which the electro-motive force of the Fuller, or main lamp, battery, M, is measured.

The battery, S, which is comparatively new, was devised by Mr. George Wirt, who is connected with the Western Electric Mfg. Co., of New York, and is a modification of the well-known Daniell battery. It is so constructed that the fluids cannot become disturbed or mixed through any slight jarring. It consists of three square bottles, $1\frac{1}{4}$ inches square by $4\frac{1}{2}$ inches high, with a neck $\frac{7}{8}$ of an inch in diameter by 1 inch long, securely clamped together with metal screw rods at the top and bottom, and held in an upright position by a light wood framework, as shown in the engraving. In the upper part of the adjoining sides of bottles I. and II. is drilled a small hole $\frac{3}{8}$ of an inch in diameter, and in the lower part of the adjoining sides of bottles II. and III. are similar holes, all arranged to correspond with each other.

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* Communicated to the Editor of the *Scientific American*.

A soft rubber washer separates the bottles at the holes, making a water-tight joint, and also acting as a support to hold in place a thin film of gold-beater's skin, through which the liquids must pass by the process of endosmose and exosmose, from one bottle to the other.

All the bottles are filled with a dilute solution of sulphate of zinc; within bottle I. is placed a piece of sulphate of copper about the size of a pea, which changes the solution to a blue colour; the copper electrode at the bottom is connected by an insulated wire, which passes through the cork to the back of the key, K. At the bottom of bottle II. is a small chunk of zinc, which collects any deposit of copper, should any pass through from bottle I.

In the top of bottle III. is suspended the zinc electrode, which measures about $1\frac{1}{8}$ inches long by $\frac{3}{4}$ wide and $\frac{1}{8}$ thick; its conducting wire as shown passes directly to the galvanometer.

It will be noticed this arrangement gives a very constant battery which cannot polarize, as each electrode is completely isolated, and the separation of the bottles with the gold-beater's skin also prevents an easy mixture of the solutions. Each electrode is never endangered, but is kept immersed in a solution favourable to retain it in perfect condition.

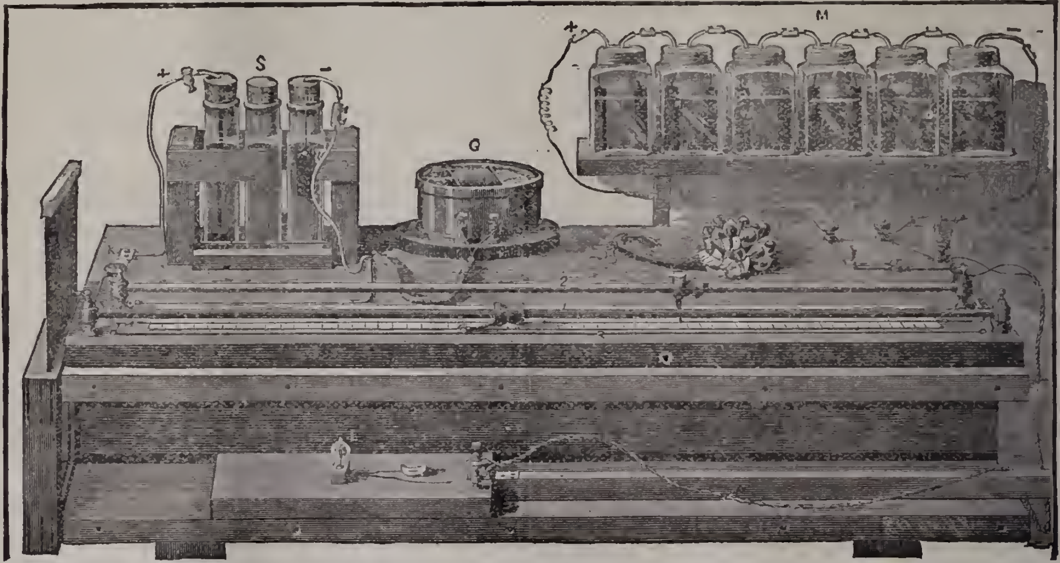
The main or Fuller battery, M, has been somewhat modified, but consists of a zinc electrode inserted in the porous cup, in which has been placed a teaspoonful of mercury and a dilute solution of sulphuric acid and water.

In the glass jar are four carbon rods about one inch square, arranged to fit in each corner of the jar, connected by a ring of wire at the top to one conducting wire, which passes out through the top of the cell. The jar is filled with the usual bichromate of potash solution, known as electropoin. A metal screw cap secures a rubber cover to the top of the jar, and thereby prevents the evaporation of the solution. Six cells are employed, and are plainly seen, located on a shelf at the right in the figure.

The amount of resistance inserted in the series is a trifle more than the resistance of the lamp while hot, and consists of a length of $5\frac{1}{2}$ feet of German silver wire $\frac{15}{1000}$ of an inch in diameter, divided into equal sections connected together at one end by a metal link. One section lies upon the millimetre scale, parallel with, and directly under, brass rod No. 2; the other also lies on the board under brass rod No. 1. The section of resistance wire under rod No. 2 is electrically connected thereto by the hinged metal pointed foot and adjustable collar, which may be adjusted to any point on the rod over the millimeter scale, and is secured by a set screw. The position of this collar is never changed except when a new lamp is to be inserted in the circuit. The section of resistance wire under rod No. 1 is electrically connected to the latter by a sliding collar provided with a spring, at the end of which is a grooved brass wheel about $\frac{3}{8}$ of an inch in diameter, which bears directly upon the wire.

In order to intelligently understand the operation, we will detail the two different circuits of the batteries.

The circuit of the Fuller battery, M, is from the positive or carbon pole of the battery to brass bar No. 1, through the collar, spring and wheel, to the German silver wire, to the lamp, and then back to the negative or zinc pole of the battery. It will be seen that by sliding the collar on rod No. 1, the amount of resistance in this circuit is easily increased or diminished.



The circuit of battery is from the positive or copper pole through the key to the resistance wire, thence through the pointed foot and fixed collar to brass bar No. 2, through the galvanometer, and back to the negative or zinc pole of the battery.

In the lamp circuit a switch is inserted for turning the current on and off when testing.

It will be noticed that there is a section of the resistance wire (the amount between the end connecting with key, and the pointed foot under rod 2) through which the current from each battery flows; and although the current from the main battery has a circuit independent of the galvanometer, it is in this section of wire that both currents are brought into juxtaposition and the electro-motive force of the main battery compared with that of the constant battery. The variation is at once noticed on the galvanometer, and is easily regulated, as will be hereafter described.

In operating the lamp, the switch in the lamp circuit is first turned on, then the key, K, is pressed, which brings the current of the standard battery, S, into opposition to the current from the main battery, through the galvanometer, G. If the electro-motive force of the main battery is too weak, the needle of the galvanometer will be sent to the right of zero a few degrees by battery, S; but such movement is at once overcome by diminishing the resistance in the main circuit through the sliding of the collar on rod No. 1 toward the left, in the direction of Key, K. As quickly as the resistance is cut out by this movement, so is the needle of the galvanometer forced back to the left until it reaches the zero point; then the batteries are exactly balanced, and the light obtained is equal to that of a standard candle; at this zero reading we have also a constant number of volts of electro-motive force.

A bunch of twenty lamps accompany the apparatus, and may be seen resting upon the base-board near the galvanometer. Although all of the lamps may possess the same electrical resistance, they will not emit an equal amount of light; hence in inserting a new lamp it is necessary to locate the hinged pointed metal foot under the brass rod, No. 2, at a different point on the milimetre scale, to correspond with the number marked on the label attached to each lamp.

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Society was held on Thursday, the 14th inst., Mr. W. COBB in the chair.

Mr. A. L. **Henderson** passed round the plates referred to by him at the previous meeting, in order to show that halation was absent. This led to a short discussion on unwashed emulsions, Messrs. Barker, Debenham, Henderson, Haddon, and the Chairman taking part.

Mr. C. **Heinrich Trinks** exhibited and explained the action of "Sargeants' Patent Shutter" (page 317).

Mr. A. **Cowan** had devised a shutter on that principle, but he did not claim originality, for Mr. Warnerke had a similar shutter made in Russia some years before. Mr. Cowan then handed to the Chairman plates from Mr. Debenham's formula which had been placed in his hands for trial. Two exposures were made, thirty and sixty seconds respectively; aperture $\frac{f}{4}$. He found sixty seconds to be about the exposure for yielding a good negative in the studio. On the previous day he made a large batch of emulsion which proved slow (14 on the sensitomer), the slowness he attributed to insufficient washing. He placed it in running water for five hours, which doubled the bulk and brought on green fog; the speed was increased nearly four times; pits and marks were plentiful. After adding more gelatine to make up for the extra water, the pits disappeared.

Mr. **Henderson** thought green fog may have been caused by lime in the water. Ammonia emulsions were liable to receive a deposit of lime when it existed in the washing water.

Mr. W. E. **Debenham** said it was a question whether the washing spoken of would account for increased speed. It was well known that by keeping an emulsion the speed would be increased.

The **Chairman**: If the emulsion had been previously washed it would gain rapidity by keeping; otherwise it would not do so.

Mr. **Debenham** thought green fog was sometimes due to impurities in the silver, and at others to the mode of preparing emulsions.

Mr. W. K. **Burton** had made several experiments with the precipitation method to discover the factor of green fog, so far he had failed. Some emulsions might be increased in rapidity by keeping. In the case of alkaline emulsions, like the ammonia process, there sometimes appeared to be decomposition; with slow emulsions this was less likely than with rapid ones. By adding decomposed gelatine emulsion to a fresh batch, it increased the speed a little, and the density appreciably.

Mr. **Henderson** had made a large quantity of emulsion two months ago, from which he continued to coat; but the speed had risen from 15 to 18 on Warnerke's sensitometer.

Mr. J. **Barker** was sure Mr. Henderson was on the right track when he first spoke of the addition of decomposed gelatine to an emulsion; they had yet to find out how to get maximum speed at once without the uncertainties of cooking or keeping.

The **Chairman** attributed green fog in very many cases to an excess of bromide in the emulsion formula. There was another point they had not considered—viz., the reverse action to speed by keeping. He had found this to be the case after reaching a maximum.

Mr. **Henderson** said a friend had boiled an emulsion until it became very slow.

Mr. **Debenham** had found that to be the case, but it was accompanied with fog.

Mr. **Barker** then toned a gelatine print in two minutes; the colour was good. The mode of preparing the paper was not stated; but Mr. Barker said it would keep any length of time.

Mr. **Henderson** thought any paper containing citrate or tartrate salts would not keep. A friend had informed him that opal plates so prepared would not keep.

Mr. **Debenham**: It cannot be said that opal plates do not keep, as some will, and others will not.

Manchester Amateur Photographic Society.

The first ordinary meeting of this Society, since the appointment of its committee and officers, was held on Tuesday evening, in the Technical School, Princess Street, and was numerously attended.

The following candidates for membership were elected:—Messrs. A. G. Westwood, James Higson, W. Hughes, George Slington, C. H. Denby, R. Gatenby, Jun., G. T. Yorston, R. R. Rothwell, H. B. Lomas, Henry Smith, G. W. A. Greenhill, W. E. Hutchinson, F. W. Cheetham, Henry Seares, and S. S. Fox.

The **President** (the Rev. H. J. Palmer, M.A.) delivered his inaugural address. The first and pleasantest amongst the duties devolving upon him as their President, he said, in venturing to inaugurate that which they all hoped and intended should be the long and prosperous career of their new Society, was that of conveying to the members his grateful sense of the honour conferred upon him in his election to so important a post. With this expression, then, of his cordial thanks, he entered upon his duties, trusting that he might be found to be second to none in the devotion of effort to further the interests of their body, and in that which he hoped would be their common endeavour to place the Society in the very first rank of movements for promoting the art of photography. There could be no necessity for him to offer any justification for their incorporation as amateurs, into an organized Society like this which had been set on foot under such happily favourable auspices. Nor could there be any arrogance or undue self-assertion in the statement of the unquestioned fact that amateurs in the past have, both as individuals and as collective bodies, by their discoveries and their patient research and experimental labour, done noble service to this useful art. And might not the members of this Society confidently look forward to results of similar benefit to photography from the united efforts and patient labours of their new and already numerously strong organization? Certainly, the photographic world had benefited greatly in the past by the work of amateurs in the origination or perfection of processes. The collodio-bromide washed emulsion, which for so long a period held a prominent place among the dry processes, had its origin in the skill and experimental research of amateurs of the Liverpool Society, and it was only necessary to mention such names as Herschell, Talbot, Abney, Wortley, Beechey, and a host of others, to be convinced that the claims of amateurs to the very forefront position among those who had brought the art to its present position of efficiency and perfection, is one which could be readily maintained. The increase throughout the world, in the number of those who practise photography as amateurs, is so marked that it was to be hoped their needs and requirements would now meet with attention. And it would be a useful department of the work of a new Society like this to endeavour to secure for themselves and their brethren the provision of some of these demands. For instance, it it was most desirable that guide-book series, such as those of Murray or Black, should begin to recognize the existence of such societies, and supply them in those volumes with information on special matters required by the members. Points of pictorial interest should now be specified in such books; thus, the aspect of a building, or of a waterfall or a landscape, might be distinctly laid down, and in addition to this, the points of the compass should be inserted in every map or plan. What could be more annoying than to find, after going perhaps hundreds of miles to photograph a subject in the afternoon, that it could only be taken satisfactorily in the morning? This had been frequently his misfortune in the course of his annual photographic vagabondizing over Europe; yet the annoyance might be entirely obviated by the addition of a few words in the description of a place, or by the insertion in a map of the points of the compass. He thought also that amateur photographers might now reasonably expect that hotel-keepers would begin to realize the necessity of providing accommodation for them. A room always ready for the changing of plates or the development of negatives, with an abundant supply of water, chemicals and dishes, for which they would willingly pay, would be a boon which they would all greatly appreciate when on their travels. No doubt the hotel-keeper who provided this accommodation would speedily find an increase of customers sufficient to make it worth his while to do so. It would be a useful work for each member of this Society to use his influence and effort to secure these and other photographic desiderata. In the direction of processes, it would be difficult, perhaps, for them to strike fresh ground, and he was not sure that it was desirable or possible to supersede the now universal gelatino-bromide process by any other. They might do something to develop and perfect this process if they would, as far as opportunity permitted, give themselves up to the task of experimental work in the concoction of emulsions and the making of their own plates. To those who are working in the preparation of rapid emulsions, he ventured to suggest that they should test the results of the combination of proto-iodide of iron with their emulsion. He must candidly confess, however, that for ordinary purposes he preferred to prepare his plates for slowness and certainty, rather than for risk and rapidity, and he had never yet obtained surer or more perfect results than those produced by his old favourite, gelatino-bromide emulsion, made with a considerable proportion of table beer. He thought much might be done in the improvement of printing processes. To his mind, the most satisfactory of all prints are those to be obtained upon the glass plate rather than upon paper. Of course he was aware that the former could never supersede the latter. However delightful might be the results of their labours visible in their windows in the form of transparencies, they would still desire to see upon their walls and in their albums permanent specimens of their own photography. A further work in which the members of the Society might profitably engage was the preservation of photographic records of ancient buildings and landmarks of the city of Manchester. These are rapidly disappearing, and he saw each time he entered the city from the Ashton side evidence of the gradual demolition of some fine old houses named Gibraltar. With these suggestions as to the various ways in which the Society might promote the photographic art, he would conclude his address in the hope that the Society might be the means of cementing many a firm and pleasant friendship; that it might be productive of an important impetus to photographic art-work, and that it might speedily, as he had said, take front rank among the scientific societies of this country.

On the motion of Dr. Tatham, one of the vice-presidents, a vote of thanks was accorded to the President for his address.

A number of photographs taken by members on the occasion of their recent excursion to Hawarden were afterwards shown, and some of them were pronounced by the President to be very satisfactory, considering the unfavourable state of the weather at the time they were taken. The exhibits comprised prints from plates taken on the occasion of the excursion by Mr. Robert Graham and Mr. J. G. Jones, and also transparencies by the President and Secretary; an excellent series of 10 by 8 views in North Wales, by the platinotype and silver process, by Mr. James Blair; half-plate views, by Mr. R. W. Davies; half-plate views of the neighbourhood of Prestwich, by Mr. S. A. Witham; and lantern transparencies, by Mr. Charles Jumeux.

Derby Photographic Society.

A meeting was held at the London Restaurant last week, the President, Captain W. de W. Abney, R E., F.R.S., in the chair.

Captain Abney read a paper on "The Theory of Alkaline Development."

The Committee were requested to draw up a rule for common observance as to the introduction of strangers at in-door meetings.

A vote of thanks to Captain Abney was carried by acclamation, and brought the meeting to a close.

An out-door meeting was held at King's Mills on Saturday afternoon. The members started by brake from Derby at 2 p.m., the weather being fine, but the wind rather too strong to make landscape photography enjoyable. Upon arriving at King's Mills they were met by several members who had come by train and by private conveyances. There was a good attendance, and several fine views were taken, and after partaking of tea, the Society returned to Derby, arriving about 8 p.m.

North Staffordshire Amateur Photographic Society.

The ordinary monthly meeting was held on Wednesday, the 6th instant, Mr. C. Alfieri presiding.

Mr. C. Brock was elected a member. A doublet lens was sent by Messrs. Newton, of Liverpool, for exhibition.

It was resolved that instruction should be given to a firm of plumbers for the fitting up of the laboratory of the Association at its present place of meeting.

It was also resolved that the North Staffordshire Railway Company be memorialised on the subject of reduced fares for the members; and that the first excursion of the season be made to Lichfield, on Wednesday, May 13.

Permission having been granted by the Dean of Lichfield for the members of the Association to photograph within any part of the precincts of the Cathedral, a number of ladies and gentlemen, members, proceeded to the sacred edifice on the day appointed, and a great number of plates were successfully exposed upon both interior and exterior; all sizes of cameras, from quarter-plate up to 15 by 12 being represented. For different parts of the interior exposures varying from five to thirty minutes were found necessary, the light being rather poor.

After viewing various objects of interest in the city, and spending a very enjoyable day, the party reached Stoke-on-Trent, well satisfied with the excursion.

Newcastle-on-Tyne and Northern Counties Photographic Association.

The ordinary meeting was held in the Wood Memorial Hall, Newcastle-on-Tyne, on Wednesday the 13th inst., at 7.30 p.m., Mr. J. B. Payne in the chair.

The Secretary read a letter from the President, regretting his inability to attend the meeting.

Messrs. Spargo, Jackson, J. E. Goold, and Worsnop were elected members.

W. Cozens Way, Esq., was nominated by Mr. P. M. Laws as an honorary member of the Association; the proposition was carried with acclamation.

The Secretary read reports from the Council with regard to out-door meetings. The Council recommended that meetings be held on June 4, at Jesmond Dene, leader, Mr. Goold; July 4, at Rothbury, leader, Mr. Gibson; August 5, at Barnard Castle, leader, Prof. Herschel; September 5, at Warkworth, leader, Mr. J. F. Maling.

Also with reference to a competition for *bona fide* amateur members only, to be held at the Society's ordinary meeting in November next, particulars of which will be issued shortly. Two prizes are offered, one by Professor Herschell, M.A., F.R.A.S. the President, and a second prize by the Council. The Judges' appointed are the President, W. Cozens Way, Esq., and Mr. J. P. Gibson.

Mr. Galloway read a paper on "The Daguerreotype Process," (see page 329). Mr. Galloway's paper was listened to with much interest, and the apparatus used came in for a large amount of attention. On the proposition of Mr. Payne a vote of thanks was unanimously passed to Mr. Galloway.

Mr. Joseph Gray then read a paper on "Obtaining Uniform Tones with the New Rapid Paper without Gold," and gave a demonstration of an interesting character with great success.

After a vote of thanks to Mr. Gray the meeting adjourned.

Manchester Photographic Society.

On Saturday afternoon, May 14th, the above Society held its first out-door meeting for the present season at Liverpool.

It has for some years past been a custom with the members to commence the summer campaign by a visit to the estuary of the Mersey, and experience has so far proved this arrangement to have been a wise one; for, not only is spring-time by far the best season of the year for absolutely instantaneous work, but the excursions hitherto have, with one solitary exception, been singularly fortunate in having favourable weather. On the above occasion, although at Manchester the morning was wet and cloudy, and the general look-out of the most dispiriting nature, the aspect of things improved during the journey, and on the arrival of the party at its destination the day was all that could be wished for; and no wonder! for did not Mr. Muth, with characteristic forethought, telephone an instruction to his friends at Liverpool that the weather should be specially adapted to the occasion? At all events, he received the encouraging reply: "Water clear, no rain, and frequent sunshine."

On arrival at the landing-stage the members speedily made their way to Rock Ferry, which was generally considered to be the best starting-point; and some good pictures were made there, with groups of stranded boats in the foreground, as well as a picturesque view from the end of the pier of a number of small boats, containing figures, which were lying on the turbulent water. On the return voyage a battery of cameras was arranged on the deck of the boat to be in readiness for "opening fire," and some very successful exposures were thus made; but when the stand-point of the camera, as well as the object to be taken, are both alike in constant and rapid motion, it must be admitted that the situation is an extremely difficult one, and an attempt made under such circumstances, to take a small sailing yacht with spread canvas, and passing swiftly in an opposite direction to the steamboat, could hardly be called a success.

The shutters used on the occasion were chiefly of the "Kershaw" type; but an extremely simple and efficient one was shown and used by Mr. Lees, of Dukinfield, the material of construction being ebonite; and the merits of the form are such that it is hoped Mr. Lees will bring it before the next indoor meeting of the Society for general inspection by the members.

It may be stated, for future guidance in such a class of work as that done on Saturday, that in the case of a pair of Dallmeyer No. 1B carte lenses, with an equivalent focus of about 6 inches (mounted stereoscopically), and diaphragms of $/_{16}$, the exposure was found to be ample with fifty-times plates, and with the quickest motion that could be applied to the shutter, although the said motion was not sufficiently rapid to secure a sharp image of the yacht above referred to when sailing at probably ten or twelve knots an hour, and in an opposite direction to the stand-point of the camera.

The next out-door meeting will take the form of a full-day excursion, on Saturday, June 6th, to the charming scenery around Bolton Abbey. Members and friends intending to join on that occasion must communicate with Mr. William Hartley, 24, Devonshire Street, Higher Broughton, at least three clear days before the date of the trip, otherwise no arrangements can be made for cheaper travelling than that of the ordinary railway fares.

Birkenhead Photographic Society.

The ordinary monthly meeting of the above was held on Thursday evening, 14th instant, at Mr. R. Hartley's Studio, Market Street, the President (Mr. J. Alexander Forrest) occupying the chair.

The Rev. H. Victor Macdnna, M.A., Messrs. A. J. Dunsford, W. Gorst, G. A. Kenyon, M.D., and W. P. Riley, were elected members of the Association.

With reference to the picture competition to take place at the end of the season, it was decided by the Council that the awards should consist of two prizes, the first for the best picture of the year, and the second for the best photograph of the year, both irrespective of subject; following these would be seven orders of merit, handsomely designed in colours, under the superintendence of the President, and kindly presented by him to the Society; the first for the three best cloud subjects, and one each of the six remaining for the best picture in each set of special subjects, a list of which will be found in the usual monthly notice sheet. It was to be understood that the pictures must have been taken within the present year, and entirely the production of the members competing.

A large number of prints of Speke, Sandbach, &c., were also passed round by Messrs. Atkins, Beer, Day, Ellerbeck, Evans, Forrest, Whalley, and Williams; after which—

Mr. John H. Day read a paper entitled, "Notes on a Day in the Neighbourhood of Sandbach" (see page 322), and a vote of thanks terminated a very enjoyable evening.

Amateur Photographers' Club.

At a meeting held at 22, Buckingham Street, Strand, W.C., on Wednesday last; present—Messrs. Platt, Pemberton, Dresser, Toulmin Smith, Duncuft, Greene, Stone, Hastings, Swift, Norris, and Captain Abney.

On the motion of Mr. Stone, seconded by Mr. Dresser, Mr. S. Platt, J P., was unanimously voted in the chair.

The Chairman called upon Mr. Stone to address the meeting in explanation of the objects in view, and for which it had been summoned.

Mr. Stone said: There seems at present to be a consensus of opinion among the amateurs of this country that the time has arrived for the establishment of a club which will bind them together. The question of the formation of this club is not without difficulties; there is the fact that amateur photographers are recruited from every rank of society, from nearly every grade; there is the fact that a large and an increasing number of ladies are amateur photographers. The club must be a *rendezvous*, a social meeting-place for country amateurs who come to town, where they can meet their London brethren and one another. The locality of the Club is a most important consideration. House-rent, and even room-rent in club land, is very high. The neighbourhoods of either Piccadilly or Trafalgar Square seem to me to be eligible positions. In any case I think a factor in the choice of rooms should be the possession of one large room or gallery, where exhibitions of photographs could be held. The possession of such a room might become a source of revenue. Then there most certainly should be one or more dark-rooms fitted up with every modern contrivance and advantage. There might be a number of lockers for the use of members, where their own developers and apparatus might be kept under lock and key. A small fee might reasonably be asked for this convenience. A billiard room is a desideratum. The formation of a good photographic library would very much enhance the value of the Club, and I believe many members would contribute books for so desirable an object. I am sure that all the photographic journals of the world would willingly send a copy of each of their issues for use in the newspaper and smoking rooms.

The feeding element in a club is at once a source of great risk and of great advantage. I believe that the Amateur Photographers' Club had better start cautiously, by merely having light refreshment supplied, such as tea, coffee, toast, wine, spirits, cigars, and tobacco. The caretaker should, if possible, be a man with a knowledge of photography, who could at the same time act as caterer. There would have to be a general committee, and also a house committee. The matter of annual subscription I hold to be of vital importance to the Club's longevity. This should have careful and thoughtful consideration. I make the suggestion that the Committee might perhaps prefer to make arrangements with a large hotel (say one of those monster ones now building in Northumberland Avenue) for the fitting up of rooms suitable for the Club, in which case the difficulties and dangers of the commissariat department might be satisfactorily solved. It seems to me that the main object of this preliminary meeting is to take such steps as will spread the knowledge of the starting of the Club throughout the three kingdoms, and enlist the hearty co-operation of all amateurs and all amateur societies and associations.

The Chairman then briefly proposed the first resolution, which was seconded by Mr. Greene, "That it is desirable to form an Amateur Photographers' Club, with premises in London."

In the discussion which ensued, Mr. Pemberton raised objections to the suggestion that the Club should be of a social character, as going beyond the strict limits of the circle of photography.

In the result, the resolution was adopted.

The second resolution was also proposed from the chair, seconded, and carried unanimously: "That Messrs. Platt, Dresser, Pemberton, Greene, Duncuft, Stone, Hastings, Fisher, and Captain Abney be appointed a Committee for the purpose of forming the 'Amateur Photographers' Club,' with power to add to their number."

On the motion of Mr. Greene, seconded by Mr. Dresser, it was resolved: "That a room having been offered to the Committee for their preliminary meetings, the offer be accepted; and that the temporary address of the Committee, for all inquiries, be made at 22, Buckingham Street, Strand, London, W.C."

At a meeting of the preliminary Committee, subsequently held, the *modus operandi* was discussed, and its final consideration postponed to a meeting, to be held by adjournment on Tuesday, 2nd June prox., at 12, noon.

Notts Photographic Association.

A social meeting of the above flourishing Society was held last Monday evening, the 18th inst., at Bingham's Restaurant, the President, Mr. G. Shepperley in the chair, for the discussion of matters relating to photography, the exhibition of apparatus, and the arrangement of a series of excursions during the coming summer months of June, July, and August. A great many members were present, who decided upon certain Thursdays and Saturdays as most convenient to their leisure, extending from Saturday, June 6, to Thursday, August 27. Amongst other places most in favour were King's Mills, Haddon Hall, Thurgaton and district, Belvoir Castle, Quorndon and neighbourhood.

The outcome of the efforts of the members will be shown at the forthcoming Exhibition in November next, which the Society propose holding for the encouragement of the art, and at which a silver and bronze medal will be presented for the best results.

The President kindly offered the use of a dark-room, centrally situated, for the convenience of those members who wished to avail themselves of its advantages.

Several new members were proposed for admission, and a very agreeable evening was passed.

Bolton Photographic Society.

The May meeting was held on the 7th inst., at the Baths, Bridgman Street, Mr. J. C. Sewell in the chair.

After the minutes had been confirmed, Messrs. Thos. Davies, Geo. Chamley, and Geo. Knott Morris, were elected members of the Society.

The accounts of the recent open meeting having been examined, it was resolved that the loss be met from the general funds of the Society.

It was also resolved that the best thanks of the Society be tendered to J. R. Bridson, Esq., for the funds placed in the hands of the council for prizes.

The following places were chosen for the out-door meetings:—Bromley Cross, Rivington, Alderley, New Brighton, and Whalley.

Talk in the Studio.

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will be held on Tuesday next, May 26th, at 8 p.m., at 5a, Pall Mall East. The room will be open at 7.15 for the perusal of publications on the table.

A Photograph, and a Photograph. — To illustrate the injuries done by the erection of the elevated railroad to a certain building situated on the corner of one of the avenues and an intersecting street, a photographer was employed to make a picture of the building and of the obstructions to its approach caused by the railroad. The photographer understood well what was desired of him, and made two views—one from above, and another below the track, full of posts, pillars, tracks, stairs, station buildings, and a locomotive blowing off steam, the building being merely suggestive, and scarcely visible. These photographs were produced in court, but the defendant in the suit was also provided with photographs. His views were taken from the intersecting street, showing that side of the building to be perfectly free from any obstruction, and another taken from between the tracks, and although a decided side view, also showed the entire building.—*Photographic Times.*

How Photographs are Advertised in the United States.—Mr. Walter B. Welsford writes:—"The enclosed I cut from the advertisement pages of an American paper will show how far behind we, in the Old Country are, as regards the matter of advertising. It may give some of us poor modest crawlers a wrinkle."—"What are the wild waves saying, sister?" "Listen, brother, and you will hear. Hartley is making the very best photographs that can be made anywhere in the world at the following prices:—12 cabinets, 1 panel, any style, $2·00; 12 cabinets, 1 panel, coloured, $2·50; 12 panels, $3·00. $1,000 Challenge to Photographers! I will make the following test case with any photographer in this city. A committee to be appointed to select ten subjects. Said subjects to have cabinets taken at any $5, $6, or $8 studio (if they can find one) and the same subjects to have cabinets made at my studio. Neither photographer to know when the subjects come to the gallery, or to know the test pictures until they are finished and delivered to said ten subjects, the name of each photographer to be then taken off the cards, and the pictures sent to Sarony, of New York, for his decision as to their quality. If mine come back pronounced as good as the others, I to receive $1,000. If mine come back pronounced inferior, I to pay $1,000. Who is the man to take this up? Do not be deceived by 'egg-shell finish.' 'Listen, sister, at what the wild waves are saying.' I positively assert that there is no such thing known to photography as egg-shell finish, and those that advertise it do not make any better-finished picture by that name than anybody else. One man says egg-shell finish is not offered in any gallery in the city at less than $6 per dozen. I say, and will bet him $500, that he cannot prove that any $6 studio makes any such picture, or that makes any better picture at $6 than I do at $2. The old saying, 'Drowning men catch at straws,' should be, 'Drowning men catch at egg-shells.' Listen again, brother, and hear what the wild waves are saying.' This same egg-shell man says, 'I could not exist at all was it not for my Sunday trade.' I will make him a side bet of $,1000 that I could live as well as any photographer, in this or any other city, if there never was a customer came into my gallery. I am not making photographs for a living, but only to make the photographers of Chicago acknowledge me dictator of prices. I have been informed that the reason certain down-town photographers do not keep open on Sunday is because the elevator does not run, and people will not climb six flights of stairs—not even for egg-shells. They make use of the fact of the elevator not running to make the public believe they are at Sunday school, instead of on the roof of the building printing. Remember, we are open Sunday—always have been, and always will be—as it is a great accommodation to the public (the churches are also open on Sunday, for the accommodation of those that cannot attend during the week) and, furthermore, I have made pictures of ministers on Sunday, and delivered the pictures to them on their way from church.'" Hartley's Studio, 309w, Maidson Street, Sign of the Rooster.

Photographic Club.—The subject for discussion on May 27th, will be "The Preparation of Lantern Slides." This being a lantern night, members are requested to bring slides. Visitors are invited. The Whit-Monday out-door meeting will be held at Welwyn. Train from King's Cross at 10.32 a.m.

To Correspondents.

*** We cannot undertake to return rejected communications.

A. F.—It seems to us that you bought the goods on the faith of the announcement that that the package contained full directions; and as it did not contain these directions, you are certainly entitled to recover the sum that you paid. Obtain a County Court summons.

A Constant Reader.—From Rouch, 80, Strand; or Marion, 21, Soho Square.

H. Parker.—The best is a quarter-plate apparatus by one of the high-class makers; if you buy a cheap substitute, you will soon become dissatisfied.

G. E. T. — Thank you for the excellent photograph, and the interesting account of your method of "squaring" the custodian. All photographers know how to get the subject square, but some diplomacy is often required to "square" the verger. You remark with some justice that there is no excuse for converging lines: but did you ever yet see any photograph which had not some fault? Do not forget your promise to send notes of your tour.

No. 99.—Is it necessary for us to say that they are excellent?

Rothwell.—1. It is merely a question of the size of the reflector, and apart from this, the distance is immaterial. 2. One on a slightly albumenized paper is best; but we have succeeded very well with plain paper. 3 —

Mercuric chloride	20 grains
Ammonium chloride	20 ,,
Water	1 ounce

4. Lithographic writing ink ink rubbed up with water to a moderately stiff consistency.

Thos. Slow.—It can be obtained from the Autotype Company, 74, New Oxford Street, W.C.

Vade Mecum.—Something of the kind is sold by Marion and Co., Soho Square.

J. Widmbr.—No. 16 corresponds to 1·65 millimetres, and No. 20 corresponds to ·914 millimetres. We post you a table giving fuller details.

E. G.—As there is no copyright, you have probably no legal remedy. Several cases have occurred in which the aggrieved persons have taken upon themselves to destroy photographs under similar circumstances.

An Old Subscriber.—The best imitation of ivory is celluloid or xylonite. It is a combination of soluble pyroxyline, camphor, and a white pigment.

Burt Sharp.—The address is Gray Brothers, 49, Blackett Street, Newcastle-on-Tyne.

W. S. F.—1. Generally speaking they give better negatives—clearer, and more perfectly gradated. 2. The idea is quite practicable, and has been carried out by several well-known practitioners. The maker of the camera will construct the frame for you; but a light-tight partition must also be fitted in the camera. 3. It has been described in the News, but is rather complex. We prefer the simple drop.

Edward's Plate-Coating Machine.—This machine, recently mentioned by M. Vidal, is described on page 540 of our volume for 1884, not on page 511, as recently stated.

The Photographic News.

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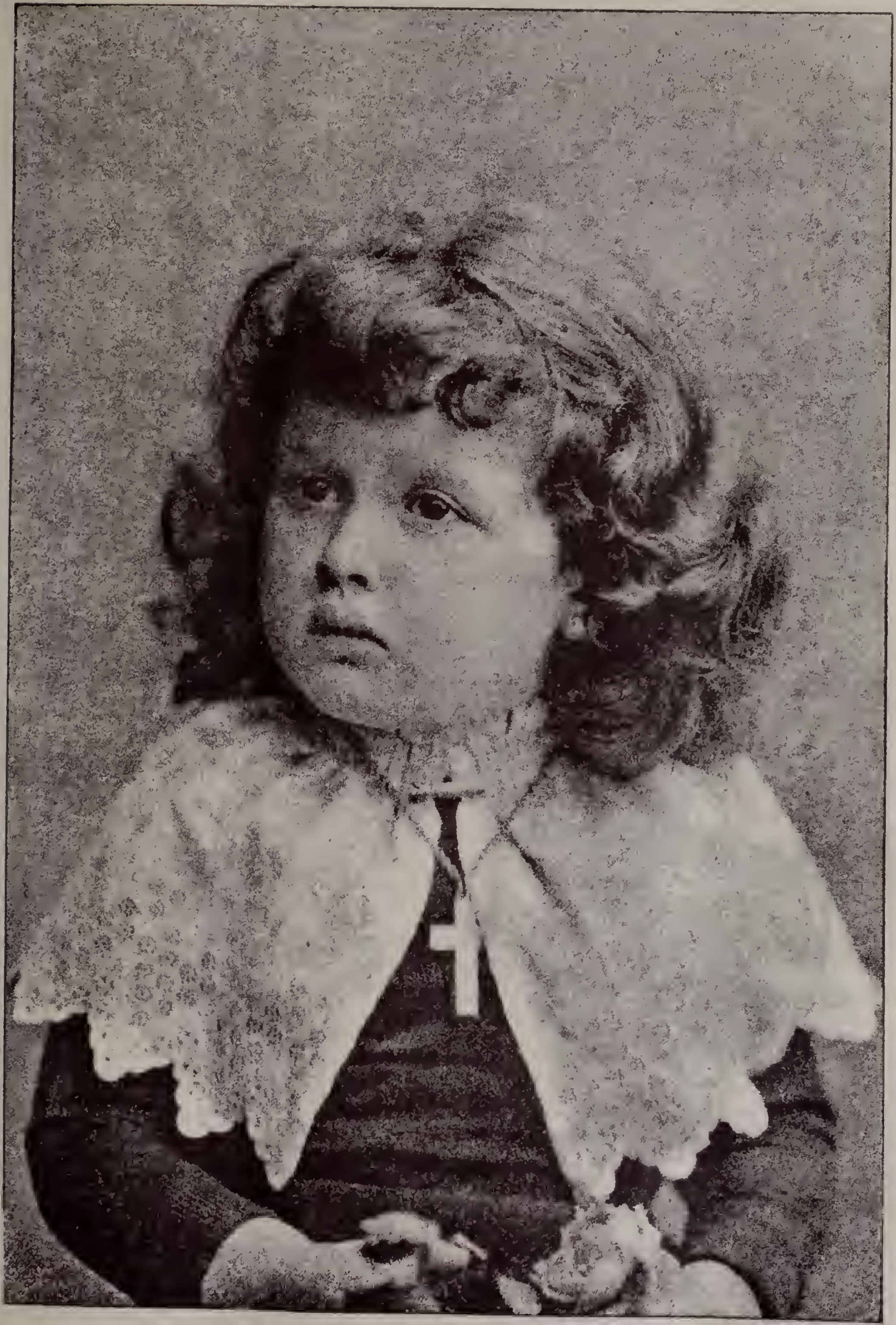

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1395.—*May* 29, 1885.

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SURVEYING BY THE AID OF PHOTOGRAPHY.

One of the difficulties in the use of the camera for surveying lies in the fact that the observations are far more liable to be disturbed by dull and foggy weather than are those made with the ordinary surveying instruments. When there is but a slight mist it is impossible to measure points in the distance with any accuracy on the negative. Moreover, a difficulty is introduced whenever it becomes necessary to work facing the sun.

In the report already referred to, drawn up by those who had been concerned in the Strassburg survey, it is mentioned that the lens used was one of only 235 m.m. focal length—about $9\frac{1}{4}$ inches—and that as a consequence distant objects were represented so small as to be beyond the possibility of accurate measurement. "A lens of considerably greater focal length appears desirable," continues the report; with reason, we should imagine, seeing that the plates to be covered were 12 inches square. A focal length of about double that mentioned is recommended by Herr Stolze.

The first condition of accuracy in a photographic survey is the ascertaining with the nearest possible approach to absolute precision of the optical centre of the lens. If any error be made in the determination of this, and consequently of the distance between the optical centre and the ground glass or sensitive plate, this error will be reproduced proportionally throughout the whole resulting plan.

The determination of the optical centre of the lens was made by the Strassburg surveyor by the well-known method of finding the distance from the ground glass by focussing a measuring rod placed vertically at some distance off, when—

$$f = \frac{d \ b}{m}$$

When d = distance of measuring rod, b = size of image of same on ground glass, m = length of rod; f here is not the principal focus, but the lens conjugate. It is, however, of course, quite easy to find the optical centre when f is determined. Concerning the method, however, Herr Stolze makes the following remarks:—

"To get the image very sharp it is necessary to place the measuring staff at some distance. From this it follows, however, that the image is proportionally small. It had, in the case in question, a length of 5 c.m. (about 2 inches). Now it is well known that every measurement of a line is transferred with a certain error at each end, so that in the particular case in point only a certain fixed degree of precision can be relied upon. From a hundred thousand estimations from photographic plates which Meydendauer and myself have made, we conclude that with the usual measurement the maximum attainable precision is for each reading 0·1 m.m. (about $\frac{1}{250}$ inch), that is to say, in the case of a line which requires two readings, 0·2 m.m. Even this degree of accuracy is only attainable by a practiced hand. With most an error of twice the amount mentioned is to be looked for. In the case in question, therefore, the measurement of the 5 c.m. may be assumed to be burdened with an error of at least 0·2 m.m., or $\frac{1}{250}$th of the whole. This error conveys itself by the calculation indicated above, to the focal length; which, therefore, even supposing it to be measured with absolute accuracy, will be estimated as at least $\frac{1}{250}$ too large or too small." The result of this is, between any two plates exposed before and after the camera is turned through an angle of 60°, an angular error of 14′ 24″; enough to completely upset any survey.

"The method whereby Meydendauer and I estimate the focal length is free from these objections. It is possible by means of it, and by the help of the most simple measurements and easy calculations, to ascertain the focal length within 0·05 m.m. of precision." Unfortunately the method is not described.

It was urged, as a serious drawback, and one giving rise to considerable error, that the camera revolved on a vertical axis which did not pass through the optical centre of the lens. In this connection we must point out that although in this typical case which we imagined, only one exposure was made, in actual practice it is necessary, as a rule, to take several exposures from each point of observation, the camera being turned after each exposure on a vertical axis, so that the one picture will overlap that next it.

Concerning the assertion that the want of coincidence of the turning axis of the camera and the optical centre can cause any considerable error in the result, Herr Stolze remarks: "I do not know who may be the originator of this wonderful statement, but I must at once declare it to be an error." He then goes on to show that the maximum error which can arise from the want of coincidence is equal to the diameter of a circle having the distance between the turning axis of the camera and the optical centre of the lens as a radius, amounting to 28 c.m.—about $10\frac{1}{4}$ inches—in the case in question. He then points out that photogrammetrical observations are not intended to serve as the basis for calculations as those by the theodolite are, but are intended for direct transference on to paper, so that any error which lies within the width of a pencil line or a pencil point may be disregarded. A distinct pencil dot has, however, according to Herr Stolze, a diameter at the smallest of 0·2, generally 0·3 m.m.; that is to say, about a hundredth of an inch. "From this it follows that when the scale of the plan is not greater than 1 to 1,400, the circle described by the optical centre of the objective is at the greatest represented by such a pencil dot, and may be entirely disregarded. To one who can judge of such

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Continued from page 322.

matters, it will be evident that in work of the nature of that in question a larger scale than this can seldom be used.

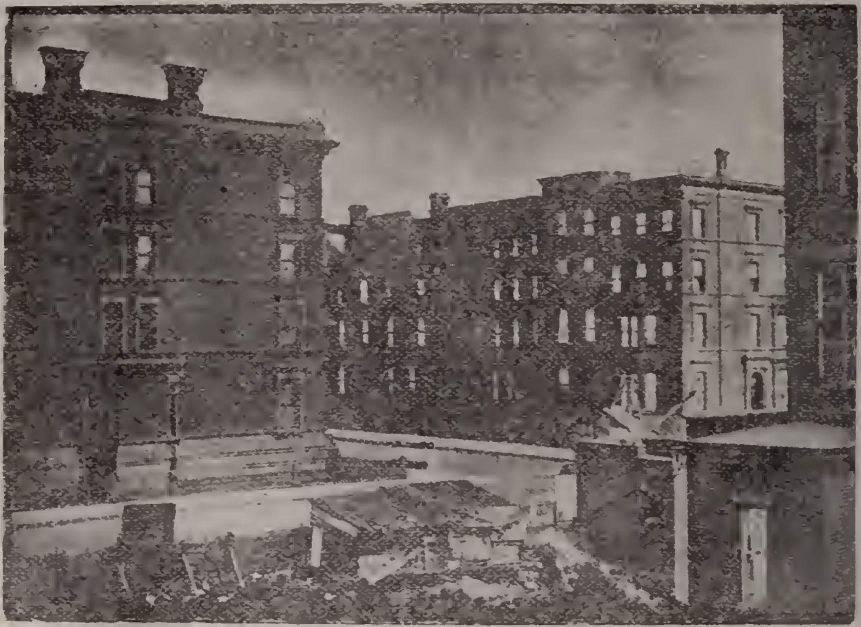
"If, however, it be desired in the case of purely architectural surveys to work to a larger scale, it is only necessary to draw the circle to scale on the paper, and to make the construction from its periphery instead of from its centre."

The reason for keeping the vertical axis of the camera behind the optical centre of the lens is evidently to cause the two to coincide; would involve a most cumbersome construction of operation; and would be a thing to be avoided unless very great advantages were to be gained from it. This will be evident to anyone who will consider how it would be necessary to construct a camera if it were desired that the screw pinching it to the tripod head should be immediately below the lens, and at the same time that the whole arrangement should be quite rigid.

◆

A PHOTOGRAPH BY MOONLIGHT.

Our illustration is a phototype block made by Mr. W. T. Wilkinson from an original photograph taken by Mr. J. B. Metcalf. Mr. J. B. Metcalf's picture was taken by moonlight on the night of December 13th, 1883, from the window of his residence in New York. The exposure extended from 6.30 to 11.30, p.m., and he used one of Eastman's (American) special plates, Dallmeyer's 6½ by 8½ rapid rectilinear lens, full opening, and ferrous-oxalate (no bromide) developer.



◆

THE ISOCHROMATIC WET PROCESS WITHOUT THE INTERVENTION OF YELLOW GLASS.

BY DR. H. W. VOGEL.[*]

About a year ago I published in the Photographic News an account of my eosine collodion process for taking coloured subjects. In this process, as in all others published afterwards, a yellow glass is necessary through which the subject ought to be taken, for reducing the action of the white and blue rays. Now it is said that Dr. Albert and Braun (Dornach) possess a secret isochromatic process which does not want a yellow glass. This is an advantage, because the yellow glass increases the exposure necessary for taking a picture.

Now it is easy to vary my published process in such a way that it works also without a yellow glass, though I confess that the proportion of brightness of the different dyes taken in this way is not so perfect as in photographs taken with azaline plates.

During the last year I published a paper on the importance of the silver eoside for the isochromatic wet process. Amory and Abney have already shown that this substance is only sensitive for green and yellow rays of the spectrum, and I thus explain the favourable action of it in the wet isochromatic process. This eoside is formed in the wet eosine collodion process, and can be easily observed when one submits a plate coated with eosine-dyed collodion to the action of a nitrate of silver bath made acid with acetic acid.

It is a well-recognised fact in photography that in many cases two sensitive substances mixed together influence each other favourably. Iodide of silver or bromide of silver when used alone in the wet process do not possess sufficient sensitiveness for the shadows, but when mixed they are far more satisfactory. The same kind of thing holds good in the case of the spectrum. Iodide of silver by itself is, with a short exposure, only sensitive a little beyond G, while bromide of silver is sensitive to F; but both together are sensitive as far as *b* or E. The case is similar with silver eoside.

The formation of the required silver compound which not only gives developable images, but is also at the same time an optical and chemical sensitiser, is the cause of the exceptionally active action of eosine in the wet process.

A notable circumstance is that the silver eoside plates lose very little of their beautiful red colour in the fixing bath, hence it would seem that the eoside of silver is only decomposed with difficulty by hyposulphite of soda. The following facts relative to the sensitiveness of films containing eoside of silver were established by me in 1884:—

1. Eoside of silver by itself is sensitive for the yellowish-green and green rays of the spectrum, the action going

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[*] Communicated by the Author, from a chapter of his new book: "The Photography of Coloured Subjects in the Right Proportion of their Brightness," which book will be published in Germany during the next few weeks.

with very long exposure a little beyond the bright blue. If one compares eoside of silver with pure bromide of silver as egards the action of the spectral yellow, the eosine compound turns out to be three times more sensitive than the indigo-sensitive modification of silver bromide.

2. Eoside of silver in conjunction with bromide of silver ives considerable sensitiveness to the yellowish-green ays; the sensitiveness of the two conjointly for these ays being at least sixty times that of a simple bromide plate.

3. Eoside of silver with a small addition of iodide gives sensitiveness for the green about four times as great as he sensitiveness for the blue.

Although one might suppose that eoside of silver itself would be the best medium for photographing coloured objects, it is not sufficiently sensitive for the purpose, hence it is better to use bromide and iodide as recommended in my receipt for colour-collodion published last year.

This circumstance leads one to the enquiry, whether it is not better rather to reduce the blue sensitiveness by reducing the amount of the substance which is specially ensitive to the blue (bromide of silver); and to correspondingly increase the amount of the substance specially ensitive to the green (eoside of silver). This question I have endeavoured to answer experimentally by omitting the iodide in my formula, and increasing the eoside about tenfold; in this case the lowering of the sensitiveness to the blue, and the exaltation of the sensitiveness to the yellow, were so great that use of the yellow glass was found to be no longer necessary in order to secure very marked results. The experiments were now continued, and the proportion of eoside was increased to twenty-fold the original, with the result that a plate was obtained which worked satisfactorily without the yellow glass, and was more acted upon by chrome yellow than by ultramarine blue. Still the result was hardly equal to the azaline plate used with yellow glass; but the convenience of being able to work without a yellow glass is very considerable, as the yellow screen prolongs the exposure very considerably. For the reproduction of oil paintings containing deep blue, the eosine collodion process, without the yellow glass, should suffice; especially if but little importance is attached to the red tints.

The image which is obtained on the collodion plate highly charged with eosine is thinner than when a plate is used containing a small proportion only of eosine, but this thin image can be easily intensified with silver and pyrogallic acid.

◆

ABOUT SULPHITE OF SODA AS A DEVELOPER AND FIXING AGENT.

BY CAPTAIN ABNEY, R.E., F.R.S.

Sulphite of soda is so commonly used by photographers as an ingredient in the alkaline developer that it is a matter of some surprise that we have not heard more regarding its capabilities in other directions. Sulphite of soda has several curious properties, one of which was announced some little time ago by Mr. Watmough Webster, I believe —viz., its supposed power of taking the place of the alkali in the alkaline developer. He found if the developer be mixed as for development, and if the alkali be absent, but sulphite of soda be present for the purpose of keeping the pyrogallic acid colourless, that after a long interval an image may be developed on a gelatino-bromide plate. It appeared to me, however, that this developing action might be due to a little free alkali which is often present in the sulphite, and to test this some experiments were made. To the sulphite solution was added a little hydrochloric acid, just sufficient to make it redden blue litmus paper, and a collodio-bromide emulsion plate was, after exposure, immersed in a saturated solution of the acidified salt, to which a few grains of plain pyrogallic acid were added. After a lapse of about three minutes, a perfectly developed picture was obtained, and quite free from fog; but it had a curious metallic look on the surface, and was a little browner in colour than that usually obtained by other means.

This proved, then, that the sulphite *per se* can be substituted for an alkali in the ordinary alkaline developer. Another plate was exposed and immersed in a mixture of sodium sulphite and sodium bisulphite (this latter is an acid salt), to which pyrogallic acid had been added, with the result that an excellent picture was obtained, but rather slower in coming out, and of a still browner colour. It will be seen that this developer worked without any restrainer whatever. It struck me, therefore, that it should be useful for collodio-chloride. Plates were prepared and exposed wet, and, in the first instance, a saturated solution of the sulphite was used; but, for reasons which will be apparent further on, the strength was diminished to half saturation. With long exposure to light the image developed up rapidly, and had a rather ruddy tone, but nothing very remarkable. By giving a short exposure, however, the image was long in coming up; but it developed eventually with great intensity, and assumed a beautiful ruby-purple colour by transmitted light, but by reflected light showed a *green metallic lustre*, which could not be distinguished from the colour of a very bad example of green fog. This was only on the high-lights, however, and not to be traced on the transparent portions of the picture. We have here a further proof, if any be required, that green fog in gelatine plates may be caused by the reduction of an haloid salt to the metallic state, as Mr. Woods and myself have shown in different manners. The ruby-purple colour by transmitted light and the reflected light are extremely significant. Silver, we know, can be caused to precipitate as ruby crystals. When metallic silver is immersed in a neutral solution of peroxide of hydrogen, argentous hydrate ($2HAg_2O$) is formed, and dissolves. When the solution is evaporated it leaves a crystalline residue, which, on treatment with water, gives up argentic hydrate, and deposits metallic silver in red microscopic crystals. The general resulting action of development is well understood; but it by no means follows that each minute reaction has been studied or followed, and it seems quite possible that the colour of the silver may be due in this case (as in other cases of ruddy images) to the formation at some stage of argentous hydrate, and a subsequent deposition of ruby crystals of silver.

Now as to the action of the developer on gelatine plates. Gelatine bromide plates do develop with the acidified sodium sulphite, but they are long in coming out, but they give pleasing images; with the strictly neutral solution the image develops more rapidly. With gelatino-chloride plates we have an anomaly. When exposed and placed in the saturated solution the plate fogged, but fogged in a peculiar way. Gelatine-bromide plates, as is well known, tarnish round the edges more readily than do bromide plates. It was when this tarnish existed that the fog appeared. The fog was very peculiar in appearance, as it gave a very bright metallic appearance, and spread over the whole of the surface of the plate, and when the plate was dry could be polished like a mirror.

Now for the cause of this. When a collodio-chloride plate was developed it was found that the liquid, on rocking, was streaked with a reddish, soluble substance, and that after the plate was developed the liquid was of a rosy tinge, and moreover, it was found that after long immersion the plate was fixed. Now I knew well that silver chloride did dissolve in sulphite of soda, and it was evident to me that the rosy tint was really due to the dissolved chloride becoming reduced by the pyro and sulphite. Nay, more, it was evident that as this reduction was gradual, intensity was given to the image by the precipitation of those particles on the silver already reduced in the film. This accounted for the abnormal density of the images obtained on the collodio-chloride, also for the polished metallic lustre on the gelatino-chloride plates. I was determined to develop a good image on the gelatino-chloride, and so I made a mixture of 1 part saturated solution of sodium sulphite, and about 1 part saturated solution of sodium bi-sulphite, and diluted the mixture down to four times its original bulk. On exposing a gelatino-chloride plate, and immersing it in this solution, to which I had added pyrogallic acid, not a trace of an image appeared for four or five minutes, when a faint trace was seen. I left it in the dish whilst doing some other work in the laboratory, and examined it after about quarter of an hour, when I found a developed picture of splendid intensity, without fog of any description, and of ruby purple tone—just such a tone, in fact, as has been sought after in connection with the gelatino-chloride paper for printing by development. The solubility of the chloride had been checked by the dilution of the developer, and also by the bi-sulphite, and in consequence a good developer, though slow, had been attained.

I further treated the capabilities of the developer for over-exposed pictures, and found that the image was always under perfect control; in fact, such a developer would be useful in cases of over-exposure, since it is so slow, and yet so sure. Bromide of silver seems to be almost unattackable by it when in the solid state, and when it has been unacted upon by light. It is, to a certain extent, however, soluble in it, and is thus reduced. It strikes me that this property may be of use in giving intensity to a picture by immersing the unexposed negative in a solution of pyrogallic acid and sulphite, the increased density being arrived at by deposition instead of reduction of silver. Again, it may be possible to saturate sulphite of soda with bromide of silver, and to cause that slow reduction of the latter in a similar manner whilst in contact with a silver image.

This fact—that silver bromide in the solid state is very little, if at all, reduced by the sulphite—led me to make some experiments by immersing the plates, during exposure, in a solution of sulphite and pyrogallic acid. With collodio-bromide plates the images developed during exposure, and were ready for fixing immediately after withdrawal from the dark-slide. With gelatino-bromide plates a trace of the image was visible, and gradually developed by means of the combined developer after a very short time (say two or three minutes). Similar results were obtained with the chloride plates. We thus have once more a developer which can be used during exposure without lengthening the exposure, for sulphite of soda is, besides being a substitute for the alkali, also a powerful bromine absorbent.

Now, suppose that sulphite of soda can be mixed with pyrogallic acid without altering the composition of the one or the other; it is evident that any other oxygen absorbent should do equally as well as pyrogallic acid. The substance that at once presented itself to my mind was hydrokinone, and it was attempted to develop various collodio-bromide and gelatino-chloride plates with it and the sulphite; but, so far, I have not obtained a trace of an image when employing them, whilst the smallest addition of pyrogallic acid to the mixture almost immediately called out an image. If this be confirmed by future experiment it would appear then that pyrogallic acid and sulphite of soda form a new chemical compound which is capable of effecting development; and there seems to be but little doubt that this compound, when oxidised, is nearly colourless. The want of colour in such a solution would, therefore, be no test as to its state of oxidation. Of course, in the development of gelatine plates, this absence of colour means absence of the well-known stain; hence the use of the mixture. There is, as chemists well know, probabilities of organic sulphites being formed when SO_2 is brought in contact with them, and this is probably the case in this instance.

Once more I endeavoured to attack the sodium sulphite from the iron developer direction. If ferrous sulphate be added to a solution of sulphite, we have an immediate precipitation of an oxide forming a gelatinous mass; if, however, to the ferrous sulphate a small quantity of sodium bi-sulphite be added, sufficient to cause the solution to be acid after the sodium sulphite is added, no precipitate of any moment forms, and an image is readily developed on a collodio-bromide plate. This action of the acidified solution is in keeping with the known properties of ferrous sulphite. Before fixing, such an image appears fairly dense, and will appear at the back of the plate; but after fixing it is weak, very different from the image produced by the ferrous oxalate when the same amount of development is effected. As to the cause of this weakness I am at present unable to give any certain reason; but from experiments made by exposing in the solution itself it almost appears as if the image was not metallic silver, but a subsalt, which on fixing is partially dissolved, and metallic silver left behind. This I am investigating, however, together with the behaviour of certain other silver compounds.

It seems, then, that sulphite of soda, when combined with pyrogallic acid or with ferrous sulphate, is a developing agent, and that with the former it forms a compound which, when oxidized, is nearly colourless.

It next struck me that sulphite might be advantageously used instead of hyposulphite in the fixing of prints, and this I tried with marked success. Now, when hyposulphite of soda is in contact with chloride of silver, a hyposulphite of silver is formed; but I am inclined to think, from some preliminary analysis, that sulphite of soda dissolves chloride of silver without change, as also does sodium chloride. If so, we have no unstable sulphur compound formed, which is an advantage.

That the whole of the silver compound which is capable of change in light is got rid of by the sulphite is shown from the fact that a print treated with it does not change in the least in bright sunlight after very long exposure. As to permanency, of course it is too soon to speak; suffice it to say that it promises well.

One word as to its use with gelatine. In one or two instances I have found that the film becomes softened when a saturated solution was employed in the developer—not that there is any tendency to frill, but it becomes tender to the touch. Such tendency disappeared in my plates when they were immersed in the fixing bath.

I would call to mind the hydrosulphite developer introduced by Mr. Sammann, and advocated by Mr. Berkeley. In this, sulphite of soda was needed for the purpose of acting on zinc to obtain the hydrosulphite.

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EFFECTS OF INTENSIFICATION AND REDUCTION.

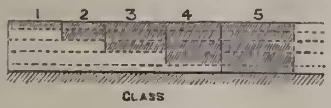
BY CHAPMAN JONES.

There can be no doubt that if an exposed plate is simply developed into a good negative, that negative will be technically of finer quality than if it had required after treatment. But it is well known that a plate may be beautiful from the negative maker's point of view, and yet be far behind an inferior negative in producing a good print. As the sole use of the negative is to furnish the print, it is not only legitimate, but proper, to treat it in any way that shall improve its powers in this direction; and although the cliché is in the end such a one that we may feel ashamed for any one to see it, we may be proud of the resulting improvements in the picture.

Disregarding altogether the use of tissue paper and all retouching operations which are often necessary if we would produce what is true and beautiful, intensification and reduction, either separately or combined, local or general, afford a means of getting results which the writer does not think can be obtained in any other way. "Intensification and reduction combined," some may say; "why the one is the reverse of the other, and undoes it—addition and substraction, multiplication and division—they negative one another." It is very easy to show, both experimentally and theoretically, that probably in every case reduction does not simply reduce, and that unless special precautions are taken, intensification does not simply intensify; but that in both cases the proportional density of the negative is changed, and its character is therefore no longer the same. This change of character in a plate is very annoying unless appreciated, but it gives the photographer a power that many are not aware of.

If we intensify by putting two particles of silver whereever one exists, or by changing every atom of silver for an atom of mercury or a proportional amount of any substance that is more photographically opaque, then we get a simple case of intensification. By such an operation the density is increased, but the proportional densities are not changed, so that the character of the plate is not changed. Suppose, for instance, that the densities of the original negative are represented by the figures 1, 2, 3, 4, 5, the densities on the intensified plate may be 2, 4, 6, 8, 10, or 3, 6, 9, 12, 15; an increased range of density, but the proportions unchanged. This simple intensification can only be produced (the writer believes) by causing the intensifier to act right through the film—that is, the intensifier must act till its action is complete. A proportional reduction must also act right through the film, and so entirely remove the image; any reduction short of this is not proportional—that is, the densities do not bear the same ratio to one another that they did before the operation—and so the character of the negative is altered.

It is obvious that in the development of a gelatine plate the image is produced first on the face of the film, and penetrates to the back more or less according to the density of the part. The detail in the shadows is the last to appear, and penetrates the film to a less extent than any other part of the image, so that we may consider the densities referred to above as in the figure which represents a section through the film. Any solution that acts upon the image will produce its effect first upon the surface of the film, and then gradually through it according to its penetrating power. If a single solution intensifier is used which can give a double density, by the time it has penetrated one-fifth through the film, the part marked 1 will be fully intensified to a double blackness, but the part marked 5 will be increased in density only to the extent of one-fifth, and the numbers which represent the densities will be 2, 3, 4, 5, 6, instead of 1, 2, 3, 4, 5. The effect (if the negative had no clear glass) would be much the same as if a sheet of translucent material were put over the negative: printing would be retarded, and the resulting print not improved. But if the intensifier penetrates two-fifths through the film before its action is stopped, a further intensification takes place except at the thinnest part, and the resulting densities read 2, 4, 5, 6, 7; that is, an increase of contrast in the thin parts, the shadows, but no increase of contrast in the denser parts, the lights; and this effect has been produced without any local application of the solution.



If, therefore, it is desired to intensify so that the proportion of densities shall not be changed, the intensification must be thorough, and a reagent must be selected that will, after thorough action, give the required amount of intensification; for example, the uranium intensifier is useless for producing a slight effect. But, on the other hand, if a negative has been produced of (say) a castle and foliage, and the detail in the foliage is buried in printing before the detail of the castle is sufficiently brought out, a short application of the uranium intensifier will probably improve matters, by giving more vigour to the foliage, without appreciably altering the denser parts of the negative. Sometimes the local application of the intensifier by means of a brush is vastly superior to the use of tissue paper, because the intensifier not only retards printing like the tissue paper, but also gives more vigour.

Reducers, of course, can never be allowed to act thoroughly, or the image would be entirely removed; unless, indeed, the reducer be of such a sort that it merely alters the colour of the image. One would expect reducers to cause increased contrasts, and certainly they do so unless their action is prolonged. The reducer acting from the surface will remove the uppermost layer of the image, so that the detail in the shadows may be even entirely dissolved away, while the chief effect upon the rest of the negative is, that it will print more rapidly. One may often, by suitable reduction, remove a general fog without injuring any detail of the image.

By a suitable combination of reduction and intensification, many improvements may be made. For example, two negatives of the same subject were submitted to the writer, both fogged, but one much more fogged than the other, and at the same time less dense in the shadows. This negative, the thinner more fogged one, he intensified with mercury and sulphite and then reduced with potassium cyanide, and by that means produced a plate with very much less general fog and greater density in the lights than the originally better negative. The intensification was done first for two reasons; it avoided the use of hypo with the troublesome washing, &c., that it involves; and there was no fear of getting the detail in the shadows so thin that the intensification could not give enough density.

It is no doubt possible to modify the results indicated; but one cannot doubt the truth of the principles laid down. It is a grave mistake to work for density at all hazards, trusting to reducers to give what is required. Intensifiers and reducers are not the handy, universally useful reagents that the rule-of-thumb photographer considers them to be, though when used intelligently they will produce effects perhaps not attainable in any other way.

FRENCH CORRESPONDENCE.

M. Balaguy's Carbonate of Soda Developer—Principles of Antiplanatic Lenses—Gelatino-Chloride of Silver Paper—Typographic Printing Block of a Fusible Alloy—Trades Exhibition—M. Chennevière's Pellicle Dark Slide—Banquet of the Photographic Society of France.

M. Balaguy's Carbonate of Soda Developer.—M. Balaguy has made some very conclusive experiments on a developer with carbonate of soda (common soda) as basis.

The following solutions are made:—

No. 1.—Water	...	1 litre
Carbonate of soda	...	200 grammes
No. 2.—Water	...	250 cubic centimetres
Sulphite of soda ...	...	50 grammes
No. 3.—Pyrogallic acid ...	...	10 grammes
Alcohol at 40 per cent.	...	150 cubic centimetes

Take 250 c. c. m. of No. 1 solution in a bottle, and add 2 grammes of bromide of ammonium. For instantaneous pictures pour into a glass—

Water	... 50 c. c.
Sulphite of soda solution...	... 5 „
Pyrogallic acid „ ...	... 5 „

Moisten the plate for a few seconds with this solution, then add in the glass 10 c. c. of the non-bromised soda solution and 2 c. c. of that containing bromide. Mix well together, and pour the whole over the plate. Should the image be slow in showing itself, add just a little more of the soda. When apparent, and all the details brought out, necessitating the addition of the alkaline solution, add 5 c. c. of the pyro and alcohol, and to terminate, if need be, with 5 c. c. of the carbonate. By this means negatives come out of a very good tone, without any yellow colouration. If a very rapid shutter has been used, the bromide may be suppressed, provided the plates are known not to be liable to fog. For negatives of longer exposure develop with the bromide and carbonate solution in only about half the water as long as 250 c. c. of carbonate, now brought up to 10 per cent., always contains 2 grammes of bromide of ammonium. On developing as above, use only the bromised carbonate solution. If under-exposed, add a little of the simple carbonate to the other to bring out the details. Where it is necessary to get very sharply-defined blacks and whites, 3 grammes of bromide of ammonium must be put to the 250 c. c. of carbonate of soda. For portraits the amount of bromide may be reduced to 1 gramme. This developer, which M. Balaguy has successfully tried, seems to be simple in use and suitable to varied exposures according to the amount of bromide of ammonium used.

Antiplanatic Lenses.—M. Adolphe Martin, in a communication to the Photographic Society of France, gave in a few words the principle of the so-called antiplanatic lenses, such as those by Steinheil, of Munich, of which the following is an extract :—"From the point of view of aberrations the lenses possess a quality of considerable importance, the knowledge of which caused quite a revolution about the year 1829 in the construction of microscopes, and which has brought them up to the high degree of perfection they have now attained. The property was discovered by Lister, who, extending to achromatic lenses the results found by Herschel with a simple lens, showed that in every optical system there are two points in which it is aplanatic, the aberration changing from one to the other in such a way that taking two objectives, establishing the coincidence between their points of aplanatism, this aplanatism extended to neighbouring points, for, if the luminous point be displaced horizontally or vertically, the aberration thus produced in the action of the first glass would be destroyed by the equal aberration in the coutrary sense of the second. This property increases, as may be seen, the extent and depth of the field of vision." I particularly wish to draw the attention of lens makers to this as a constant problem to be solved, which imposes itself more imperiously every day, and which consists in the manufacture of lenses having short focus and giving a clearly-defined image over the whole field when fully open. At present we are far from reaching this desideratum with the aplanatic lenses, as a clear image does not cover the field until the lens is more or less stopped down by diaphragms. The antiplanatic No. 1 for groups, &c., has an aperture of 17 millimetres, focus 9·5, and it covers 68 by 54 m.m. when fully open. The aplanatic nearest in approaching these dimensions is No. 2 with 9 m.m. aperture, 7·7 focus, and covering without diaphragm 61 by 50 m.m. With respect to luminosity, the antiplanatic, having an opening more than three times as large, would require an exposure of one-third the length of No. 2, all things otherwise equal; but the focal length of the aplanatic being nearly one and a-half less than the antiplanatic the length of exposure would be a little over the half of the other. There is, therefore, no hesitation in the choice of an objective for instantaneous work, and I specially recommend the combination of the antiplanatic with a shutter similar in construction to that by MM. Thury and Amey.

Gelatino-Chloride of Silver Paper.—The firm of Marion, in Paris, have gone in for preparing gelatino-chloride of silver paper like Messrs. Morgan and Co. It will, no doubt, come greatly into favour, not only on account of the splendid results, but also the rapidity and regularity with which the prints are produced. By the aid of a series of jets, and placing the dark slides on both sides of each plane, a great number may be printed at one time, which will be desirable in houses of business.

Typographic Block of a Fusible Alloy.—M. L. de Roux has taken out a patent for making a new kind of typographic printing plates. He develops a carbon print on a copper plate, and takes a mould of it in an alloy similar to Darcet's metal composed as follows :—

Mercury	10 parts
Lead	8 „
Tin	12 „
Darcet's metal	70 „
	100

Darcet's metal is composed of :—

Lead	3 parts
Tin	3 „
Bismuth	3 „

The alloy is melted in a dish, the copper plate pressed down over it until cold.

Trades Exhibition.—An exhibition is being organized in Paris, to be held at the *Palais de l'Industrie* from July till November, under the name of *Exposition du Travail.* Class 43 of the programme comprises all that concerns photography. The organization of that department has been entrusted to M. Leon Vidal as superintendent, and M. Balaguy as assistant superintendent.

M. Chennevière's Pellicle Dark Slide.—M. Chennevière has thought of a very ingenious plan for perfecting the dark-box of my pocket apparatus so as to allow of its receiving paper pellicles. The interior slide is hollowed out to form two parallel frames, leaving room for two pellicle sheets to be introduced back to back, with a sheet of card pushed up between them, two little hooks fastening them together, and it can be introduced into the case of slides just like an ordinary plate.

Banquet of the Photographic Society of France.—The annual banquet of the Society was a greater success than ever: of course the toasts to the future and prosperity to photography, and to the brotherly union existing between the Society and the Chambre Syndicale, were drunk with enthusiasm.

Leon Vidal.

DISTORTION IN PAPER POSITIVES.

BY W. E. DEBENHAM.

Mr. J. Harris, in your paper of the 8th inst., does well to call attention to the subject of that distortion which results from unequal expansion of the paper, employed as the base, upon which the photograph is printed. Mr. Harris's views, however, as to the cause of the evil referred to are, of course, open to discussion, and in this, as in other matters, we may hope for practical benefit by the examination of various theories brought forward to account for the facts, and the rejection of those which may prove unsound or mistaken clears the way for the recognition of true ones, and points to a remedy.

Mr. Harris argues that the cause of distortion is the high glaze, due either to a large quantity of albumen, or albumen put upon the surface of the paper; and even goes so far as to state that the use of an albumen paper bearing a "legitimate" surface will result in a "truthful delineation of feature." In support of his theory, he also says that in the earlier days of photography upon albumenized paper, complaints of distortion were unknown, and assumes that if such distortion had then existed, it would have been recognized, and presumably complained of.

Now the use of a highly-glazed surface for photography is not such a new thing as is often supposed and asserted. In the very first vol. of the Photographic News, 1858, page 34, the Editor recommends for the purpose the use of pure albumen without any water. That distortion from expansion of paper existed at the same period may be inferred from the fact that in the same vol., page 168, it is mentioned that a photograph mounted with starch is sure to shrink on drying, and in doing so to draw the cardboard round towards it.

It is not easy to see how a more or less high glaze of albumen, or albumen and gelatine, should cause distortion. In the first place, the coating of glazing material being apparently structureless, or homogenous, might be expected, if expanded, to do so equally in all directions, and this would cause enlargement, but not distortion. Such enlargement by expansion may, indeed, be seen in the case of gelatine in a negative which has frilled from the glass, and which will then overlap it all round. With albumen, general expansion was similarly noticeable in a process worked some twenty years ago, in which the film was detached from the paper and placed upon ivory; further, moist albumen and gelatine are so elastic that when in moderately thick films, such as are used for photographic papers, they appear to expend their expansive energies in the direction of thickness, rather than in producing any strain upon the more rigid paper base. This is evident from the fact that photographs on paper remain flat in the water in which they are washed, toned, &c. When a film of gelatine is enormously thick, as in the case of carbon tissue, its expansive power is shown laterally by causing the tissue when thoroughly soaked to curl round; but even then there is no evidence that the paper is expanded by the gelatine.

Another reason for rejecting the theory that distortion is due to the albumen film is found in the fact that paper which has received no such coating is liable to the defect mentioned. I have some plain (*i.e.*, unalbumenized) paper that has been in my possession for some three years or more. Upon damping this, it is found to stretch considerably in one direction only. This instance also replies to an argument referred to (but not supported by) Mr. Harris, that distortion is caused by albumenizing upon too newly-made a paper. Surely an albumenizer would not be expected to wait many years before floating his paper in the hope that its properties might change in the meantime?

The true cause of distortion appears to be that the paper employed expands whilst wet in one direction, but not (or not materially) in the other. The distortion which exists whilst wet, is made permanent by mounting the print whilst in that condition upon a rigid support, such as card. What are the conditions in the manufacture of the paper tending to this result appear to be recognized by the makers, as I am informed that for a particular purpose, chromo-lithography, a paper is prepared in which this expansion is reduced to a minimum, so that the register to the various stones may remain true. If paper-makers would supply a paper suitable for albumenizing similar to that referred to as in use by chromo-lithographers, wet mounting might be safely employed; but at present the only method of ensuring freedom from distortion is to mount when the print is dry and has returned to its original dimensions, that is to say, to the dimensions in which it existed whilst in contact with the negative and before being expanded by water.

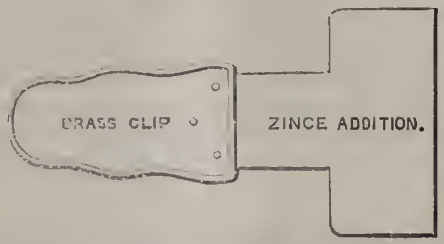
In addition to the advantage of freedom from distortion conferred by dry mounting, and in connection with it, is that of flatness of the finished picture; prints mounted wet upon cards of ordinary thickness, even if temporarily flattened by rolling, are sure to return sooner or later to the curled state, in consequence of the tension of the strained paper. For dry mounting, starch is generally recommended; the back of the print is covered with starch paste, and when dry and trimmed, is held on a card that has been damped with a sponge, and the two passed together through the rolling press. I have, however, not succeeded very well with starch, as the prints have sometimes refused to stick, and sometimes peeled off after a day or two; but have not met with these difficulties when using a thick solution of gum instead of starch paste.

PRINTING-IN CLOUDS IN LANDSCAPES.

BY A. T. NEWINGTON.

The mode recommended by Mr. Brightman (page 279) answers very well where no objects rise above the horizon of a landscape; but where there are buildings, spires, &c., or where the subject is architectural, the cotton-wool process is not altogether satisfactory. The plan I adopt is as follows; perhaps it is not new. I paint the edge of the sky-line and all objects appearing above it with a line of Indian red (water-colour), about the eighth of an inch wide, taking care that the paint does not extend beyond the edge; should it do so, a white spot in the finished print will be the result. I then cut out a mask in orange paper, so that it shall cover the print with the exception of about the sixteenth of a inch of the upper edge of the painted line. The whole of the print is thus protected from the action of light. To keep the mask in position, I attach a clip at one side. I then turn the print over and place it on the cloud negative in an ordinary printing-frame, withdraw the clip, and close the frame. The paint should be tolerably thick. When the print is being washed before toning, all trace of the paint can be easily removed with a camel's-hair brush. The clouds will fit the most delicate lines with no perceptible join.

I make the clip by adapting two pieces of sheet zinc about an inch wide by two long, to a brass clip. The following is a sketch of the article. A convenient frame for printing-in clouds can be made by having the springs to act lengthwise instead of across as in the ordinary frame; the back to be hinged in the same way, and the lower end of the back of the frame removed. This allows the print to be moved up or down on the negative, so that the most suitable portion of cloud may be selected. The flaps of the back may be of unequal width; the wider portion, being placed on the upper part of the print, allows a larger space of sky for inspection. This unequal division of the back is very useful, even in ordinary printing-frames.



I have frequently seen suggestions made for lantern shades for the dark-room. The most simple and efficient plan is to shade the eyes, and not the lantern. Cut out a crescent in cardboard, attach a piece of elastic, and place it over the eyes, similar to an ordinary eye-shade. The full light of the lantern is thus preserved instead of being intercepted by the shade, and the light can be placed in any position.

Notes.

Dr. H. W. Vogel is about to publish a work in German on the photographing of coloured objects, so as to obtain the proper range of tone: "Uber Photographie farbiger Gegenstände in den richtigen Tonverhältnissen." A translation from one of the advance sheets appears on another page.

They are photographing audiences in Boston, says the *Topical Times*, with the aid of the electrical light, and giving each person who attends the performances a copy of the picture. Really, admitting the possibility of taking the photograph, one would like to know by what rapid process the printing is effected so that each may have a copy before leaving the theatre. Or does the management take the trouble to ascertain the addresses of the audience and post on copies? This with every audience would be rather a formidable and expensive business. To adapt an old proverb to the occasion, the game isn't worth the electric light.

At last the secret is out! We know now why the National Gallery authorities so favoured Messrs. Braun. A Brighton paper has discovered it all. In noticing a collection of the Autotype copies of the pictures which an enterprising photographer has hung on his walls, the paper in question says:—"So anxious have the trustees of the Gallery been lest rough and imperfect reproductions of the pictures should spread abroad a false estimation of their value, that they have been reluctant to open their doors to the photographic artist; but Messrs. Braun are no novices in their profession, and the trustees will have no cause to regret having at length admitted the photographer." The unconscious irony of this explanation is delightful, and we doubt whether the trustees will be as grateful for it as they ought. By the way, our Brighton contemporary appears to be under the impression that Messrs. Braun are the first photographers who have been admitted to the National Gallery. All photographers know, of course, that this is not the case.

In the course of work at the Yorkshire College, Leeds, photography takes a regular place, and a convenient photographic laboratory has been fitted up.

The automatic engraving competition has begun to make a show at the Inventions Exhibition, but does not at present look very attractive. Perhaps the authorities do not think it worth while to adopt any method of arrangement with such a small number of specimens; but they might at least insist upon every picture bearing a label which will show what class it refers to. Those which are so labelled are specimens by the Woodbury Permanent Photographic Printing Company (Class D, automatic photo-mechanical processes), A. Le Mercier (Class A, automatic *intaglio* processes), Direct Photographic Printing Company (Class B, automatic relief processes), and Photo-Mechanical Printing Company (Class B). Messrs. Meisenbach, Sprague, Waterlow, Dallas, and other inventors of photo-engraving and photo-litho processes exhibit, but at their own stalls, and apparently are not competing.

Paintings are subject to a heavy duty when imported into the United States, and buyers of European pictures often purchase without seeing the painting, but rarely without seeing a photograph. Indeed, it is quite a common thing for European artists who wish to dispose of their works in the New World to have photographs made of them, and to send these to agents in the United States. Mr. Edwin Cocking, whose exceptionally fine photographic reproductions of paintings will be remembered in connection with the last Photographic Exhibition at Pall Mall, tells us that he frequently photographs pictures for artists who desire to make sales in the States. He also remarks that recent works are much more satisfactorily reproduced by the camera than those which are old.

Photography is being turned to a use at the Cape which is, we think, completely novel. It is the local law at Cape Town, not only that publicans shall not serve customers who are inebriated, but that they shall also refuse to retail intoxicants to citizens who have twice been convicted of drunkenness within a giver period. But how, it may be asked, are the publicans to identify such individuals? We have heard of people carrying conviction by their arguments, but never of their carrying them in their faces; and as it was not likely that the convicted ones would proclaim their past inebriety, the landlords were in a dilemma.

But not for long! In due course the police authorities came to their assistance, and it is now the rule that a photograph of every tabooed customer shall be "served," so to speak, on each licensed victualler in the district to which he belongs. In neighbourhoods, therefore, where thirst is prevalent, and the police acute, the liquor-bars may be expected to resemble a photographer's waiting-room rather than an ordinary public-house. One thing is certain, however—viz., that the licensed victualler's lot under such circumstances cannot be a very happy one. Imagine the interminable scrutinies to which he must subject his customers; the persistent fear that he is, after all, failing to identify a convicted inebriate; the ever-present dread that he may be assaulted by some indignant patron of his bar whom he has wrongly identified as a tabooed toper! All this must be, indeed, too much for sensitively organized licensed victuallers; and we can quite imagine that such a law will, if unrepealed, drive all the more nervously organized publicans to the "Diamond Fields."

The *Vedimost*, in an account of the number of bears killed during the past winter, says that the son of the English Ambassador, Sir E. Thornton, together with Lord Hubert, while hunting in the Lodanopolski district, killed nine bears in eight days, one of which was a tremendous size (sixteen inches between the ears). The foresters state that these gentlemen were excellent marksmen, and that they carried a photographic camera with them, with which they took several bear hunting scenes, most of the exposures being made at the moment when the bear was emerging from its lair.

It is said that during the past week the stewards of Epsom Summer Meeting have definitely refused to allow a temporary *atelier*—we thank ye, Messrs. Braun, for teaching us that term—to be erected by the side of the judge's box at the Derby race course. The object of the applicant was to obtain an instantaneous view of the "finish" of the great race, and under certain circumstances—say another dead heat, or a win "by a short head"—such a negative would have an exceptional value. But we think the application was advisedly refused. For how would it be, in case it were granted, if the evidence of the camera failed to confirm the verdict of the judge? No; the only thing the stewards could do would be to take the advice we gave a year ago, and provide the judge himself with such an apparatus as has been referred to. This verdict might then be founded on his own "negative," and there would be positive evidence to justify his assertion.

Last week we alluded to the ingenious photographer who has brought out "Mrs. Langtry at the age of sixteen." The notion is one capable of well nigh unlimited development. The public, anxious to see what the "Jersey Lily" was like at sixteen, will doubtless eagerly buy up cartes of Mr. Toole at the age of ten, or of Mr. Henry Irving in his first knickerbocker suit. Why should we not have a series of "nursery negatives" too? "Celebrities in their Cradles," it might be called; "Big Men in their Bassinets." What a sale there would be of Miss Mary Anderson in her nurse's arms, and of Miss Terry in long clothes! How interesting would be "The Seven Ages of Mr. Sims Reeves," say, or "Glimpses at Oscar Wilde in Ten Cartes." But, as we have said, of the development of the first happy thought referred to there is virtually no end.

The landscape photographer who wishes to keep a record of his work would do well to get the photographic note-book published by Mr. R. Keene, of All Saints, Derby. It is conveniently headed and ruled for recording size, subject, time of day, process, lens, stop, and exposure; it also contains some sheets of gummed paper perforated so as to be readily torn up in squares.

How is it—we are often asked—that in spite of the repeated reductions in the market value of silver, the price charged for the nitrate does not fall? Perhaps it is that the dealers think that they did not make profit enough on the article in the old time, and they now intend to recoup themselves.

One consumer, who uses some hundred and fifty ounces a week, now makes his own nitrate, and finds that the operation pays.

Patent Intelligence.

Applications for Letters Patent.

6204. **Edwin Lloyd**, 115, Cannon Street, E.C., for "Improvements in the ornamentation and preservation of photographs on transparent substances."—20th May, 1885.

6359. **Benjamin Constant le Moussu**, 28, Southampton Buildings, Chancery Lane, W.C., for "An improved process for producing plates for surface printing."—[Complete Specification.]—23rd May, 1885.

6368. **James Robertson** and **Douglass Roberton**, 96, Buchanan Street, Glasgow, for "An improved mode of obtaining photographic negatives or positives and apparatus therefor."—[Complete Specification.]—23rd May, 1885.

Patents Sealed.

7201. **Thomas Samuels**, Monken Hadley, Middlesex, Gentleman, for "An improvement in photographic cameras."—Dated 3rd May, 1884.

16,976. **James Brown Jordan**, The Elms, Cherry Orchard, Staines, for "An instrument for recording the duration and intensity of sunshine."—Dated 29th December, 1884.

Patent which has become Void through Non-payment of the Fourth Year's Renewal Fee.

579. H. **Chameroy**. "Electro photographical receivers for telegraphs."—1881.

Specification Published during the Week.

7792. **William Heath**, 24, George Street, Plymouth, Optician and Mathematical Instrument Maker, for "An instantaneous shutter for use in obtaining photographic pictures."—Dated 16th May, 1884.

The patentee appears to claim the right to construct shutters with apertures other than circular or rectangular. He also claims the application of parallel motion to shutter-plates.

Patents Granted in America.

317,788. **De Witt C. Hoover**, Buffalo, N.Y. "Combined shutter and diaphragm for photographic cameras."—Filed June 12, 1884. (No model.)

Claim.—The combination, in a camera, of two sliding and apertured shutters or diaphragms, fitted for movement in opposite directions, a spring having connections for moving the shutters to cause coincidence of their openings, and devices for anjusting or limiting the length of movement of the shutters, whereby the shutters are moved to the desired size of opening, and the opening closed by a return movement, substantially as described.

317,915. **Lewis T. Young**, Philadelphia, Pa. "Attachment for photographic cameras."—Filed May 28th, 1883. (No model.)

Claim.—The combination of a photographic camera with a finding-glass, L, carried by the frame of the camera, but independent of the focussing adjustment of the latter, said finding-glass consisting of a lens, casing, diaphragm, and ground glass, all substantially as set forth.

ON ALKALINE DEVELOPMENT.

BY CAPTAIN W. DE W. ABNEY.*

The paper I am going to read to-night is on a subject with which I have often dealt myself, and on which others have had their say. I have thought that perhaps I might epitomize the subject for the benefit of the Society, and at the same time redeem the promise I made in the autumn of last year, that I would read a paper before my Derby friends. Now when we have light acting on silver bromide we have an alteration of some kind taking place in it. The question as to what that is has provoked a good deal of discussion from time to time, and recently there have been opinions expressed that it is not the formation of what I hold it to be myself—viz., sub-bromide (Ag_2Br), or a combination between two atoms of silver and one of bromine, one atom of bromine being liberated—but that it is either unaltered bromide of silver, in which the atoms have an extra swing given them by light, in which case, of course, no bromine would have been liberated; and in the other, that metallic silver is left behind, and not sub-bromide at all. I will endeavour to deal with the last supposition first simply by analogy. I have, at the last meeting of the Photographic Society of Great Britain, dealt with the first supposition, and believe it to be untenable. If we take ferric chloride, and treat it with potassium ferricyanide, we know well that there is no precipitate formed; if, however, we expose ferric chloride to light, a change takes place, and we know that ferrous chloride is formed, as on treating it with potassium ferricyanide a blue precipitate is formed. Here we have direct chemical experiment proving the nature of the change. Again, if we take ferric oxalate, and expose it to light in solution, we know that bubbles of carbonic acid are given off (and with great rapidity if direct sunlight be used), and we have ferrous oxalate left behind. Or, if the ferric oxalate be sponged on paper, and dried and exposed, and then treated with a solution of warm potassium oxalate mixed with which is a platinum salt, metallic platinum is deposited by the reducing action of the light-produced ferrous oxalate in presence of potassium oxalate. I have never heard in either case that it is supposed metallic iron is produced. In the last experiment indicated it would be impossible to be the case, since no iron would behave thus towards a platinum solution. Again, take a solution of cupric chloride (a body very analogous to silver chloride, by-the-bye) and expose it in alcohol or in water to light (though in the former the action is more rapid), and we get chlorine liberated and a cuprous salt deposited, which is insoluble in alcohol. This salt can be produced in bulk and analysed. The result of such analysis shows the absence of metallic copper. Uranic salts exhibit the same phenomena; and are we to suppose that silver is not to be placed in the same category? At the Photographic Society of Great Britain I endeavoured to give proofs of the existence of such salts as the sub-chloride and sub-bromide of silver; and I need scarcely repeat these proofs here. Suffice it to say that chemical and photographic evidence is ample to prove that such bodies exist, and are producible by the prolonged action of light.

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* Read before the Derby Photographic Society.

Mr. Brebner, of Glasgow, not long ago, in a paper before the Glasgow Society rehabilitated the idea that development is due to voltaic action. To prove his theory, it appeared, to his mind, necessary that instead of sub-bromide forming the photographic image, which is capable of development, metallic silver must form it. Let us examine this for a moment. Evidence of the strongest character shows that with the prolonged action of light on chloride and bromide of silver, sub-chloride and sub-bromide of silver are respectively formed. Such being the case, if metallic silver constitutes the developable image with short exposure, the brief action of light does more work on the salt of silver than does prolonged action. Now this is more than difficult to believe, and, indeed, Mr. Brebner has seen the difficulty, and has boldly asserted that the prolonged action of light does give metallic silver; the strongest proof he adduces is some experiments made by Dr. Guthrie, who amongst other things found that silver chloride blackened when exposed in nitric acid. Guthrie assumed that this black body was metallic silver, and that it assumed a passive state in nitric acid, as, after treating the blackened mass with ammonia, he found he then had metallic silver left. As this is exactly what happens when chemically prepared silver sub-chloride is experimented with, Guthrie's experiments, in reality, support the sub-bromide theory, and not the metallic silver theory.

Mr. Brebner has rather puzzled me in his paper, and I have been unable entirely to follow him in it. Let me briefly say that chemical action and voltaic action are interdependent, that where you have the first you must have the second. If a chemical change is made in any body, electrical phenomena must, of necessity, exhibit themselves, and by proper appliances can be shown to exist. On the other hand, when voltaic action is present, in ninety-nine cases out of a hundred, it can be proved (and the hundredth case will probably some time be proved) that it is due to chemical action. I therefore may say at once that development is a chemical action which gives rise to voltaic action.

Coat a couple of metallic plates with emulsion, and separate them by a thin film of conducting liquid, place one plate in connection with one terminal of a galvanometer, and the other with the other. Expose one of the plates to light, and develop, and it will at once be seen that a current is traversing the galvanometer, which shows that the act of reducing the salt of silver to the metallic state at once induces electrical action.

You cannot lift a book from the table or your foot from the ground without electricity of some kind being developed. It is not therefore surprising that such energetic action as the reduction of the silver salt should cause a current.

Now, what does this reducing action depend on? Let us take as a type the ordinary alkaline developer, in which we have three effectives (putting on one side the water, which enters into all three)—viz., the pyrogallic acid, the alkali, and the restraining bromide. When pyrogallic acid is mixed with an alkali and water, it is in an unstable state, and greedily absorbs oxygen from whence it can get it. During the process of development it is in contact with solid salts of silver—viz., the bromide and the sub-bromide. Take the former into consideration first, leaving out the action of the restrainer, the soluble bromide. We then have a vigorous oxygen absorbent, and a haloid salt of silver and water. Now all bodies when brought in contact have a tendency to assume new forms, and to rearrange themselves to take the most stable form they can. This is what the three substances do. The oxygen absorbent will take up oxygen from the hydrogen of the water, and this hydrogen reduces at the moment of liberation the metallic silver from the silver bromide, and hydrobromic acid is formed. This in its turn forms bromide of the alkali, and water again.

$$\overset{\text{Alkali}}{2NH_4HO} + \overset{\text{Pyro}}{Pyro} + \overset{\text{Water}}{H_2O} \overset{\text{and}}{+} \overset{\text{Silver Bromide}}{2AgBr} \overset{\text{give}}{=} \overset{\text{Oxidised Pyro}}{Pyro\,O} + \overset{\text{Silver}}{2Ag} +$$

$$\overset{\text{Alkaline Bromide}}{2NH_4Br} \overset{\text{and}}{+} \overset{\text{Water.}}{H_2O.}^*$$

So far we have treated merely of the reduction of bromide of silver, and not the sub-bromide. Our formula for sub-bromide is Ag_2Br. Now the action of light on the bromide, Ag_2Br_2 is, as has already been implied, to cause one atom of bromine to swing off, and in doing this, a certain amount of energy of radiation is expended on it. In other words, light has partially effected in the bromide what chemical action has to do when light has not acted. Suppose, then, in the case of the bromide, we have an amount of chemical energy to be expended in order to reduce it to metallic silver of (say) 100 units, and that light does what 10 of these units would do when it is reduced to sub-bromide, evidently chemical action of developing has only to do 90 units. So if we have bromide and sub-bromide of silver together, and could so arrange that the chemical energy of the developer shall be (say) 95 units, the developer would be able to reduce the sub-bromide and not the bromide; and in case the energy of the developer was more than 100 units, it would attack the sub-bromide in preference to bromide. With a very weak developer this is practically the case; and it may be used without any (what is called a) restrainer. The re-arrangement of the molecules in the developer and silver sub-bromide is effected with a less amount of trouble (what in this case may be said to be evolution of heat) than in the developer and the bromide. Hence the sub-bromide is first reduced. Now what is the action of the restrainer? This is a point which is more difficult to answer. I am now talking of a chemical restrainer—viz., the soluble bromide. Silver salts are known to form double salts very readily. For instance, there are double chlorides of silver and sodium, and they can be obtained in definite crystals, as can the double bromides, and it seems more than probable that the restraining action is due to this affinity. When we have double salts formed, the energy of their combination is shown by the heat which is given out during the combination. Now, in order to dissociate them from each other, the work that the two, in combining, can do, shown by a rise in temperature, same amount of work would have to be done on them to separate them. The double salt is therefore more stable than the bromide salt *per se*. The energy existing in the developer has not only to do the work of separating the bromine from the silver, but also preliminarily of separating the double salt. It may be said, in objection to this, that the bromide is in solution, and therefore cannot form a double salt. That would be valid if we could say that no double salt was formed. We know, for instance, that two salts when in solution will form a double salt, and that two solids form a double salt. The question as to whether a salt in solution can form a double salt with a solid salt, such as silver bromide, is not quite so easily answered; but the evidence, as far as it goes, is in its favour. Let me give you one piece of evidence. If two silver plates be taken, one coated with silver bromide, and the other bare, and both be placed in a solution of potassium bromide, and if they be respectively connected with the terminals of a galvanometer, we have immediately a current (and a strong one) produced, showing action somewhere. I won't enter into details of this experiment, I will only tell you that it can be proved that the action is not due to the silver plate, or to a change in the bromide, but every experiment traces it to the energy of the formation of a double salt.

As far as I am concerned, then, I lay the action of the restrainer to the formation of a double salt during development, and a consequent increase in work that the developer has to perform to reduce it. A body like the sub-bromide does not appear to form double salts; its composition is not allied to the soluble bromide. A remarkable proof of this may be found in certain experiments; but it may be taken that solubility of one body in another is indicative of the possibility of the formation of the double salts. Now, my friend, Dr. Hodgkinson, Professor of Chemistry at Woolwich, finds that whilst chloride of silver is soluble in sodium chloride, the sub-chloride is not, and thus he arrives at a method of separating the two. This points to a similar action of the bromide and sub-bromide in soluble bromide. It must not be forgotten that bromide of silver is soluble in bromide of potassium to a limited extent.

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* This equation is merely symbolical; the real chemical change in the pyrogallic acid is more complex.

I have thus treated of the action of pyrogallic acid alkali restrainer on the bromide and sub-bromide of silver; but there is a further action in development that has to be considered. The quantity of sub-bromide to be reduced is infinitesimally small when a brief exposure to light alone has been given to it. I will here remark that Mr. Brebner has endeavoured to raise a laugh at my expense, though it would have been better—to say the least—if he had used the whole of my theory of development instead of emasculating it. He says:—

"But further, a perfect developer, such as hydrokinone, could by no possibility give, under the conditions imposed by Captain Abney," (I have stated that a perfect developer is capable of reducing the sub-bromide alone at first shock without reducing the bromide, and hydrokinone fulfils this), "any visible image whatever. . . . . . Hydrokinone only reduces the sub-bromide, and does not affect the bromide. Is this so, and thus, or does hydrokinone, like many other compounds, change its nature to suit the sub-bromide theory? Conceive, oh ye gods and little fishes, the colorific power of silver reduced by the above developer from sub-bromide at the first shock! But the conception is too terrifically grand; my mind, in 'a tottering equilibrium" [Herschell (*sic*)], is abjectly reduced at the contemplation of a powerfully coloured invisible image."

I am not going to deny Mr. Brebner the mental state of "tottering equilibrium." I would merely suggest that a scientific argument does not gain by such—what shall I call it?—satire. The first shock does reduce the sub-bromide, but at the same instant that metallic silver is formed it combines with the silver bromide in contact with it, and fresh sub-bromide is formed, which is at once acted upon, as I have stated in several editions of my works on photography. If you want to express anything you don't quite understand, it is safe to talk of polarity or catalytic action, otherwise I should refer the formation of the new sub-bromide to the latter. This, then, is the theory of alkaline development which I have summarized for you to-night I don't wish you to accept it if there is anything to disprove it. Everything I have put forward I believe is capable of proof, and I need scarcely say more.

TOURING WITH A CAMERA.

BY C. H. BOTHAMLEY, F.C.S.*

Most men, if they are wise men, spend whatever holiday they can secure in travelling either abroad, or—if they are *very* wise men—in their own country. If the tourist is a photographer, he naturally takes his camera with him, and hence a paper on "Touring with a Camera" may not be altogether without interest, even though it be but an account of the experiences and mode of work of one individual.

One of the first questions to arise is, what size of camera shall be taken? If the tourist is driving or tricycling, this question is of no great importance; but if he is walking (and it is to walking tours that what I have to say mainly refers), it becomes a very serious matter indeed. When the main object is to see as much of a district as possible, or, in other words, to get over the ground quickly, and the photographs are desired simply to serve as momentos of the places visited, the tourist will do well to confine himself to a quarter-plate camera of the lightest possible construction, for every pound tells at the close of a long day's walk. It is true that quarter-plate pictures are very small, but if any of the negatives obtained are sufficiently good to be worth the trouble, enlargements can be made without much difficulty. When, on the other hand, photography forms the most important part of the tourist's programme, and the distance covered is a secondary consideration, he will naturally wish to obtain pictures of tolerable size without the trouble of enlarging. After very carefully balancing the pros and cons, I decided to adopt a 7½ by 5 camera for my own use, and up to the present have seen no reason to regret my choice. This size gives a distinctly better picture than a half-plate, and the proportion of length to breadth is very suitable for general landscape work; moreover, if it is thought desirable to use half-plates for certain subjects, the slides can easily be fitted with carriers. A whole-plate gives a somewhat larger picture, but the shape is too square for general work, and the increase in weight is very considerable. In selecting the particular make of camera to be used, there is almost unlimited choice. It is very largely a matter of give and take. If the tourist wishes for lightness, as he most probably will, he must be prepared to sacrifice a certain amount of strength; if he wants great strength, he must be prepared to carry more weight, and so on.

The essential condition—to my mind, at least—is that the camera shall have a sufficient range of focus to permit of the use of long focus lenses. It would be out of place here to enter into the many reasons which make the use of long focus lenses so desirable; but I may say that on looking carefully through all the negatives which I took last year, I find that the greater proportion of my best pictures, both from an artistic and photographic point of view, were taken with a lens the focal length of which was somewhat more than double the length of the longest side of the plate. My own camera is very light and portable, and yet quite strong enough if used with reasonable care. It is easily and quickly set up, and gives a range of focus, in the 7½ by 5 size, up to very nearly seventeen inches. The dark slides are of the so-called solid form, with ferrotype shutters, which pull completely out. Some critics have objected that a shutter of this kind is a nuisance, because you are obliged to hold it in your hand whilst exposing, or else to place it on the ground, where it is liable to be trodden upon, or otherwise damaged. It is only necessary, however, to slip the shutter on the base-board of the camera, underneath the bellows, and this difficulty vanishes at once. The main disadvantage of this camera lies in the fact that, when vertical pictures have to be taken, a loose reversing piece must be screwed to the camera. The arrangements for keeping the plates in their places in the dark slides are also not quite satisfactory.

The number of slides sent out with this camera is four, which, of course, hold eight plates, and I have generally found this number sufficient for a day's walk; but it is a great advantage to have some extra plates and a changing bag. One of the "plate books" recently brought into the market will be found very useful in the operation of changing in the field. Extra dark slides can be obtained if preferred, but that means a considerable increase of weight. If the tourist is provided with a changing bag, he will find two slides quite sufficient.

With regard to the camera-stand, I hold with the late Mr. Baden Pritchard ("About Photography and Photographers," page 66) that no tripod is worth the trouble of carrying which will not, when set up, raise the camera to the level of the photographer's eye as he stands erect. A photographer should be measured for his tripod just as much as he is measured for his trousers. Sliding legs to the tripod may also be looked upon as indispensable. Rigidity, when set up, is, of course, a first consideration; but many of the stands in the market are unnecessarily heavy. A very common—if not, indeed, the most frequent—cause of vibration is the imperfect fitting of the tops of the tripod legs to the triangle or base-board, there being sufficient play to allow of considerable horizontal vibration. The photographer should look carefully to this point.

Except for special kinds of work, it is not necessary to carry a whole battery of lenses. A lens of the rapid symmetrical or rectilinear type is the most generally useful, and either the front or the back combination can be used alone as a single lens with about twice the focal length of the doublet. A lens of double the focal length will cover four times the area, and hence when one of the single lenses is used with a plate which would be properly covered by the doublet, only the central or best part of the lens is utilized, and the distortion of straight lines is not appreciable even at the margins of the plate. A lens of shorter focal length, for use in cramped situations, is also highly desirable, for a wide-angle lens, as they are commonly called, is like the Yankee's revolver, "you don't often want it, but when you do, I guess you want it real bad." If only one lens of this kind is taken, it also should be of the rectilinear type, for this can be used for both landscapes and architecture, whereas a wide-angle single lens gives too much distortion to be available for architectural subjects. Moreover, the front or back combination of a wide-angle rectilinear can be used as a single lens, so that with this and his rapid lens the tourist has virtually four lenses, two doublets and two single lenses, with a range of focus from (say) 5 to 17 inches.

Amongst other apparatus the tourist will require a small spirit-level, which may, with advantage, be permanently fixed to the camera, and a shutter for rapid exposures.

A view-meter is not absolutely indispensable, but it is extremely useful, and saves a great deal of time, since it enables you to see at a glance whether your view-point is adapted to your lens, or if you have several lenses it enables you to select that one which is most suited to the subject. The form devised by Mr. Harvey Barton is simple, compact, and efficient, and is too well known to need description.

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* A paper read before the Leeds Photographic Society.

A great point in touring, either with or without a camera, is to have as few separate packages as possible, and hence it is advisable to have a light wooden box with divisions to contain the lenses, spirit level, if this is loose, and, if possible, the shutter, all these articles being thus kept together, and the risk of losing any of them diminished. The view-meter is of course carried in the pocket, ready for instant use.

Development *en voyage* I regard as unnecessary and very troublesome, but the operation of changing plates is, of course, unavoidable. This is an operation over which many photographers give themselves a great deal of quite unnecessary trouble. I read, not long ago, of a tourist who carefully drew down the blind of his bedroom window, closed up the heavy window curtains, placed a mat against the bottom of the door, put out the light, and then——got under the bed!

Now, during the last autumn, I frequently changed plates in rooms in which there was sufficiently diffused light from the moon, or from lamps outside, to enable me to see every object in the room. Indeed, if I had wished, I could have changed my plates without using a lamp, and yet I had not a single case of fog, even with rapid plates. Of course the operation of changing is performed as expeditiously as possible, the plates being uncovered for only a few seconds; and in order to be on the safe side the changing should be done in a part of the room not directly in front of the window. The lamp which I carry is made of cardboard, in the triangular form described by Abney ("Instruction," p. 277), each side being 8 inches high by 4½ inches broad, hinged with black cloth, so that they fold together. The openings in the side are covered with one thickness of canary medium, the light being a small candle or night-light. The top of the lamp is a flat, triangular piece of tin which packs inside, and in the centre of which there is a circular hole for the exit of the products of combustion. The light passing through this hole forms an illuminated circle on the ceiling, but I have not found this to affect the plates. Exposed plates I re-pack in their original wrappers, or else in pairs back to back, with a sheet of "Papier Joseph" between each pair, and orange or black paper over all.

I do not find it necessary to put a label on each plate. It is my practice to carry a note-book in which I record the exposure of each plate, the lens and stop, subject, character of lighting, &c. The exposed plates are always taken out of the slides, and packed in the same order, a note being made on the outside of the packet; and when I come to develop at home, a reference to the note-book tells me at once what plate I am dealing with. The use of such a book minimizes the risk of double exposure, and the notes as to lighting, &c., are very valuable aids to proper development.

The tourist will sometimes find it a great convenience to be able to transmit a packet of plates by rail, or, in country districts, by parcels post, and this can be safely done if the packet of plates is put in a light wooden box, with a plug of paper at each corner to prevent shaking. My stock of fresh plates I keep in their original packages, packed in a wooden box in such a way that the plates rest on their long edges, care being taken that the packages cannot shake one against another. The lid of the box is secured by padlocks, and there is a strong handle at the top. During last autumn, my box of plates, packed in this way, travelled many miles by rail in Lincolnshire, and was subjected to the by no means tender mercies of country railway porters, booking clerks, carriers, and the like, without a single plate being broken. The box must be waterproof.

Before leaving home it is advisable to make one's self acquainted with the maps and guide-books to the district to be visited, in order to obtain some idea of the character of the subjects likely to be met with, and to form a general plan of the tour. It is not advisable, however, that the photographer should bind himself beforehand to arrive at or leave a particular place at a given time, for he will not unfrequently find that a place where he expected to meet with many pictures turns out to be very uninteresting; whilst another place which, perhaps, he had scarcely thought worth visiting, is unusually attractive from a photographer's point of view. If he is likely to visit old halls, or other residences which he wishes to photograph, it saves time, and possibly annoyance, to write to the occupier beforehand for permission, and the same course should be adopted in the case of cathedral precincts and the interiors of churches. A case in my own experience will illustrate the way in which a photographer may suffer delay through neglect of this precaution.

I was walking through one of the most famous parks in England, and wished to take some views of the house and the park, and therefore went up to the house to ask permission. My ring was answered by an under-porter, to whom I explained my business. He went off and brought back the head porter, and I explained my business to him. The head porter likewise went off, and after some time brought back with him the butler, and the explanation was repeated a third time. The butler, in his turn, went in search of his master, and eventually brought back the desired permission; but the light had changed, and the pictures were not satisfactory.

Photographing views as they are met with *en route* frequently does not give the best results, and the tourist should, if possible, spend part at least of the first day after his arrival in a new district in making a reconnaisance without his camera, selecting his subjects and points of view, and deciding, as far as possible, at what time of day the light will be most suitable for each subject. It is easy to obtain small pocket diaries which give the time of sunrise and sunset for each day in the year, and with one of these, and a small pocket compass to determine the bearings of his subject, the photographer can readily calculate approximately the time of day when the sun will be in a position which will give him the lighting he desires. In many cases, however, time will not permit of this, but if the tourist arrives at a place in the evening, there is often sufficient light left after he has refreshed the inner man to enable him to reconnoitre, and thus get a very fair idea as to the best subjects and points of view.

When the photographer is limited to a certain number of plates each day, and is walking through a district with which he is unacquainted, it becomes a question as to how far he shall husband his plates in the early part of his day's walk.

Experience, not always of an agreeable kind, has taught me that a picture on the film is worth two in uncertain prospect, and now if I come across a really good subject a plate is exposed without any hesitation, on the ground that something a little better may possibly be met with later on the day.

Of experiences and adventures, amusing and otherwise, every tourist has his share. Every photographer who has done much landscape work can remember occasions when he has waited half-an-hour, or an hour, or even longer, for the wind to drop, or the sun to come out from behind the clouds, and after all his waiting, has concluded that the conditions are as favourable as they are likely to be that day, and has made his exposure. Then, just as he is buckling the last strap of his camera case, the wind drops, not a leaf moves, and the sun shines out gloriously, but ——it is too late. Every photographer, too, has made the acquaintance of the ubiquitous small boy who, even in the most out-of-the-way village, knows that you are "takin' likenesses" as soon as you begin to set up your tripod, and forthwith summons a small crowd of his small companions to assist at the operation by their presence and remarks. Then there are unpicturesque members of the great British public, who illustrate the strength of human vanity by their anxiety to appear in a photograph which they will probably neither see nor hear of afterwards. These individuals, however, afford the photographer an opportunity of exercising his ingenuity in devising some plan of fooling them into a belief that their desire has been fulfilled, without, at the same time, spoiling his picture.

A sham exposure, or a dummy lens at the side of the camera, as suggested by the writer of a recent article, or perhaps, best of all, a careful posing of the victims *just outside* the angle of view included by the lens, will in most cases get over the difficulty, and even if the victims become suspicious, and ask anxiously, "Have you got me in?"—the crafty but conscientious photographer can always reply, with perfect truth, "O yes, you'll *come out* beautifully;" and so they do.

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PHOTO-MICROGRAPHY BY LAMP LIGHT.

BY W. H. WALMSLEY.*

The difference between a photo-micrograph and a micro-photograph is so clearly defined in the supplement to Worcester's Dictionary, that in view of the indiscriminate manner in which both terms are applied to the same subject by various authorities, I am led to quote therefrom in the hope of adding my mite toward the establishment of uniformity in the meaning of the two terms. It is a matter of no great importance, to be sure, ut if the distinction therein given were generally accepted, we should be saved a considerable amount of annoyance at times when the exact meaning of a writer is ambiguous.

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* A communication to the Society of Amateur Photographers of New York.

"A photo-micrograph," says this authority, "is an enlarged representation of a microscopic object, produced by throwing its image through a suitable combination of lenses, as of a microscope, on a sensitized plate."

"A micro-photograph," says the same authority, "is a photograph of proportions so minute that it requires to be examined by the microscope."

Here we have the difference clearly and distinctly defined. Each term was so recognised and used by the late Colonel Dr. Woodward, the most eminent worker in photo-micrography the world has yet seen, and it is to be hoped his successors will follow where he led.

It may not be amiss to recall the incidents attending the production of my first negative of a microscopic object. For some months previously my spare moments had been devoted to the fascinating work of out-door photography with gelatine plates, which I had pursued with all the ardour, common to a novice, so well known to all of you. My first essay was made with the so-called pocket camera of Walker, a little square box without bellows, carrying a plate 2¾ by 3¼ inches, the focus being adjusted by sliding the tube carrying the single achromatic lens. With this little box very fair work may be done, and I produced many negatives which were a source of pride and pleasure. The advent of winterish weather seemed to forbid further out-door work; interiors were unsatisfactory, and the camera was reluctantly laid aside to await the advent of another summer.

One evening, whilst engaged with the microscope, the thought suddenly occurred, why not try to make a photograph of that object? This happened to be the small eyeless flea of the mole, not a very perfect specimen, having lost several of her feet, and not at all adapted to a beginning in photography (as I afterwards learned), having a thick, yellow, chitinous skeleton, rather opaque, although mounted in Canada balsam. The objective in use was Beck's 1½ inch, first-class series, with 10-inch tube, inclined at an angle of 45°, and an A eye-piece; illumination, the light of a German student's lamp, reflected by the concave mirror of the microscope without any condenser. I found that upon removing the cap of the microscope ocular and the lens tube of the camera box, the outer tube of the latter exactly fitted over that of the former, holding the camera in place, and revealing to my delighted eyes a small but perfectly defined image of the specimen on the focusing screen. To transfer this to a sensitized plate was now the problem I had to solve. There was absolutely no guide procurable; nothing had been published, so far as I knew, on the subject as connected with gelatine plates and lamp-light illumination. Experiment alone must be my teacher. The character of plate suitable, with length of exposure adapted to the object, could only be determined by actual work.

Choosing the most sensitive plate in my possession (Carbutt's . C. B.), an exposure of five minutes was given, and development with ferrous-oxalate followed. I will say nothing of my feelings as I watched the latter and the growth of the image. You have all made your first negative. The exposure proved to have been correct; a clear, clean negative of proper density was the result. But where was the crisp sharpness of outline and detail so clearly seen when examining the object through the ocular in the microscope itself, or its image upon the ground glass? This negative was sadly wanting in sharpness. I was certain that focussing screen and plate holder registered exactly, for the Walker camera is very accurately made, and my out-door negatives had all been sharp and crisp. Suddenly I remembered having read that all microscope objectives of powers under one-fifth of an inch require special correction to render the visual and actinic foci coincident, which correction had not been applied to the objective now employed. Thus the mystery of a sharp image on the ground glass, and a dull one on the gelatine film, was solved.

The Messrs. Beck have since made for me a series of object glasses from four inches to four-tenths of an inch focus, corrected for photographing, and their performance on all classes of subjects is perfectly satisfactory. From a quarter-inch upward to the highest power I have employed, no special correction has been necessary. From the negative (the making of which has just been described) I have printed a positive, which will be shown on the screen this evening, together with another made from the same specimen with a corrected 1½ inch, and an exposure of ninety seconds on a slow plate, leaving you to make your own comparisons as to the advance made since that first exposure.

(To be continued.)

Correspondence.

MR. A. PRINGLE ON JUDGING PHOTOGRAPHS.

Sir,—May I ask you as a favour to give publicity in your columns to the following correspondence? I abstain for the present from all comment on this matter, confining myself to the statement that each of my "suggestions" has been framed with a view to meet one or other of the flaws or irregularities in the past system of judging noticed by me when acting as a juror last year at the Exhibition in Pall Mall. I place my case in the hands of the public, asking that public to judge between the council and me, to say in your pages whether or not my suggestions are reasonable, and to decide whether or not the public will demand the attention which has been denied to me by the council. If anyone accuse me of a desire to hurt, or detract from the influence of, the Photographic Society of Great Britain, he accuses me falsely. Now that we hear of pseudo-amateur societies springing up, ostensibly representing amateurs, but really representing commercial interests only, so far as I can discover, it is high time that *the* Society should place itself in a position *sans peur et sans reproche*, and that its members should take steps first to perfect, and next to perpetuate, what really ought to be the representative society not only of amateurs, but of professional photographers all over the kingdom.

Andrew Pringle *to* W. F. Donkin, *Esq., Hon. Sec. P.S. of G.B.*

Dear Mr. Donkin: Official.

Herewith I send you a communication addressed to the President and Council of of the Photographic Society of Great Britain, and I have to request you to lay my letter before your Council at the first opportunity. If I have no reply after a period of one week from the date of your *second council meeting after this date*, I shall understand that the Council declines to pay any attention to my suggestions.—I am, yours very truly,

(Signed) Andrew Pringle.

The date of this was March 28th, 1885, and since then the Council has had two meetings, the latter being on the 12th of the current month, May 1885. I have—now that much more than the time allotted by me has elapsed—got no reply of an official nature, nor have I any official notice of my suggestions having been even considered by the council. My only course, therefore, is to publish my suggestions, which I now proceed to do. The following accompanied my letter to Mr. Donkin already reproduced:—

To the President and Council of the Photographic Society of Great Britain.

Gentlemen,—Having last year a slight insight into the system of judging at our Exhibition in the Society's Rooms in Pall Mall, and also at an exhibition under different regulations in another place, I beg, with diffidence of myself, but with full confidence in you, to offer for your consideration a few points that I think might with advantage to our Society be noted for future guidance. The object of my suggestions is not to prevent future groundless dissatisfaction, which appears to be inevitable, but to avoid ground for dissatisfaction. I purposely, for reasons that you will appreciate, delayed my approach to you till after the closing of our annual exhibition for 1884, and until I should have a chance of forming an opinion by comparison with other systems of awarding prizes.

With your permission I will put my suggestions categorically.

1st. Each juror should carefully examine and allot a value to each frame in the room, and should *sign a paper* stating on his word that he has done so; this paper to be attainable to the public. And every person elected by you to act as a juror should, before his election is confirmed, *undertake* so to examine each frame.

2nd. Each juror should, at the completion of the judging, sign the medal-list, not necessarily attesting his *entire*, but his *general*, assent to the awards. After the signing the award-list, on no account should any addition be made to the list, nor any kind of "Honourable Mention" be given, unless approved by the body of jurors, and signified on the award-list aforesaid.

3rd. Each juror should examine and, if he thinks proper, award a value to each frame proposed to be rejected by the hanging committee.

4th. If the voting is to be continued on the simple and effective system of 1884—viz., valuing pictures at from 1 to 10—I consider it of the utmost importance that conditions should be published, and the jurors so instructed, that they may all vote upon the *same standard*. For instance, "10 marks" may represent either a picture of *absolute perfection*, or the *best of its kind* in the room. Whatever rules be published, and whatever instructions given to the jurors, it is essential that they shall work from the same basis.

5th. An understanding should be arrived at, *and published*, with regard to photographs printed or mounted in manners other than the ordinary silver, carbon, or platinum pictures mounted on cardboard. I allude to such exhibits as photo-engravings and pictures mounted in optical contact with glass, &c.

6th. I cannot see the possibility of satisfaction being given, nor even of justice being done, where jurors have to compare the merits of landscapes, seascapes, portraits, groups, *genre* pictures, composition pictures, purely scientific work, &c., &c. It is as impossible to judge between these as between a horse, a cow, a sheep, a dog, and a pig. And who ever heard of these animals coming into competition with each other? The result, in my opinion, of comparing these branches of photography is, that real merit is apt to be overlooked, and productions of a *sensational* or *surprising* nature gain the medals. In the case of the animals, did the pig happen to be some unheard-of weight, it would probably gain the prize against the horse, if he were only a very grand horse on the lines of ordinary horses. I would urge, therefore, for the convenience of the jurors, and for the sake of justice, that landscapes, seascapes, portraits, composition pictures, &c., should be placed in separate classes, and not brought into invidious and impossible competition with each other.

*7th. I believe, but may be mistaken, that in past years you used to have a regulation that the names of exhibitors should not be placed on the front of the pictures or of the frames. I would suggest a return to that rule; it is unpleasant for a juror to see the exhibitor's name in front of a picture, and it affords a loophole for cavil by ill-conditioned persons.

These, gentlemen, are my suggestions. I have neither the right nor the wish to dictate to you on any matter. I believe that my suggestions merit your consideration; and I venture to hope that you will give them your careful consideration, and to beg that, in case your decision on any or all of the points brought forward by me should be unfavourable, you will direct your secretary to communicate to me briefly your reasons for rejecting my proposals.—I am, gentlemen, very respectfully yours,

(Signed) ANDREW PRINGLE.

Craigcleugh, Langholm, N.B.

This is all the official correspondence that has passed. I know that my address found its way in good time to the proper quarter; and thanking you beforehand for giving me so much of your valuable space, I am, sir, your obedient servant, ANDREW PRINGLE.

May 25th, 1885.

SEA SIDE GROUPS—A HINT.

SIR,—Both amateur and professional photographers have often experienced the annoyance caused, when taking a seaside or other instantaneous group, to find several gawky-looking individuals posing themselves in the foreground, with the hope of being immortalised, the nearer the camera the more the chances of immortality being evidently their idea; so what would otherwise be a good composition is completely spoiled.

One very good plan of outdoing them is as follows, and is exceedingly simple:—Choose the best point, focus, and get everything ready; then look along the edge of the camera and sight some object in a line with it, which can be easily recognised again.

Now turn the camera round (say 45°), put in the dark slide, and open the shutter. The objectionables will have followed your movements, and will probably have got themselves into a similar position. Now all that is necessary is to suddenly bring back the camera to its original position, and fire away. The objectionables will thus find themselves sold, and you rid of what would otherwise have spoiled a good picture.

I tried it some years ago with great success, and others have probably done the same. I only hope I may some day soon be able to again adopt the same system.

WALTER B. WOODBURY.

CHANGING PLATES ON A TOUR.

DEAR SIR,—In his inaugural address, the President of the Manchester Amateur Association mentions the difficulty that tourists have to find suitable accommodation for changing their plates. I shall be glad if you will give insertion to the following offer to tourists in Wharfedale. I will set apart a dark room for changing and developing dry plates to any one who calls; and as most, if not all, would prefer to pay some trifle for the accommodation, instead of making a direct charge I will place in the room a box for contributions, which at the end of the season will be sent to the Photographers' Benevolent Association.

All photographers will be welcome, and I hope to see a good addition to the P. B. A. funds from the above offer. I remain yours faithfully, W. T. WILKINSON.

North Parade, Otley, Yorkshire.

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

A MONTHLY technical meeting was held at the Gallery, 5A, Pall Mall East, on Tuesday last, the 26th inst., Mr. W. ENGLAND in the chair.

Mr. COWAN showed some pictures taken from a very low standpoint—some with the camera actually standing on the ground; and he seemed to think that as a general thing photographers use stands which are higher than necessary. Some discussion followed, and instances were given of the use of stands ranging from three to ten feet in height; the burden of opinion, however, being in favour of the moderately low stand—indeed, about the elevation at which a painter artist usually works when sketching a landscape.

Mr. WARNERKE showed some examples of large heads taken by Lieutenant Pavloffski, with a single landscape lens, having the diaphragm behind (see p. 328 of our last week's number). The lens used was an old Ross view-lens of about 18-inch focus, and stopped down to something like $\frac{f}{16}$. The definition of the portraits was remarkably good.

Mr. ASHMAN exhibited a rack for holding plates film downwards while being washed.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Society was held on Thursday, the 21st inst., Mr. C. HEINRICH TRINKS in the chair.

The HON. SEC. read a letter from Mr. G. M. Satchfield, stating that illness prevented him from giving his promised demonstration.

The CHAIRMAN introduced Mr. Richard Jahr (St. Louis, U.S.), and invited him to give his experience in emulsion work.

Mr. JAHR preferred taking part in the general discussion. He remarked that the reports of discussions carried on by the London Societies proved of the utmost value to those photographers located in small towns in America, away from the centres of information.

Mr. A. COWAN: Can Mr. Jahr enlighten us on developing without green fog?

Mr. JAHR said they had found certain plates difficult to develop with ammonia in hot weather, on account of green fog. It was very unpleasant for the manipulator to find his negatives fogged; so they now used an alkali of a milder nature, which gave them negatives quite free from fog. The carbonates of oda or potash, together with sulphite of soda, produced a ellowish-grey film, just sufficient yellow to little more than eutralize the grey, and thus the film harmonized with the etouching; restraining bromide was not necessary with these evelopers. At first, ferrous oxalate was the standard developer America, then followed ammonia and pyrogallol; now the oda replaced ammonia in many formulæ. They worked last mmer at 110° F., and had no trouble with frilling. This was wing to the kind of gelatine used, and the care to keep down e temperature in the preparation of the emulsion; a slight ddition of chrome-alum was generally employed.

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* Since I wrote the document now being quoted I have been convinced of my error in making this 7th and last suggestion. I therefore withdraw it now; but, to omit nothing of my original, I quote it here with the rest.—A. P.

The **Chairman**: Then we understand that notwithstanding ery high temperatures, you are able to overcome frilling.

Mr. **Jahr**: Yes. Not only is it my own experience, but that American plate-makers generally.

Mr. A. L. **Henderson** had seen hot water used with the deve- per in America, and there was no frilling.

The **Chairman** said he had repeatedly soaked plates in a ncentrated solution of chrome-alum to stop frilling, and then eveloped them in the ordinary way; this did not interfere with e image beyond improving the colour.

Mr. L. **Warnerke** used to think that such treatment slowed e plate, but he had changed his opinion. A supersaturated lution might have no action upon the plate, when a diluted lution would, as instanced with strong and weak hypo.

Mr. A. **Mackie** had checked frilling in the manner described the Chairman, and also used it with the developer after ltering out any precipitate which might be formed.

Mr. **Henderson** said that if an emulsion was broken up, and aked in a solution of alum, then thoroughly washed, the rdening properties of the alum would be obtained without the ances of fog.

Mr. **Warnerke** said it was his usual practice to place the nulsion in a saturated solution of common alum directly it as set, and before removing the nitrate salts.

Mr. J. **Barker** had a few prints he wished to tone in the esence of the members. They were on gelatine paper, which inted three or four times quicker than ordinary ready-sensized paper, toning easily in the usual acetate of soda and chlode of calcium bath. The toning was successfully demonstrated, d the resulting colour was quite equal to albumen prints. he formula was not stated, but the paper appeared to be preared by one of the numerous modifications of silver chloride in latine, obtained by the addition of another silver salt of an ganic nature.

Mr. **Henderson** thought papers of this kind would keep uch better than albumen, and could be made at half the price ready-sensitized paper. He had made several batches, and as surprised at the vigour obtainable.

Mr. W. E. **Debenham** questioned the advantage in substitutg gelatine for albumen. It had been said that albumen should present in gelatine papers prepared for development.

Mr. **Henderson** replied that Mr. Erhmann, of New York, had entioned albumen instead of gelatine for dry plates. If a eet of paper could be coated with an emulsion containing ly 6 grains of silver, there would be an advantage on the side economy.

The following question was then considered: Is there any lphur naturally in gelatine? Some analytical chemists pubsh that there is, while others make no mention of it.

Mr. **Cowan** had no doubt about it; he could often taste it.

The **Chairman** alluded to the many sources from which gelane was obtained, and thought the presence of sulphur may be some samples, but not in others.

Mr. **Jahr** said it was a matter of extreme difficulty to dry inrior gelatines at certain seasons, especially in thunder weather, hen it was customary to fume with sulphur. Pure photoaphic gelatine contained nothing but the extract obtained om the skins.

Mr. **Warnerke** thought sulphurous acid was often employed bleach gelatine.

Mr. W. H. **Harrison** stated that some German chemists say, per cent. of sulphur forms a constituent of gelatine, others do t mention it. The samples tested were pure gelatine, of Gern manufacture.

Mr. **Mackie** pointed out that sulphur was one of the conituents of albumen, and if it was deprived of its sulphur it ould no longer be albumen. This applied with equal force to latine. After some further discussion upon the subject of Gelatine," the proceedings terminated.

Hyde Amateur Photographic Society.

This Society held its usual meeting on Wednesday evening, when there was a goodly number present; the President, Mr. F. W. **Cheetham**, in the chair.

Several very important matters were brought up and discussed; also the next ramble was discussed, and how best to make it a success; several members had friends who wished to go on the trip. It was ultimately decided that each one give in the number of tickets required, and be responsible for the number given in.

Several members brought views taken at the last ramble (which was under the leadership of Mr. McClean).

The **President** also showed a 12×10 photo of a group of about fifty gentlemen; this was greatly admired, being a very good negative, and was taken on one of Edwards' plates.

Cambridge University Photographic Society.

The first annual Exhibition was held on Saturday last, in the Hall of Emmanuel College. The Exhibition was in every way a thorough success, especially in the almost entire absence of those very bad photographs which are to be seen at nearly every amateur exhibition. Besides about 150 prints, all exhibited by members of the Society, and many of great artistic merit, there were also about 60 negatives and a few transparencies. Several prizes were offered for competition by the Society, and these were gained by Messrs. G. L. Salt, A. Paschkoff, C. F. Jenkin, H. M. Elder, and L. Cobbett.

A loan exhibition of pictures by well-known photographers was held at the same time, and included many works which have already gained medals in Pall Mall and elsewhere.

Talk in the Studio.

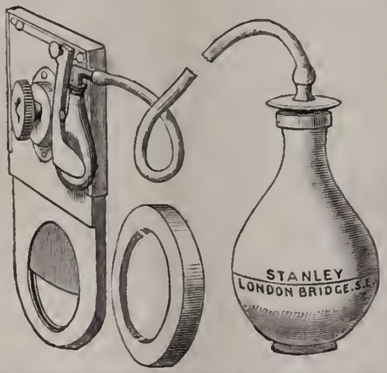
South London Photographic Society.—The next meeting will be held at the Society of Arts on Thursday next, June 4th, at 8 o'clock, when Mr. W. M. Ashman will read a paper, entitled "Hints for Summer Work," and exhibit and explain "An Inexpensive Electric Shutter for Studio Use."

The Rescue of Greely at Cape Sabine.—In the current issue of the *Century*, a thrilling account is given of the discovery of the ill-fated Greely Expedition by Lieut. Harlow, of the rescue party. The following extract shows how much the camera is prized as a means of describing incidents of travel, &c. Lieut. Harlow, who at the time the forward rescue party were on land searching for Greely, was on the ship *Thetis*. He writes:— "Lemby and I had speculated upon the possibilities of the next hour, but little dreamed of the horrible tragedy that was to be revealed. Someone was seen on the ice-foot signalling. I ran forward to read it; but he had begun his message, and I only got the following: '*Harlow with photograph machine—doctor with stretchers—seven alive.*' When it came to the last few words I had him repeat them. They might be 'd-e-a-d.' But no! 'a-l-i-v-e' waved plainly through the air, and the fate of the Greely party was known on board the *Thetis*. Two boats were lowered at once, and Taunt, Lemby, Melville, Doctor Greene, and I started with strong crews for the shore. The wind had increased to a full gale, and was tearing over the hills in furious blasts . . . Shouldering my camera I started for the tent. . . . Turning a little to the left, the tent came in view. To my right, stretched out on the snowdrift, lay one of the dead. His face was covered with a woollen hood, his body with dirty clothes. Hurrying on past a little fire, over which a pot of milk was warming, I came to the tent. One pole was standing, and about it the dirty canvas bellied and flapped in the fierce gusts. Brainard and Biederbeck lay outside at the bottom of the tent and a little to the left of the opening, one with his face swollen and rheumy, so that he could barely show by his eyes the wild excitement that filled him; the other muttering in a voice that could scarcely be heard in the howling of the gale his hungry appeal for food. Reaching over, I wiped their faces with my handkerchief, spoke a word of encouragement to them, and then pushed aside the flap of the tent, and entered. The view was appalling. Stretched out on the ground, in their sleeping bags, lay Greely, Connell, and Ellison, their pinched and hungered faces, their glassy, sunken eyes, their scraggy beards and dishevelled hair, their wistful appeals for food, making a picture not to be forgotten. I had time for a glance only; the photograph must be taken, and the poor fellows removed to the ships. Stepping over to Greely, whom I recognized by his glasses, I pressed his hand. A greeting to the other two, and I returned to my camera, to take the plate I had so often pictured to myself—'The Meeting with Greely!' How different it was from the ideal picture only my own imagination can know. Strewn about the ground were empty cans, a barometer case, chronometer boxes, a gun, old clothes, valuable meteorological instruments, showing the indifference they felt for anything that was not food or fuel."

The Aberdeen and North of Scotland Amateur Photographic Association has been formed at Aberdeen, with a promising membership. Mr. John Milne is President, and Mr. Robert Hanston, of I, Millbnrn Street, is Secretary. Communications from strangers or visitors are invited.

Galton's Method of Composite Portraiture.—Speaking of some composites made by Professor Pumpelly, *Science* (Cambridge, U.S.A.) says:—"No one can look upon them without a new respect for that shadowy thing called the normal man. There is a singular dignity in these combined shadows; they are strong faces, those of high-browed, deep-dyed, earnest-looking men, fit for all sorts of trials. But most of those who review the faces of American men of science will recognize that one face appears, curiously, to dominate all the others, yet this, taken by itself, is perhaps the most individual of all those contained in the plate. It would be interesting to know what effect on the composite its absence would produce. This element of what we may perhaps call prepotency is most likely to disturb these composite delineations; for, though in itself a very interesting phenomenon, it seems to be somewhat of an obstacle in this use of the new art. With this great contribution of Galton well in hand, we may at length hope that we shall be able to enter upon the study of that unexplored realm of the human face, and physiognomy become a tolerably exact science. Some such process as this seems to offer the only chance of obtaining valuable generalizations in this field.

Sargeant's Instantaneous Shutter.—Our readers will remember that this shutter was recently exhibited at a meeting of the South London Photographic Society, and the subjoined cut will make some details clear. In general principle the apparatus is similar to an arrangement described by Mr. Cowan and figured on p. 306 of our volume for 1883; but the skill and ingenuity of Mr. Sargeant have brought the apparatus into a surprisingly small compass; indeed the thickness of the metal casing is no more than one-eighth of an inch, so that the shutter may be made to take the place of the diaphragm by somewhat widening the slot in the lens tube. The action consists merely of the revolution of a single arm crank actuated by a spiral spring, with the crank pin moving in a slot, precisely like the action of the ordinary punching bear. By this form of action the motion, although rapid, is remarkably steady, as the pin at all places fits the slot so as not to admit of jar until the exposure is complete. For very rapid exposures the small milled head screw, shown at the top of the illustration, should be drawn out a little: for other exposures, the pneumatic ball is held in the hand, and the shutter remains open so long as it is pressed, and closes instantly it is released. Mr. Stanley, of London Bridge, makes the shutter.



Large Photographs.—There are, at New Orleans, some views of the public buildings at Washington, taken by order of the Government, that have a length of seven feet by five wide.—*Anthony's Bulletin.*

Photographic Club.—The subject for discussion on Wednesday, June 3rd, will be "Contact *versus* Camera Printing, for the Production of Transparencies." Saturday out-door meeting at Blackwall, leaving Old Swan Pier at 2 p.m.

To Correspondents.

*** We cannot undertake to return rejected communications.

J. G. P.—1. Sprague and Co., Lithographers, St. Martin's Lane, Cannon Street, London. 2. Write for a scale of charges.

A. L.—Through some transmitting agency, as the Globe Express, or Pitt and Scott. Each firm has an office in St. Paul's Churchyard.

C. R. B. D.—1. The condenser should be at such a distance from the light that the image of the flame is formed at a point corresponding to the diaphragm of the objective, or lens, used to form the enlarged image. 2. It should be as nearly central as practicable. 3. The general design of your lantern is good, and we cannot suggest any improvement.

Colonist.—In practice you are not likely to experience any difficulty, as stock houses on the Continent issue price lists, and the technical terms explain themselves at a glance to one knowing the languages fairly well. Thank you for the suggestion, which we hope shortly to carry into practice. The prints you send form the best collection of marine studies we have seen for some time.

J. G.—It will be described in due course; perhaps next week.

A. Rothwell.—It is available even for the size you mention, and we doubt whether there would be any advantage from the use of gelatine; but you may try a very small proportion—say one-twentieth of the albumen.

Determine.—

Chloride of gold	1 grain
Acetate of soda	30 grains
Water	10 ounces

A. A. J.—It is much better to use a solution of the crude sulphide of potassium sold under the name of "liver of sulphur." Add this to the waste hypo solution until no more dark coloured precipitate is thrown down. The deposit is sulphide of silver, and may be reduced by fusion with carbonate of soda.

W. A. C.—It is probable that your "hypo" is acid. Either add a solution of carbonate of soda until it just changes red litmus paper to blue; or else shake up some whiting with the hyposulphite solution, and allow it to settle, after which the clear portion is poured off for use.

Paco.—1. The so-called Brunswick black answers very well, and it is an excellent plan to line the inside of the wooden dish with thin calico or linen, using the black varnish to stick it down. Several coats should be applied afterwards. 2. From Hancock, Rubber Manufacturer, Goswell Road.

W. Sanders.—The address of the Xylonite (manufacturers of celluloid) Company is 124, High Street, Homerton, E.

J. C. Hannyngton.—1. Add chloride of potassium to a strong solution of platinic chloride (tetrachloride), and potasic platinic chloride will separate as a yellow deposit. Collect this on a filter, and suspend it in a small quantity of hot water, after which cuprous chloride is gradually added until very nearly the whole of the platinic salt is dissolved. Now filter the hot liquid, and allow it to cool, when the potassic platinous chloride will be deposited in red prisms. 2. Add neutral oxalate of potassium solution to a solution of ferric chloride, keeping the latter in excess. Ferric oxalate will be precipitated.

H. N. Stroud.—We are inclined to think that you will find the slides most convenient.

H. Howard.—1. If there is any turbidity or milkiness, you may assume that silver is present; but if the solution is transparent—even though coloured—you may assume that there is none present. You are not likely to alter the sensitiveness by such a course, but the plates will be more likely to take a stain or tint from the action of the pyrogallic acid.

G. V.—See an article on page 173 of the Year-Book for the present year. Although it is out of print, you may perhaps obtain a chance copy from one of the photographic material dealers.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1396.—*June* 5, 1885.

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PHENYL-HYDRAZINE: A NEW DEVELOPER.

BY DR. J. MARIA EDER.

HE hydrazines possess powerfully reducing properties, nd reduce in the cold solutions of silver, gold, platinum, nd mercury salts: even alkaline copper solution is educed.

I have made experiments specially with the hydrolorate of phenyl-hydrazine, the compound having been btained through Dr. Walter, of Basle. This salt forms hite crystalline leaflets, which are permanent in the air, asily soluble in alcohol, and sparingly soluble in water. he aqueous solution reduces silver nitrate, but not silver romide or chloride.

If the hydrochlorate of phenyl-hydrazine is mixed with alkali, the base (hydrazine) is set at liberty, and this ase is, to some extent, soluble in water. The mixture, ith caustic potash, is a very powerful developer for elatino-chloride, and for Wellington's gelatino-chlororomide; there being no tendency to fog. On silver romide its action is less energetic. The colour of the nage obtained is generally yellowish brown, but under ther conditions it is greyish black.

The phenyl-hydrazine developer remains colourless for long time, but in the end it becomes yellowish, and acuires the smell of tar products.

One cannot at the present moment form an opinion as whether the new developer possesses any practical alue, but I will give a few details as to chemical constiution and preparation of the hydrazines.

The hydrazines contain the group N_2H_3 or NH—NH_2, nd they are formed (*a*) by the reduction of nitrosoamines ith zinc and acetic acid; (*b*) by the reduction of diazo ompounds with sodium sulphite; (*c*) by reduction of iazo-amido compounds with zinc and acetic acid.

The hydrochlorate of phenyl-hydrazine is prepared as llows:—Twenty parts of aniline are dissolved in 50 parts hydrochloric acid (*s. g.*, 1·19) and 80 parts of water; his solution being then treated in the cold with the calcuated quantity of sodium nitrite (this salt being dissolved double its weight of water, and slightly acidulated with ydrochloric acid). The mixed solution is now slowly oured into excess of an ice-cold and saturated solution f sodium sulphite, and as soon as a sample of the crystals hich separate redissolve in the mother liquor without volving gas on the application of heat, the next stage is eached. The whole is now heated cautiously on the ater bath, and when the greater part of the separated alt has dissolved, the liquor is neutralised with hydrohloric acid. It is next acidified with acetic acid, and hile warm is treated with zinc dust until it is decoloursed. After this it is filtered, heated to boiling, and onehird of its volume of strong hydrochloric acid is added. he hydrochlorate of hydrazine now separates in crystals.

Phenyl hydrazine has the composition C_6H_5—NH—NH_2, and the hydrochlorate contains C_6H_5—N_2H_3—HCl.

SURVEYING BY THE AID OF PHOTOGRAPHY.*

So far we have treated of photogrammetry as applied to land surveying only—to the production, that is to say, of maps. There is another application of it, however, which is possibly more extensive and more likely to be useful than this one of map making. It is that of architectural surveying; that of making plans and elevations of buildings. In a recent number of a German photographic contemporary, Dr. Vogel has a very comprehensive article on the application necessary for the performance of surveys of this kind. From this we learn that the camera is very considerably used by German architects as a means of assisting them in the production of drawings of buildings. Already a considerable number of architects make use of photography in their surveying, and it therefore became desirable that a well-constructed camera should be designed for photogrammetrical purposes. It is necessary in such a case to have a means of determining the horizon line, and where possible also the point of view (Augenpunkt). Meydenbauer accomplishes this by means of fixed marks, against which the plate in the camera rests, and he makes use of a peculiarly-constructed camera. The problem was to reach the same end with the usual apparatus and an ordinary dark slide.

Dr. Vogel has, after consultation with his friend Herr Professor Doergens, solved the problem in an exceedingly ingenious manner.

The accompanying cuts will render an explanation of the arrangement readily intelligible. B B represent the bellows of an ordinary camera of substantial and exact construction. A is a single dark slide working in the usual grooves, C C. So far the camera is the same as any other, except in as much as great precision is, of course, necessary in construction.

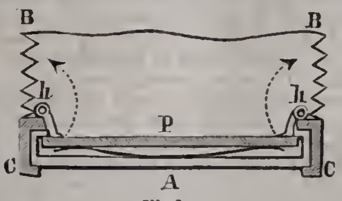

*Fig.*1.

The appliances marked *g h i* are the only additions necessary for photogrammetrical purposes, and they almost explain themselves; *g g* are two circular rods which are capable of being turned by hand from outside the camera, and also of being adjusted lengthwise to a certain extent, and afterwards fixed. The pieces l l are fixed to these rods, and can, by the turning of a thumb-screw, be caused either to be against the plate, or to be so removed from it that they will in no way interfere with the exposure. Of course if the exposure is made with the pieces l l against the plate, their form as seen in figure 2 will show on it after development as clear glass. The line joining the angles of the pieces l l will then be the "horizontal line."

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* Continued from page 322.

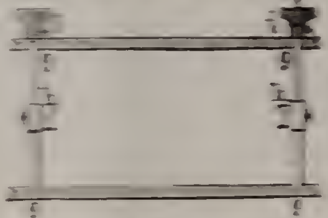

Fig. 2.

The focus adjustment of the apparatus may be made in the following manner. By means of a level, two horizon points at some distance from the camera are fixed. The camera is then so adjusted that it stands precisely horizontal, and with the axis of the lens at the same height as the level, and consequently, of course, level with the two horizon points. An exposure is now made with the marking pieces l l pressed forward against the plate. A line joining the two horizon points on the image is the horizon line, and it is only necessary to so adjust the rods f f that the angles of the marking pieces will coincide with the horizon line, and they will in future mark the horizon line themselves by merely levelling the camera. "The exposure is repeated after the camera has been turned through an angle of 90°. Thus a second horizon line is produced; where this cuts the first line is the point of view."

The angle of view it was determined need not exceed 60°, and therefore a Voigtländer Euryscope was used. The camera was in all ways constructed like an ordinary tourist's bellows-bodied camera of very solid workmanship, but it was arranged to stand on the usual surveyor's tripod, with the common triple screw arrangement for levelling. The first camera made with this attachment for surveying was for plates [illegible] by [illegible] inches, but Dr. Pressel has seen fit to have one made for plates [illegible] by 12 inches, presumably because greater accuracy can be got with the larger size. It goes without saying that the camera may be used for ordinary landscape purposes at any time, the marking piece being merely withdrawn.

The first camera made on the lines indicated by Dr. Vogel has now been in use for two years, so that it may be said to have had a trial long enough to indicate its usefulness in practice.

Concerning the accuracy of the method of photogrammetry as applied to architectural work, there is an interesting piece of information given by one of the members who joined in the discussion on photography as applied to surveying in the Prussian Parliament.

It appears that a photogrammetrical survey had been made of the [illegible]. On comparing the drawings which resulted from the survey with those that had before existed, it was found that there was a discrepancy between the two drawings in the case of the "French Dome," and of course it was assumed that the photogrammetrical drawing was inaccurate. It was, however, eventually discovered that the error was in the first drawing, not in the photogrammetrical one. In building the tower, a deviation had been made from the original designs, and the deviation had never been accurately shown on the drawings.

FURTHER REMARKS ON SULPHITE OF SODA.

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.

In a communication last week on this subject, there were one or two doubtful points left over for consideration, and I propose briefly to advert to them. The first is as to the solubility of silver chloride in the sulphite. Of one thing there is now no doubt—viz., when silver chloride and sodium sulphite are brought in contact, the former being dissolved, that double decomposition takes place, at all events when moderate heat is applied, and not, as I at first suspected, that the chloride is simply soluble in the sulphite.

In other words, we have:—

Silver Chloride and Sodium Sulphite give Silver Sulphite and Sodium Chloride

$$Ag_2Cl_2 + Na_2SO_3 = Ag_2SO_3 + 2NaCl$$

This result was shown by dissolving the silver chloride in a saturated solution of sodium sulphite, evaporating to dryness over a water bath, and then treating with alcohol to extract the sodium chloride. On applying silver nitrate to the alcoholic extract, an abundant precipitate of silver chloride was formed, showing the presence of the soluble chloride in it. The sulphite of silver is soluble in an excess of alkaline sulphite. The following results show the solubility of the chloride in solutions of various strengths of the sodium sulphite.

Solutions of Na_2SO_3 at 60° F.	Chloride of Silver per oz.
3 grains to the ounce	·17 grains
10	·33 ...
20	1·02 ...
30	1·62 ...
40	2·22 ...
50	4·8 ...
100	6·12 ...

Regarding this table and its comparison with hyposulphite solutions, I propose to deal next week.

These results were obtained by shaking up an excess of washed silver chloride in the different solutions of the sulphite, and, after filtering, re-precipitating the chloride by nitric acid, which liberated sulphurous anhydride, the silver immediately combining with the soluble chloride. The chloride was collected, and washed, and weighed, and checked by duplicate estimations, reducing the chloride contained in the acidified solution by precipitating metallic silver by means of zinc, and estimating the chloride volumetrically. Another advantage is thus shown in using the sulphite. Silver chloride can be recovered from the old fixing baths by the addition of any acid; hydrochloric acid would perhaps be the best, since the dissolved organic salt would be precipitated also as chloride.

I have made further experiments with the sulphite as a fixing solution with most satisfactory results, and I should urge on photographers to give it a trial for prints, for the following reasons:—1st, that sulphite of silver, if the washing be incomplete, should not split up in sulphur compounds, but should prove nearly innocuous; 2nd, that no insoluble compound appears to be left in the whites of a print which so often gives rise to fading, as shown by Spiller; 3rd, that there are not two sulphites of silver, though there are two hyposulphites, one soluble and the other insoluble. It should be remembered that the action of acids on the sulphite is to cause sulphurous acid to be liberated; the action of acid on hyposulphites (thiosulphates) is very different, giving rise to the formation of sulphides. It would be to the advantage of photographic knowledge if photographers would undertake to make duplicate prints of the same subject under similar conditions, and to fix one in hyposulphite of soda and the other in sulphite of soda, and to observe the relative degree of fading in both. Prints should also be mounted, but care should be taken that the mounts are free from hyposulphite, otherwise the test would fail.

I continued my experiments with hydroquinone and ulphite of soda, and found that with sulphite of soda lone a very feeble image would be developed on a collodio-hloride plate, but that with a mixture of the bisulphite nd sulphite and hydrokinone the image obtained was nerely a phantom image. Even plain pyrogallic and ydrokinone gave better images, though the films previous o exposure had been treated with a solution of common alt to get rid of all excess of silver if there were any. I vould here say that Mr. Burton's remark as to the leveloping power of pyrogallic acid *per se*, which he made n a recent paper at the Society of Arts, is fully justified, hough I was sceptical as to it at the time. The image eveloped by it is of the feeblest description, and would lmost appear as if it were only due to the reduction of the articles on which light had acted. This requires more in-estigation. Solutions of pyrogallic acid and sulphite of oda, or of sulphurous acid, having been qualitatively nalyzed, appear to give the compounds which are strongly educing, and fairly dense images can be got with the sub-tance which is soluble in alcohol from the evaporated queous solutions.

I also find that potassium nitrite with pyrogallic acid is ffective, as might be expected; and it appears, too, to give double decomposition, partially, at all events, when in ontact with silver chloride.

The pyrogallic acid developer, with a mixture of bisul-hite and sulphite, should prove useful, as I said before, in iving an image in the gelatino-chloride developing paper, wing to the brown tone the image assumes by reflected ght, and some prints which I developed with it have roved to be very promising in regard to toning capabili-ies. For gelatino-bromide plates or paper it is much too low, unless an alkali be added to it; and then, of course, e have the ordinary developer.

◆

HE BEHAVIOUR OF THE HALOID SALTS OF SILVER IN THE SOLAR SPECTRUM, AND THE EXALTATION OF THEIR SENSITIVENESS TOWARDS CERTAIN PARTS OF THE SPECTRUM.

BY DR. J. M. EDER.*

ODINE green of one kind gave a maximum of action etween D and C in the orange (curve 13), and was sensi-ive in the red almost up to A; other kinds which appear ess blue-green, give a maximum nearer to C. Disregard-ng the generally diminished sensitiveness of plates stained ith iodine green, they show, best of all, sensitiveness to ne ultra-red. These results occur both when much iluted, and in a more concentrated state.

Cyanine is a very good sensitizer for orange and red in romide of silver gelatine, as I discovered simultaneously ith Schumann. With a short exposure, in addition to ne powerful action in the blue, there is a weaker action etween D and C; whilst in the green and yellow but ery little blackening is observable (curve 14). With onger exposure the action extends from the blue portion f the spectrum continuously till near the line B in the ed. In this case a minimum occurs between E and F about $\frac{2}{3}$ towards E), then follows between E and D about towards D, a slight maximum, not always easy to be istinguished; and then the before-mentioned increase alf way between D and C. The preponderating effect, owever, occurs (when no yellow glass is interposed) in ne blue (curve 14). Chlor-cyanine, sulphate-cyanine, nd nitrate-cyanine, behave in a similar manner; but, aving regard to the sensitiveness of the plate, iodine-yanine is most satisfactory. With all four kinds of yanine the maximum of sensitiveness to orange lies in the ame place. The general sensitiveness of cyanine plates o white light is less than with unstained plates, perhaps only one-fifth or one-tenth of the amount; but the relative sensitiveness to orange is more than a hundred times greater. In working it is necessary to employ a much lowered deep red light, and to operate in shade as much as possible. Schumann recommends covering the red light with brown paper; I have, however, not found this practicable.

If a certain quantity of ammonia is added to the cyanine which is to be mixed with the emulsion, the maxima of action stand out more boldly.

Eosine, and the colours derived from it, are, at the same time, very good sensitizers for the green, the yellow-green, and eventually for the yellow. With these dyes the action of optical sensitisers is not difficult to study, and may even be recognized when working with diffused daylight.

I have experimented with the various forms of bromeosine to be met with in commerce, and obtained similar results with all. A short exposure gave, in addition to the ordinary bromo-silver spectrum, a maximum of the characteristics of the action of the dye, between E and D, (E $\frac{1}{2}$ D); whilst between E and F there is no perceptible action (curve 15). With longer exposure the maximum in the yellow-green increases; the action extends as far as D, but falls steeply away. On the other side, the curve falls towards E, and shows a minimum between F and E (E $\frac{1}{2}$ F), curve 15. The addition of ammonia to the above-mentioned compound increases the action in the yellow-green, the maximum becomes more intense, and the action is both on the right and the left of the maximum, somewhat more strongly visible. At the same time, a second weak maximum at E, which is otherwise scarcely recognizable, becomes a little more distinct. This is shown in curve 15.

The bluish shades of eosine have an absorption band farther into the yellow. Corresponding to this, the band of optical sensitiveness lies near the line D. This occurs with the bluish eosine (eosine B) and with the bluest of all the eosines, Bengal rose, the action of which I first published in a preliminary communication in April, 1884. The spectrum for long and for short exposures with bromide of silver gelatine emulsion containing Bengal rose, is shown in curve 16.

In the presence of ammonia the maximum at D is increased in a remarkable degree. The action then extends—with an abundant exposure, that is to say—farther towards the less refrangible rays. Between the principal action in the blue and the weaker maximum at D, there is a less perceptible increase at E.

The other eosine colours prove to be optical sensitizers for yellow-green and yellow—namely methyl-eosine (methyl-erythrine) ethyl-eosine, phloxine (potash salt of tetra-brom-dichlorfluoresceine), cyanosine (methyl-ether of phloxine), aureosine (chlor-fluoresceine), and safro sine (bromnitrofluoresceine). The band of sensitizing action lies between those of eosine and Bengal rose, according to the position of the absorption rays. The general sensitiveness to light obtainable is, however, not alike with all; for instance, it is less with cyanosine and phloxine than with eosine.

If the sun's rays are passed through yellow glass, or a solution of bichromate of potash (1 : 1000) before entering the slit of the spectroscope, the ultra-violet, the greater part of the violet, and the blue, are considerably weakened. By this means the relative light of the spectrum in the yellow-green, yellow, and orange, is considerably increased. By the use of silver bromide gelatine emulsion, thoroughly stained with eosine, a picture of the spectrum is then obtained, in which the darkening in the yellow considerably preponderates over that in the blue. Curve 17 exhibits this action. Plates which in this manner represent colours are good for photographing objects of blue and yellow hue, because to the human eye yellow appears—approximately o the same extent as with such plates—lighter than blue and violet.

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* Continued from p. 228.

* *Photog. Correspondenz*, 1884, p. 95.

The sensitiveness of eosine dyes to the red, however, is insufficient, and the relative sensitiveness to the green too great. Curve 18 shows the spectrum picture upon a bromide of silver gelatine plate which has been stained with a mixture of eosine and cyanine. The dotted line answers to excess of eosine, the plain line to an excess of cyanine.

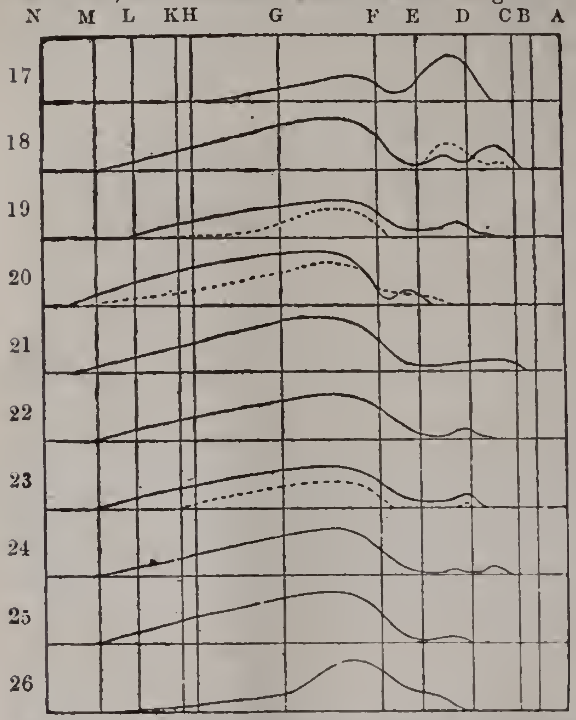

Fig. 9.—17. Photograph of the spectrum upon bromide of silver in gelatine, coloured with eosine (through yellow glass). 18. The same with cyanine and eosine. 19. Aniline red. 20. Fluoreosine and ammonia (the solid curve wet, the dotted curve dry). 21. Resorcine blue. 22. Coralline red. 23. Naphthaline red. 24. Coupier blue. 25. Safranine. 26. Chrysaniline.

The mixture of these dyes, however, does not exhibit in the spectrograph the distinct action of either used separately. The one injuriously affects the action of the other. An emulsion stained with cyanine plus eosine possesses less sensitiveness to red than one coloured with cyanine only; in the mixture of the two also, the sensitiveness to yellow green becomes less. Nevertheless, by the mixture of dyes, the relative sensitiveness to the less refrangible rays of a large portion of the spectrum may be considerably extended, because the minimum of action of one dye is made to disappear by the addition of another dye, which has its maximum at that place. My researches afford ground for the hope that in this manner an equal sensitiveness in silver bromide to the whole of the spectrum, without any maxima or minima, may be attained.

Aniline red sensitizes well for yellow and yellow-green. I have experimented with hydrochloric and acetic rosaniline—also Coupier's toluolred—with similar results. The maximum of optical sensitizing effect lies two-thirds of the distance from E to D: the action extends in a weak degree beyond D, and, in the other direction, with a minimum at E, as far as the blue, violet, and ultra-violet (curve 19, fig. 9).

With a short exposure—before any action commences in the yellow—the aniline red dyed plates show considerable weakening of the action in the violet and ulta-violet, and a powerful sensitiveness to the blue between G and F (dotted curve 9). It appeared to me remarkable that acid-fuschine (sodium sulphate rosaniline) of my own preparation did not cause the same sensitiveness in the yellow as aniline red, but, at the same time, caused a weakened action in the violet.

With fluorescine and ammonia I obtained, upon dry bromide of silver gelatine plates, a sensitiveness in the green as far as the neighbourhood of D, without any projection of a maximum (dotted curve 20). On the other hand, used wet, and with a longer exposure, a recognizable maximum shows itself in the green in the region of E (plain line, curve 20); with the long exposure the image becomes very intense. A similar action to that of dry fluorescine is exhibited by chrysoline (bensylfluorescine); but the action in the green is stronger, and extends farther into the yellow (beyond D). Both dyes injure the general sensitiveness but slightly.

With resorcine blue (fluorescent blue) also, I have obtained only upon plates which have been immersed in a solution of the dye, and exposed wet, a slight sensitizing effect, which extends as far as B (curve 21). With short exposure, as with aniline red, the action in the blue stands out especially strong, because that in the violet and ultra-violet is diminished.

Coralline, except that known as "red coralline," did not always give a certain result. The latter kind caused, as well by itself as in the presence of ammonia, a considerable rise in sensitiveness in the yellow, at D. The action extended into the orange towards C, and after passing a minimum half-way between D and E, shows an intense action throughout the blue (curve 22, fig. 9). Acids hinder the action.

Naphthaline red (Magdala red) gives a powerful maximum of action in the yellow at D. With a short exposure, this maximum stands isolated, and the action commences again in the blue-green, and extends into the ultra-violet (dotted curve 23). With longer exposure, the action extends into the orange, and is continued with faint sensitiveness to the green, to the more refrangible end of the spectrum (curve 23).

Coupier-blue induces a sensitizing action for the less refrangible rays, which is remarkable for showing (besides the ordinary maximum for bromide of silver in the blue) two maxima; one in the green, from E two-thirds towards D, the other in the orange half-way from D to C, as is shown in the curve 24. It seems probable that the Coupier-blue which I employed was not a simple dye-stuff, but a mixture of two different ones.

Safranine is a good sensitizer for green. Its action extends, with sufficiently long exposure, a little beyond D. The action in the green, according to my experiments, rises to no strong maximum, but subsides to E, from which point the curve rises rapidly (curve 25). Certain kinds of ponceau also produce a similar effect; for instance, ponceau 3R, phenolponceau, biberich scarlet (the last only in to a slight extent), and grenadine (a by-product of the manufacture of aniline red), which, with a short exposure, cut off the spectrum picture at both ends, and make it more vigorous, but with a long exposure, sensitize as far as D.

Chrysaniline is a good sensitiser for green. Its action in an ammoniacal solution in this direction has been described by Dr. Lohse.* I found this dye stuff also effective in a neutral aqueous solution. It altered the action of the sun's spectrum upon the silver bromide in gelatine in a remarkable manner.

The action of the violet and ultra-violet is lowered. In the blue between G and F, two-thirds towards the latter, an intense blackening takes place, which towards E is much reduced, and disappears before arriving at D (curve 26, fig. 9). On this account the curve appears, compared with that upon an undyed plate, removed further towards the green. The blackening in the green resulting from the addition of chrysaniline is so closely connected with that of the normal spectrum upon bromide of silver that no interruption can be perceived. This is also the case with chrysoline.

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* Dr. Lohse found the following to act as sensitisers for yellow and green. He employed a solution of 0·004 grm. of dye stuff in 2 cub. cent. of ammonia and 100 cub. cent. of water. Chrysaniline, nitric chrysaniline, hydrochloric diamidoazobenzol. On the other hand, he found but little or no action result from the following yellow dyes:—orthonitrophenol, orthonitroaniline, paranitroaniline, metanitroaniline, thymochinone, phenanthrochinone, chrysophanic acid, tropaeoline, quercitrine, and some others.

Many dye-stuffs applied to bromide of silver in gelatine give no decided maximum of sensitizing effect in the green, yellow, or red; but affect the spectrum picture in the blue and violet portion. Thus, by the use of acid, fuchsine, dry resorcine blue, aniline red, and coralline (the two latter with short exposure), and many other dyes—yellow, red, violet, and blue—the action in the violet and ultra-violet is weakened, whereby the blue appears relatively stronger, and the general sensitiveness is lowered (curve 27, fig. 10). In this manner it appears possible to keep down particular portions of the spectrum.

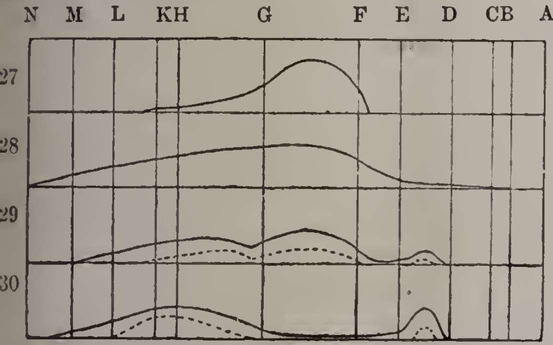

Fig. 10.—27. Spectrum photograph upon bromide of silver in gelatine, coloured with acid, fuchsine, resorcine blue, &c., with short exposure. 28. The same, with haematoxyline, soluble Berlin blue, &c. 29. Iodide and bromide of silver with eosine. 30. Chloride of silver in gelatine with eosine.

Other dye-stuffs sensitize bromide of silver in gelatine without a decided maximum for the less refrangible rays. Plates which have been treated with dilute ammoniacal solution of haematoxyline, ammoniacal tincture of curcumine, soluble Berlin blue, hydrochloric monophenylrosaniline, and some other dyes, show action extending through the yellow and into the red (curve 28). Nevertheless, I have never obtained that definition in the Fraunhöfer lines which is shown with dyes having a strong maximum of sensitizing effect, but the picture is generally vague and foggy, as if it had been over-exposed.

Iodo-Bromide of Silver in Gelatine, with Dye-stuff.—Mixtures of gelatine emulsions that have been separately made with iodide and bromide of silver give, as before mentioned, a spectrum showing two maxima, separated by a minimum—one in the violet, the other in the blue. When such a film is stained with eosine or other dye, a third maximum is seen in the yellow green, or in the place characteristic of the optical sensitizing of the dye. Curve 29, fig. 10, shows the spectrum picture upon a mixture of iodide and bromide of silver stained with eosine. The maximum of eosine action lies between E and D, exactly in the same place as with pure bromide of silver; and indeed, there is only a single band, nowhere interrupted by a minimum at the place of optical sensitizing; following this come the characteristic spectrum maxima upon the mixture of iodide and bromide of silver in gelatine—three maxima in all. Other dyes behave similarly.

Iodo-bromide of silver in gelatine, in which by digestion the two maxima have become united (curves 7 and 8, fig. 7), have the maximum due to an added dye-stuff in the same place as with pure bromide. An addition of from 1 to 3 per cent. of iodide to the bromide does not sensibly modify the action of the dye. When, however, the iodide of silver amounts to from 10 to 30 per cent., the dye, so far as my researches go, does not sensitize so powerully for the less refrangible rays. Schumann observed hat pure iodide of silver cannot be sensitized for the green yellow by eosine, which succeeds so easily with bromide of silver; this behaviour of iodide of silver explains the above-mentioned appearance.

Chloride of silver in gelatine is powerfully sensitized by eosine, cyanine, and other dyes which act upon bromide of silver, and the maximum of action of the dye stuff lies in the same. Next comes the spectrum in the violet, characteristic of chloride of silver. Curve 30, in fig. 10, shows chloride of silver stained with eosine. With shorter exposure (dotted curve 30) there is a maximum at H at the commencement of the ultra-violet; no action is to be seen in the blue and green; on the other hand, the action of the eosine stands out powerfully half-way between E and D. With longer exposure, a weak action extends through the blue and green as far as the yellow, where a maximum appears sometimes exceeding that in the violet.

Mixtures of iodide of silver, with chloride of silver in gelatine, as well as of bromide and chloride, behave with dyestuffs in a manner analagous to that of a mixture of iodide and bromide. Chloride of silver with from ten to twenty per cent. of iodide gives, upon the addition of eosine, a bright and strong picture with relatively very powerful sensitiveness in the yellow-green, generally exceeding that of dyed bromide of silver.

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ARTISTIC FEELING IN PHOTOGRAPHY.

BY A. H. WALL.

Part III.—Portraiture.—*Continued.*

There is, perhaps, in the whole range of portraiture, photographic or other, no branch in which the difficulties are so great as they are in that which deals with children. Rule and method are here of the smallest service; we can only watch and wait, ready, with that quick perception which belongs to sympathetic feeling, to seize our opportunity when it arises. If we take some of the best models of this branch of art, we shall recognise in them nothing that is not perfectly natural and simple, nothing that we have not ourselves seen scores of times in living originals; and yet, what revelations of individual child life they afford, how forcibly they indicate the presence of various essentially childish impulses and sentiments! You see at once that it was the child-model who inspired the feelings of the artist, not the artist that influenced the child's.

To glance through an ordinary collection of portraits of children you might almost imagine that one model had sat for the whole, there is so much sameness in their expressions, positions, &c., so little individuality belonging to one or the other; whereas, in a really artistic collection of children's portraits, such as may be gleaned from both paintings and photographs, the utmost variety prevails. In some we see dreamy, thoughtful little faces, in which is that wondering awe of the world's mysteries which is so characteristic of some little ones—embryo philosophers and poets; the thoughtless gaiety and exuberant animal spirits which are rampant in others; then the shy and timid, or the bold and saucy; the innocently simple, and sly, mischievous, Puck-like faces, with many others having intermediate shades and expression of character. Aristocratic-looking children, with their self-consciousness displayed in every line of their face and figure, and plebeian children, with vulgarity stamped unmistakeably on every lineament, cannot be made to look alike; but there are phases of each to be caught in which what is unpleasant in both may be softened into dignity in the one case, and elevated into simplicity in the other, without loss of naturalness, individuality, or childishness. In illustration of the one case, what aristocratic stateliness there is in Gainsborough's famous portrait called "The Blue Boy," of which I append an engraving; and with what graceful ease and apparent unconsciousness on the part of his model has the artist contrived to express it in pose, expression, and treatment; all of which conspire in the production of a result suggesting nothing that is forced and nothing artificial.

Amongst the most delightful of the many delightful specimens of portraiture which came from the easel of Sir Thomas Lawrence, is that of Master Lampton. In the original, not by any means in my sketch, the face and eyes are wonderfully expressive of life and thought, and the pose, too, is in wonderful harmony with it. One seems to have sprung from the other. The little lad is leisurely appreciative of some pleasing object; the picturesque scenery suggested by the background, perhaps, and a sense of idle enjoyment, pervades the expression of both face and figure. I can give you nothing of these here, but if you can get a glimpse of a fine engraving from this painting, published by Messrs. H. Graves and Co., or, failing that, see a wood-cut copy of it published in the second volume of Messrs. Cassell's "Magazine of Art," you will, I think, understand my meaning more fully than I can express it. Here we have not only all that is required in the way of pictorial composition and artistic effect, but that grace poetically said to be "beyond the reach of art." The boy's face is not a mere mask, such as could be cast in plaster or wax, but the outward substance of an inward spirit.

Some good examples of simplicity and characteristic naturalness will be found in some of the studies of this year's R. A. Exhibition. Mr. Weedon Grossmith's "Such is Life," Mr. G. A. Storey's "As Good as Gold," and Mr. Seymour Lucas's "In Disgrace," may be cited, each being a single figure treated portrait fashion, although not professedly portraits. If each of these tells a story, which portraits usually do not, I cannot conceive that any portrait would be the worse for doing the same. Sir Frederick Leighton's "Lady Sibyl Primrose," although good as a portrait, and fine as a painting, would certainly be the better for something more story-like; and Millais' study of a child, with a rabbit in her lap, called "Orphans," although it is a fine painting, and pretends to tell a story, contains as little accordant sentiment or feeling in either expression or pose as if it were a mere commonplace portrait of the most uninspired model rigidly fixed for a long sitting, with her head in a photographer's head-rest. Such a study smacks far more strongly of the studio than of child-feeling or child-life, and I have certainly seen many a child's photograph which has aimed higher, and hit nearer the mark. Colour and technical ability are not everything in a work of art, although many of our modern painters appear to believe that it is.

There is, however, a picture by Millais which, while wonderful for display of colour and great technical ability, is also marvellous as a bit of pictorial story-telling. It might, however, as well have been a family group of portraits as a picture-subject, and I venture to add an illustration from it—a slight sketch from the figure of a girl seated in a child-like, contemplative attitude beside the couch of a sick ornithologist. The grouping in this very fine painting is most masterly, and I shall probably add another sketch from it to a paper I am preparing for these pages on grouping in portraiture.

◆

A FEW FALLACIES.

(From an Old Photographer's Note-Book.)

The nervous sitter.—"I always sit so much better without that thing (*i.e.*, the head-rest) at the back of my head."

The short-legged sitter.—"I always take better standing."

The squinting sitter.—"Looking up—straight towards the spectator, you know—is the best view of my face."

The fashionable lady.—"The portrait is not a good one, because the dress doesn't come out as well as I expected."

The vain sitter.—"Oh! I think it's very bad, and none of my friends like it. They think it does not do me justice."

The snub-nosed sitter.—"Please take me in profile; that suits me best."

The sitter with the washed-out eyes and straw-coloured eyebrows.—"I don't like the portrait at all. Surely my eyes should come out better than that."

The unreasonable sitter.—"Yes; I've had a couple of sittings, but you do not mind, of course, giving me another without extra charge?"

The dissatisfied sitter.—"Oh, I've not the slightest fault to find. But if you examine the photograph carefully, you'll find that my left foot is too large, and the little finger of my right hand has got an awkward crook in it, and that fold in the trousers is very ugly, and somehow my head's on one side, and one eye seems larger than the other. Still, the photograph's a very nice one, and, as I said just now, I'm not complaining in the least."

The plain sitter.—"I've brought a photograph of Mary Anderson for the pose I wish to be taken in. I'm considered very like Miss Anderson."

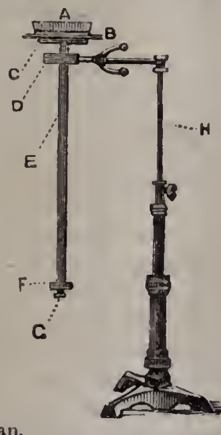
The self-opinionated sitter (after throwing himself into a sprawling attitude all over the chair).—"There, that's something like how I want to be taken—easy and natural, don't you know. None of your artificial fancy poses for me. Doesn't this (stretching out his legs a yard and a-half apart, and thrusting his hands deep in his trousers' pockets) look better than holding the eternal book."

Nearly every mother.—"My children never give any trouble in being photographed."

◆

A ROCKING STAND FOR THE DEVELOPING DISH.

L. W. Felt, of Chicago, sends to the *Photographic Times* a description of a rocking table which he uses in his dark-room, for holding his dishes while developing. The rocking motion keeps the developing solution flowing over the plate evenly, and allows attention by the photographer to other duties.



A—Developing pan.

B—Top, made of wood, large enough to hold any size pan—say, 14 by 16 size.

C—The arms, welded to pendulum, with screw-holes that allow the top to be fastened firmly in its place.

D—A round rod of iron, flattened at one end to go into the jaws of ear-clips in head-rest, to hold it to its place and make a home for the pendulum.

E—The pendulum, made of bar iron, flat, wide enough to allow for hole being drilled to pan on arm clutched in ear-piece of head-rest, the hole being bored large enough to allow the pendulum to pass two inches or more on the rod, and with sufficient play to prevent binding.

F—A common split weight of, say, 4 lbs., that rests on the bottom ledge, G, of pendulum bar.

H—A tall head-rest, of any make.

◆

AN ELECTRICAL STANDARD FOR MEASURING LIGHT.*

The mode of testing the candle power of each lamp is to first set the hinged pointed foot arbitrarily at some number on the millimetre scale, then to turn on the switch of battery M, and gradually slide the wheeled collar from the extreme right hand end of rod No. 1 to the left, until enough resistance is cut out to make the intensity of the light from the lamp equal the light of a standard candle, and at the same time to see that the reading of the galvanometer is zero.

The average of a large number of photometric readings is taken to determine the uniformity or the intensity of light emitted from the standard candle.

In view of the differences in the lamps, each one is marked with a special number, which is the separate test, as was shown on the millimetre scale, when it was originally tried, and is to be used when the lamp is put into the main circuit of battery M, in the manner previously described.

The electrical standard of light thus obtained is far more constant and reliable than that obtained from the standard candle, in that all variation of the flame or the uncertainties of the wick are avoided. The galvanometer employed is of the ordinary pattern, having an estimated resistance of about 500 ohms.

As soon as any blackening occurs on the interior of the globe, or even before it, which is due to the gradual destruction of the carbon film from long use, the lamp is removed and a new lamp substituted.

The lamp, when employed in making the photographic tests, is used but a few seconds at a time, and it is estimated one lamp will, on this account, be good for several thousand tests before the variation of the light will amount to more than one per cent.

Much credit is due to Mr. Edison and his assistant in working out the practical details of the apparatus, and the simplicity and delicacy by which the resistance is employed to control the current of the variable battery is especially commendable.

So delicate is the balance that the resistance of a quarter of an inch of the resistance wire can be read on the galvanometer.

The application of the light in testing the sensitiveness of photographic dry plates may be described as follows:—A sensitive dry plate is placed in contact with a Woodbury carbon screen, such as is used in a Warnerke sensitometer, in a plate-holder, and the latter is set into a groove at one end of the testing box, the slide protecting the plate from all light, then being withdrawn, as shown in the engraving. The electric lamp is then placed so as to be opposite the centre of the screen, and 24 inches therefrom. The switch putting the battery M in circuit is now turned on, and the light emanating from the lamp is allowed to act upon the screen for twenty seconds; it is instantly stopped by turning off the switch.

The sensitive plate is next removed from the plate-holder and placed in a developing solution of a given strength for five minutes, and it is then taken out, washed, and immersed in a fixing bath of hyposulphite of soda until the bromide of silver film, unacted upon by the light, is dissolved out. It is again washed, and when dry, is laid film side down upon a piece of white paper. The highest number on the finished negative which can be seen represents the sensitiveness of the plate, and by means of comparative tests the relative sensitiveness of different plates is thus easily determined.

A sensitive plate showing a reading of 25 will be regarded as having an extreme degree of sensitiveness; and other things being equal, such as freedom from fog in the film, will be excellently adapted for taking instantaneous pictures. One showing 14 would be considered very slow, but excellent for copying or for ordinary landscape work. Nearly 200 tests have been very successfully made with the lamp, and it forms a valuable addition to the photographic laboratory. In addition to its application to photography, the light may be used for many other purposes, such as comparative photometric tests with other kinds of illuminants. It forms a ready and convenient standard for use in the laboratory, or even for use in gas-works, and is an improvement which has long been sought for.

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* Continued from page 332.

Mr. Edison and the Society of Amateur Photographers are to be congratulated on their success in at last having found a practical method for the more exact measurement of light. It is a matter of scientific interest to the community at large, and is well worthy of the attention of all who are in search of standard light.

Notes.

As a photographer of the animals in the Zoological Gardens, Mr. T. J. Dixon stands pre-eminent, and practically without a competitor. Our supplement of this week gives four examples of his work, and they are four out of a series of several hundred. Artist-painters have made extensive and good use of Mr. Dixon's studies, but generally without acknowledgment.

Every one, be he traveller, explorer, special correspondent, scientist, or what not, now includes a photographic apparatus amongst his *impedimenta;* and ere long a critical public will not be satisfied if the story of his doings which each of these has to tell on his return is not copiously illustrated with photographs taken *en route.* It will soon be quite useless for a traveller to use the long-bow, for he would be expected to duly produce negatives of everything that he has shot with it. Descriptions of hairy men-monsters, such as Paul du Chaillu brought back from Africa, will be laughed at, if confirmatory cartes are not exhibited. Exploring, thanks to photography, will be transformed into an exact science.

Seeing that our £70,000 Raphael is already cracking in a most decided manner, and that blisters are developing on its surface, would it not be well for the "Society for Photographing Old London" to secure copies of this interesting work before it is lost to the Metropolis and the world for ever? It can scarcely be called a relic of Old London, it is true; but under the special circumstances the Society named would doubtless strain a point, and include it with their other more purely metropolitan relics which are doomed ere long to destruction.

A Methodist Episcopal clergyman in Kentucky has started what may be called an Album Register, and is, in every case of a wedding or christening, placing the *cartes* of the principals in the ceremony, opposite the entry of its performance. These photographic annals of his labours will in time doubtless become interesting.

Once more we hear of cheap magnesium; it being said that the Schering Company, of Berlin, are supplying the magnesium powder at 100 marks the kilogramme—say 45s. a pound. If this is true, portraiture in the evening should become easy and economical.

The Derby Photographic Society—which is a year old this week—now consists of seventy-eight members; the President being Captain Abney, and the Secretary Mr. Fred. W. Simpson.

Mr. N. W. French, who was introduced to a London public at St. Andrew's Hall, Newman Street, last Thursday, is not only an American author and lecturer of note, but a most successful photographer. His lectures are, indeed, profusely illustrated by photographic views taken by himself, and displayed on a screen as he talks; and they may be probably taken as types of what the lectures of the future will be.

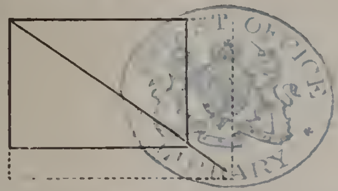
We alluded recently to the enterprising Boston lessees who are having their audiences photographed *en masse* every night; but we have since read, also in an American paper, of a member of a theatrical audience returning the compliment by endeavouring to photograph the principal actors in the more striking situations they took part in on the stage. The gentleman who was caught in the act asserted that he was only taking the actors for his own amusement; but, as there is a suspicion that he was taking them with a view to the amusement of others (it being suggested that he was photographing the situations with the intention of bringing out a pirated version of the play), the incident is to be made the subject of legal proceedings.

Mr. S. Bidwell read a "Note on the Action of Light in Diminishing the Resistance of Selenium," at the last meeting of the Physical Society. It is this action which determines the principle of the diaphote, by which photographs can be more or less perfectly transmitted by telegraph.

The French are generally credited with a love for the morbid. They seem, however, to have had the good taste not to favour very highly M. Bumat's photograph of Victor Hugo taken after death. Wooden fans, bearing on them photographic copies of this portrait, have been hawked about the streets of Paris during the week, but, according to a correspondent, have not found a ready sale.

If an enterprise contemplated by a London firm be successful, we are within a measurable distance of illustrated daily papers. From a circular which has been issued during the last few days, we learn that the patentee of what are called "type-photographs," proposes to supply newspapers with blocks, so that any editor can, if he pleases, enliven the pages of his paper with pictures which, if not very artistic, will be accurate. To quote the circular, "portraits and scenes of general interest will be produced regularly as the events of the day bring them into public notice, and lists of those on hand will be published for the information of customers, so that they can exercise their choice." The patentee proposes to begin the manufacture of type photographs in a few weeks at central works in London. It must be confessed that the specimen portrait which accompanies this circular is not much better than an exceedingly rough woodcut, but in cases of exceptional interest, newspaper readers are not very critical so long as the likeness is preserved, and these "type-photographs" may answer.

Artists who make drawings which are to be reduced by photography are sometimes puzzled how to arrive at the exact measurements which, when made smaller, will result in a photograph of a given size. The plan, however, is a very simple one. Supposing the photograph required is to measure eight inches by six, all that is necessary to be done is to mark off a parallelogram eight by six, and bisect it by a diagonal. This diagonal, if prolonged, will give proportional or homologous parallelograms enlarged to any size the artist may desire. The above figure will explain what we mean.



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M. Feyen Perrin, the painter of a very pretty picture of a fisher girl in this year's Salon, is more fortunate than Mr. Rossi, the artist who was lately charged by Mr Vander Weyde with infringing the copyright in a photograph of Miss Mary Anderson. Mr. Rossi's defence was that another lady sat for the supposed portrait; the magistrate, however, held there had been a colourable imitation of Miss Anderson's photograph, and ruled against him. In the case of M. Feyen Perrin's picture it was alleged by a merchant that the portrait of the fisher girl was the portrait of his wife, and he insisted upon the artist altering the face. This M. Feyen Perrin did, but not sufficiently to satisfy the husband, who demanded that the picture should be removed from the gallery; ultimately the matter was referred to arbitration, and the decision was that the picture did not resemble the lady in question, and therefore it should be allowed to remain in the Salon. The point opens up some rather curious reflections. Resemblances in features are by no means uncommon, and one scarcely dares to imagine what would be the result, supposing a jealous husband detected the likeness of his wife in any of the Royal Academy pictures, which have recently so excited the indignation of the "British matron."

A photographer who numbers among his pupils several ladies, was startled the other day by one of them—a lady of a decidedly uncertain age—speaking of the camera *limbs.* She was far too modest to say "camera legs." After this we should not be surprised to hear of such refinements as fo-*cursing* for focussing, *demon*-oper for developer, and pyro-*girlic* for pyrogallic!

It will be well if the hosts of candidates who have been let loose upon the Metropolitan constituencies in view of the changes which the Redistribution Bill will bring about enlist the aid of photography. As a matter of fact, electors just now are terribly confused and puzzled how to identify the various aspirants for Parliamentary honours. In the late contest for the American Presidency, some millions of photographs of the candidates were distributed, and this method of canvassing is also a favourite one with the Buonapartist section, who, from time to time, issue floods of photographs of the leaders. It is pretty certain that you feel more interest in a man when you are acquainted with his features, and we fancy that a judicious expenditure in the way of photographs would be a profitable investment on the part of any Parliamentary candidate, especially if he be at all presentable.

Photography is often the means of revealing some very awkward facts. The Empress of Austria, for instance, cannot feel very pleased at her photograph with autograph attached, being one of the objects of curiosity at the sale of the effects of one of the leaders of the Paris *demi-monde*, whose establishment was conducted on a princely scale. The lady in question was an intimate friend of a well-known *equestrienne* patronised by the Empress, and frequently met the latter at circus rehearsals. The "tell-tale image," *Truth* remarks, was forgotten by the *soubrette*, who was careful to empty all the photographic albums of their contents before the world of fashion were admitted to the private view. Thereby much scandal was saved.

Patent Intelligence.

Applications for Letters Patent.

6526. Harry J. Bovill, Grove Park, Chiswick, and John Aloysius Broder, 4, Brunswick Gardens, Kensington, Middlesex, for "The improvement of Horsey and other tobacco pouches, called 'The Album Photo Pouch.'"—29th May, 1885.

6583. John William Ramsden, 2, East Parade, Leeds, for "Improvements in tripod stands for photographic, surveying, and other purposes."—30th May, 1885.

Amended Specification.

12,752*. H. E. Newton (Chardon).—"Printing from engraved plates."

METEOROLOGY FOR PHOTOGRAPHERS.

BY J. VINCENT ELSDEN, B.S.C. (LOND.), F.C.S.

Chapter I.—Introduction—Connection between Meteorology and Photography—Definition and Scope—The Atmosphere: its Extent and Composition.

Perhaps no two sciences are more reciprocally important than meteorology and photography, for while the former receives immense assistance from photography in the various automatic methods of making continuous records of variations in temperature, pressure, and other atmospheric conditions, the success of the latter is influenced in almost every detail by those atmospheric changes which are generally included in the term *weather.*

The two sciences resemble each other, also, in their comparatively recent and rapid development, and in the great field which yet remains open for further advances and future discoveries. It is true that our knowledge of meteorology is rapidly attaining that degree of perfection which almost reaches the power of prediction; but its future progress will depend, in a great measure, upon the assistance which it may receive from careful observations taken at every available spot upon the earth's surface, an assistance which many photographers are exceptionally fitted to render.

With these objects in view, therefore, it will be useful to examine, in a few short chapters, the present state of the science of meteorology, dwelling at greater length upon those points which are of more particular interest to the photographer.

The word meteorology is derived from two Greek words (μετέωρα, λογος), signifying the science of the things above the earth, and in its widest sense it includes all phenomena of the sky, both atmospherical and astronomical. It has been found convenient, however, to restrict the term to those atmospherical conditions only upon which depend climate and weather, although it is impossible to exclude astronomical phenomena entirely, since, as will be seen hereafter, it is the sun which is the chief cause of all atmospheric changes, and the great regulator of every meteorological phenomenon. The motions of the earth, also, claim to be considered, producing as they do the daily and annual variations of such phenomena as depend upon the relative positions of the earth and sun. It will be necessary here, however, to assume that our readers possess sufficient knowledge of such elementary astronomical notions as the movements of the earth, the discussion of which would carry us too far from the scope of the present article.

Since, therefore, the atmosphere is to be the main object of our enquiries, it will be well at the outset to have clearly before our minds its nature and composition.

The atmosphere, which literally means *vapour* sphere, is a gaseous envelope, surrounding and probably conforming to the figure of the earth. Its density progressively diminishes above the earth's surface, and it has been estimated that three-fourths of the whole atmosphere encircling the earth lies within four miles of the surface. Its total height has been variously estimated, but it can be shown that at a distance of seven miles from the earth it is so attenuated that respiration is scarcely possible, at forty miles it is no longer capable of refracting the sun's rays, at one hundred miles it no longer retards meteorites sufficiently to cause incandescence, and at two hundred miles it may be said to be practically absent. Thus, on a sphere of 2 in. diameter the atmospheric envelope would not exceed one-twentieth of an inch in thickness. We must not, however, regard the upper limits of the atmosphere as a sharply-defined surface, for gases have no surface. It appears rather that its height is constantly changing, more atmosphere being accumulated over any locality at one time than at another time, so that the upper limits of the aërial ocean are ill-defined, graduating imperceptibly into space, and constantly being agitated by waves and currents.

Respecting the composition of our atmosphere, it has been proved by many hundreds of careful analyses to consist essentially of two gases, oxygen and nitrogen, *mixed* together (not in chemical combination) in the proportion of 20·9 parts by volume of the former to 79·1 parts of the latter. This proportion, moreover, is not exactly constant. Thus, Dr. Angus Smith has shown that while, near the sea-shore or on the Scotch moors and mountains, the oxygen amounted to 20·99 per cent., in towns, especially in foggy weather, it may sink as low as 20·82, in crowded rooms as low as 20·28, and in mines as low as 20·26. In tropical countries, from some unknown causes, the proportion of oxygen appears to sink exceptionally low, diminishing, in one of the cases observed, to 20·4 per cent. even over the ocean. As regards its variation in altitude, Frankland finds that the composition remains practically constant up to heights of 14,000 feet above sea-level.

Now although these differences in the proportion of oxygen may seem small and unimportant, they are specially worthy of being noticed by the photographer, since even small variations in the composition of the air may exert considerable influence upon the absorption and actinism of light. Besides, a difference of one-tenth per cent. amounts to a considerable quantity when we consider the whole volume of the atmosphere.

But if the variations in the amount of oxygen are small, this is not the case with the other atmospheric constituents, of which the most abundant are *water vapour* and *carbonic acid*. The former of these plays such an important part in all meteorological phenomena, that its consideration will be deferred to subsequent chapters. It will be sufficient to mention here that the average quantity of water vapour in the air of England is about $1\frac{1}{2}$ per cent., and that it usually varies between 4 and 16 parts per 1,000. Carbonic acid—more properly called carbon di-oxide—is generally present in the proportion of 4 parts in 10,000; but this amount increases rapidly in the air of towns and of badly-ventilated rooms. Over the sea its amount is somewhat less, but at high elevations it has been found to be generally greater. The meteorological importance of carbonic acid consists chiefly in its effect in absorbing the sun's rays.

Amongst the minor constituents of the atmosphere, a most important part, from a photographic point of view, appears to be played by *ozone*. This substance, as is well known, is a more active condition of oxygen, and its powerful action as an oxidising agent may possibly exert an important influence upon length of exposure; for Abney has shown that solarization is impossible unless an oxidising agent be present, and that it takes place more quickly in ozone than in ordinary air. In addition to this, ozone, as will be shown hereafter, has a great effect upon the absorption of light in the atmosphere, and its presence has more than once been hinted at as a producer of atmospheric effect in a photograph. Unfortunately, it is very hard to determine accurately the amount of ozone present in the air. Zeuger's experiments gave results corresponding to about ·001 milligrams of ozone in a hundred litres of air; but it is doubtful whether this amount can be taken as representing the general average. Smyth and other chemists maintain that its amount is constant; but the experiments of Houzean and Reiset point to an increase in the proportion of ozone at high elevations, and also with the prevalence of south-westerly winds. Its amount depends also, according to Neuman, upon the electrical condition of the air; and it is believed to be largely produced during the spontaneous evaporation of water. Ozone is absent from the air of towns, being reduced to the condition of ordinary oxygen by the sulphurous acid and organic matter present in such localities. Even here, however, it probably exists at high elevations.

Besides the above-mentioned substances, the atmosphere, especially near towns, usually contains very appreciable quantities of *sulphuric* and *sulphurous acids*, *nitric acid*, *sulphuretted hydrogen*, and *ammonia*. Ammonia, indeed, has been stated to be a normal constituent of the atmosphere at high elevations, although this point requires further confirmation.

Dust-particles and *smoke* are most important elements in the production and persistence of fogs; and as an illustration of the commercial importance of these atmospheric impurities to the professional photographer, the following fact may be noticed. In the year 1880 it was found that Kew enjoyed 150 hours more sunshine than Greenwich, the difference being due entirely to London smoke, which was wafted towards the east by a prevalence of westerly winds.

Perhaps, also, the air is never entirely free from *organic germs;* and even these become of considerable interest to photographers when it is remembered that mildew, one of the great enemies of carbon prints probably originates, in them. Pasteur's researches show that germs of plant and animal life are always present in air, and that these bodeis are the propagators of fermentation and putrefaction. (*To be continued*).

TRIP WITH THE CAMERA INTO HAMPSHIRE.

BY CHARLES ALLAN FERNELEY.

In the village of Froyle, Hampshire, may be found several beautiful studies worthy the attention of both the artist and photographer. The village is divided into two parts —viz., Upper and Lower Froyle. In it are very many picturesque old cottages, principally thatched, of which I am afraid most will, in course of time, have to give way to the modern style, which is not so attractive to the eye of an artist. The lanes here are very pretty, and diversified with trees and old cottages.

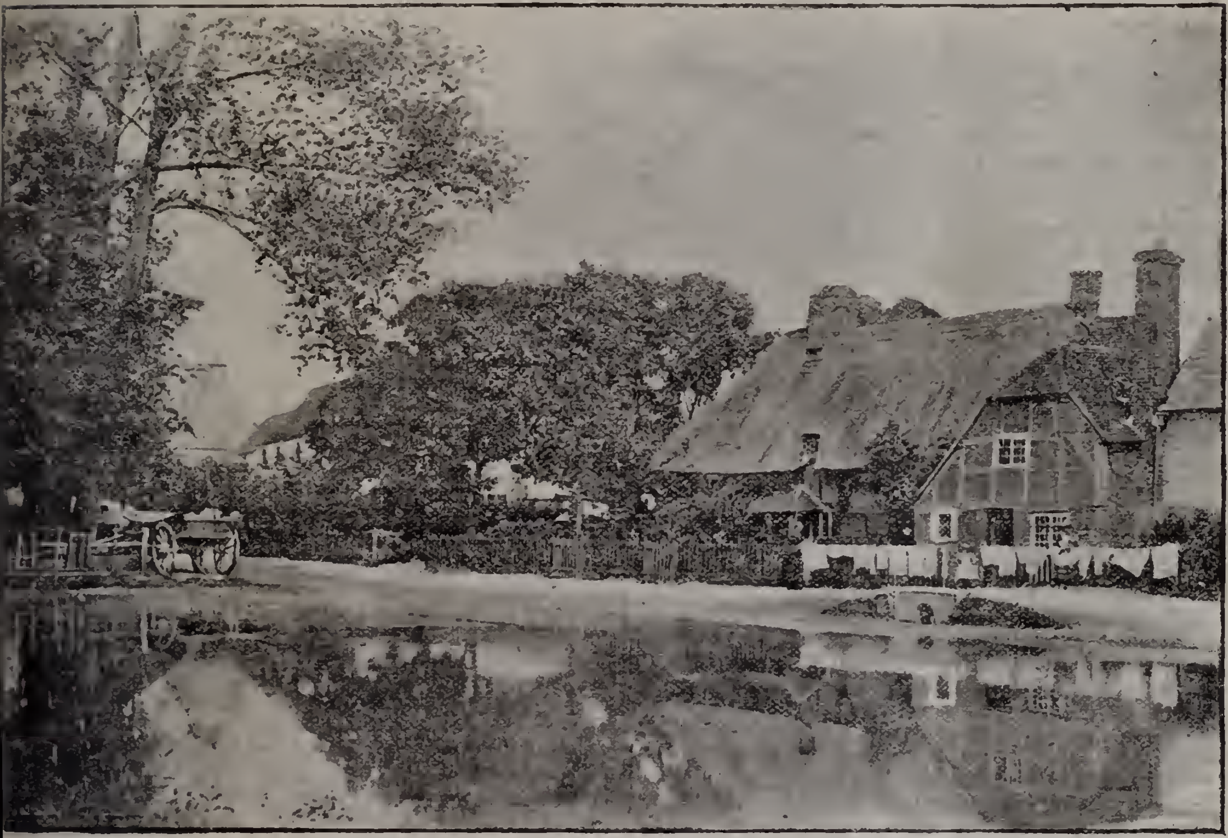
On entering Lower Froyle, on the right hand is a pond, overhung with trees; the road and old cottages casting their reflection into the mirror-like surface, make a pretty picture. The best time is 2 p.m.; good light required.

Near the iron church is a thatched cottage, with overhanging eaves, and shaded by some fine trees, which remind the rustic wanderer of those beautiful lines of Poet Burns:—

> "At length his lonely cot appears in view,
> Beneath the shelter of an aged tree."

Near the Inn are one or two good subjects; for example, a cottage in a garden; and a group by the side of the road with peculiar-shaped gables.

In Upper Froyle, which is distant one mile upon an eminence which overlooks an extensive view, may be found one or two views. The exterior of the church is uninteresting as a photographic subject. The nearest station is Bentley, on the South Western Railway, distance from Waterloo 41½ miles; fare, 3s. 4½d. third class. Distance of Froyle to Bentley, 3 miles. Carriages can be obtained at Bentley Station.



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THE CRUISE OF THE *CEYLON*, 1885.

A Voyage to the Spanish Main with a Camera.

BY NORMAN MAY.*

Passing Tobago, said to have been Robinson Crusoe's island, and where the Tobagoans will still show the veritable cave, we soon ran into the discoloured water supposed to proceed from the many mouths of the Orinoco. Sticks, trees, cocoa-nuts, mingled with weeds, were floating here, and as we neared the Bocas we passed thousands of curious jar-shaped anemonæ, and saw our first shark as he scuttled hurriedly from under our bows.

Sailing now over a glassy sea, we cast anchor in the harbour of Port-au-Spain, the capital of Trinidad. In Trinidad is to be seen the greatest curiosity of the West Indian Archipelago—the far-famed Pitch Lake, a natural phenomenon such as exists nowhere else in the world. The landing place for Pitch Lake is at La Brea, a more wretched-looking place than which it would be difficult to imagine. The ship anchors in pitch, the passengers embark on a pitch wharf, the lightly-made wooden houses are built on pitch, and in whichever direction the eyes turn there is nothing but pitch, pitch—boiling or bubbling slowly as it is, it is yet strong enough to bear one's weight while walking quickly across.

At Port-au-Spain we paid a visit to the market, busy and interesting. Picturesque coolies were squatting behind insignificant little heaps of pine apples, mangoes, carrots, and other vegetables and fruits spread in rows on oblong pieces of sacking on the ground before them. Fat, noisy negro butchers and traders, with their uncouth movements, formed a great contrast to the slight, unassuming, graceful coolie. After a little trouble and some explanation by a negro bystander, I was able to persuade a coolie stall-holder that my little camera was not a new kind of explosive instrument, and succeeded in getting a cabinet photograph, which, if not all that can be desired, it is at any rate charcteristic.

One is struck in Trinidad with the variety of nationalities met with in ordinary work-a-day-life. Negroes and coloured people of all shades mingle with Chinese and Indian coolies; while French, German, and English colonists are well nigh as plentiful as the Trinidadians. While returning from the market I felt tempted to endeavour to photograph a perfectly naked, round-bellied little negro boy of about four years of age, who was walking unconcernedly, and in an amusingly unconscious manner, along the pavement; but I knew the moment I planted the camera in front of him he would lose his charm of manner, even if consenting to stand at all.

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* Continued from page 216. Owing to the exigencies of our space we have been obliged to considerably curtail the descriptive portion of the very interesting letters of Mr. Norman May, so that they hardly read so smoothly and connectedly as if left intact. The Madeira section especially was greatly condensed.

The cool open stores or shops in Trinidad have few or no goods of native manufacture, and are filled with English and French articles considerably behind the fashion. Bright-coloured hammocks from the Indians of the mainland of South America, and a few carved calabashes, slippers, &c., were all that our party were able to purchase. One of the ladies was successful in buying some bangles from a coolie woman, but instances of their selling these are very rare, the men taking a pride in bedecking their wives with bangles and rings of all kinds, even to one through the nose. The shopkeepers and others we found arrant extortioners; indeed, during the whole of our cruise the name of the *Ceylon* was quite sufficient to make them put three hundred per cent. on the price of their goods, evidently fancying we were people of untold wealth. That indispensable West Indian institution, the ice house, was a very large and complete establishment, with restaurant attached, and became our *rendezvous* when ashore. Hiring buggies at a dollar an hour, some went to visit the Government House, and Botanic Gardens, in which the house is situated. The drive of about a mile and a half through the town and past the Savannah was very pretty. The streets, as we neared the Gardens, were lined with white wooden cottages of one storey, encircled by verandahs, and embowered in brilliant tropical vegetation. The jalousies being in many cases open, we were able to catch glimpses of the interior arrangements as we drove past.

The Government House is a substantial well-built establishment, beautifully placed in the park-like gardens, and well nigh covered with gorgeously flowering creepers, the sweet smelling jasmine mingling with stephanotis and flowers of every hue twining round the columns of the verandah. Over the well-kept garden beds hovered the many-hued and beautiful little humming birds, darting swiftly from flower to flower.

In the afternoon several of us visited the Blue Basin, a waterfall and rocky basin some nine miles from Port-au-Spain. We had plenty of leisure to observe the interesting peculiarities of the country, as our horse, none of the freshest when we started, on the return journey was either so obstinate or tired, that he several times came to a dead stop. Possibly, like Mark Twain's horse, he only wanted to be left in peace to sleep, and had no jibbing propensities; at any rate, every few yards our black driver had to dismount and pull the wretched animal along by main force. One means of persuasion I had never before seen practised, was adopted by our driver. He turned one of the horses blinkers back, so that the animal could see the whip, and mounting, went through an extraordinary performance with his arms and legs, accompanied by various yells and groans, with the result of, for a time, an accelerated rate of speed.

In course of time we reached Port of Spain, and in the evening I went on board the *Ceylon* for my developing trays, chemicals, &c., and in a somewhat inconvenient bath room, by the aid of a binnacle lamp with a large sheet of cherry fabric thrown over it, I managed to develop my Barbadoes and Trinidad plates, all turning out pretty correctly exposed. I reared the plates on end to dry in my bedroom, and during the night the ants ate large holes in the gelatine film of one negative, rendering it entirely useless; the others I was able to varnish safely on board. I hope the negro lady whom the ants swallowed did not interfere with their digestion.

Next day our party dispersed in various directions, the majority going to the Falls of Maraccas, some thirteen miles from Port of Spain, and much prettier than the Blue Basin. Others, I among the number, chartered cabs, and drove leisurely round the country roads. The cabs in the West Indies are only matched by the horses, both being dirty, unkempt, and in the last stages of decay. Rotten wood, uncleaned and battered lamps, twisted iron-work, and unwashed wheels guiltless of paint; the carriage attached to the small rawboned horse by dirty rotten harness, held together by leather laces, bits of string and wire, will truly describe the state of the majority of the conveyances to be hired in the whole of the West Indies, the carriages in Havana being the cheapest and best.

Leaving Trinidad, we touched at La Guyra, and spent a day at Caraccas, a beautiful town on the Spanish Main.

Steaming northward, past the shoals and fortifications of Port Royal, we anchored near the wharf at Kingston, the capital of Jamaica. The island of Jamaica, the most important British possession in the West Indies, is nearly 150 miles in length, with an average breadth of 40 miles. It is generally of great altitude, the highest peaks of the Blue Mountains reaching 7,105 feet, and densely wooded to the summits. The climate of Jamaica is, of course, from its position, tropically hot; but it is well watered, and cooled by a sea breeze which constantly blows over the island during the day. The soil is remarkably productive and fertile, even to the tops of the hills. The principal products are rum, sugar, and molasses, and excellent tobacco is largely cultivated, though owing, it was told me in Havana, to the imperfect manufacture, very few cigars are fit for the export market. Pine apples, mangoes, bananas, oranges, and all tropical fruits and vegetables flourish, and cattle are plentiful, many oxen being engaged for draught purposes..

Soon after lunch we were rowed ashore in the ship's boats, landing at the wharf adjoining the market. We went first to the dirty Post Office, and next strolled about the town.

Of all the dilapidated, tumble-down looking places we had ever seen, Kingston was the worst. Never well-built, it has, in common with Jamaica generally, been suffering for some years from the state of the sugar industry, and since the great fire of December, 1882, it has borne a still more miserable aspect, a large proportion of the buildings not having been rebuilt.

It would have been amusing, if it were not melancholy, to see a pair of nicely-worked iron gates swinging (at least they had once swung) on huge stone or brick columns of fine proportions, forming an imposing entrance to a narrow path, which, when followed, ended in a one-storied dirty cottage, guiltless of paint or whitewash, and in some instances of window shutters or blinds. Ruined grandeur and decay are everywhere apparent, speaking far more eloquently than words or statistics of the unfortunate state of trade in the island.

After our experience in other parts of the West Indies, we were not anxious to sleep on shore, to be bitten by mosquitos and rapacious members of the *coleoptera* tribe, so went on board to dine, not returning to Kingston that night.

Making an early start next morning, a companion and myself were able to secure a very comfortable carriage and pair, and soon were making for Gordon Town *en route* to Newcastle, the camp of the white troops stationed in Jamaica. For the first few miles there was nothing especially novel or interesting to us, unless we except the natives, who were a continued source of amusement. Whole strings of negresses we met, each bearing on her head her bundle of fruit or vegetables to sell in the market, and sometimes a child with a gourd or calabash of water, nicely poised on her shoulder. We passed, on the right, the racecourse, parched and dry, with a small grand stand, and as we neared Gordon Town the country became more broken and rugged; pretty ravines and streamlets lay below us, while above hovered the peaks of the lovely Blue Mountains, green with vegetation in the foreground, and purple on the distant heights. Bananas and palms gave a cool and pleasant aspect to the dry roads, and the cottonwood and other trees were covered with rare orchids, to be had for the trouble of picking.

Arrived at Gordon Town, we left our driver and carriage at the stables, and mounted ponies for the remaining six miles of our journey. Soon leaving the cool forest glades below us, we climbed the steep and rugged road, in some places a narrow, rough, dangerous-looking path; on one side the grateful shade of leafy boughs, on the other a steep briar-covered precipice, reaching almost perpendicularly down to the rivulet, which softly wended its way some hundreds of feet beneath. Over narrow white wooden bridges we crossed and re crossed the river, now and then passing a group of negresses washing and splashing in boisterous mirth in the cool pools. At one point we had an excellent view of Kingston, Port Royal Harbour, and the distant azure sea, the dangerous shoals at this altitude well marked and defined.

Newcastle was safely reached, and after rambling over the mountain paths, we returned in the cool of the evening, and after a hurried run to the beautiful Bog Walk, by noon next day were steaming out of Port Royal harbour on our way to the Queen City of the Southern States.

(*To be continued.*)

Correspondence.

MR. A. PRINGLE ON JUDGING PHOTOGRAPHS.

Sir,—From the tone of Mr. Pringle's letter one may reasonably suppose that he expected an immediate response, worded somewhat in the following style:—

Andrew Pringle, Esq.

Sir,—We, the executive of the Photographic Society of Great Britain, desire to most heartily and respectfully thank you for taking so much trouble to point out to us the imperfections and failings of our system, and it is merely a matter of form for us to say that your letter of last Saturday's date carried immediate conviction to every one of us. Indeed, so deeply impressed are we with the utter valuelessness of the many years' experience we have had in the management of the Exhibition, and the practical worth of your suggestions, that we hope we may venture to request you to yourself undertake the sole management of the Exhibition of 1885. As it is nearly time for us to appoint our usual exhibition sub-committee, we hope you will reply promptly, and let us earnestly request you—not in our interest, but in the interest of professional and amateur photographers all over the country—to favourably consider our request.

With much diffidence we make the following remarks on your admirable and practicable scheme; but in doing so we fully recognize the circumstance that your decision should be final.

You suggest very properly that each juror should "sign a paper *stating on his word*" that he has examined every frame. It might, perhaps, be advisable for him also to make a statutory declaration or affadavit to the same effect. This would give the public still more confidence; and it might be as well to disqualify for ever any proposed juror who hesitates to make the required declaration.

Your excellent suggestion that all details upon which the awards are based should be open to the inspection of the public, brings to our remembrance the circumstance that up to the present time we have considered ourselves only responsible to our members. Now that we clearly understand otherwise, we will endeavour to "merit the approval" of the public, and from this time forward our minute book will be open to public inspection on each anniversary of the date of this letter.

5a, *Pall Mall East*, *April* 1*st*, 1885.

It is quite possible that such a reply was posted to Mr. Pringle, but one may, perhaps, suppose that it was lost in the post; still, surely one can hardly assume that the Council of the Photographic Society so far failed in their duty as neither to write signifying complete assent to Mr. Pringle's suggestions, nor to write and give him reasons why they cannot carry out his proposals. Probably a mere matter of half-a-dozen extra meetings of the Council might have been sufficient for the elaboration of *brief answers* to Mr. Pringle's numerous suggestions.

A Member of the Photographic Society.

London, *May* 30*th*, 1885.

MR. BOTTONE'S PHOTO-MICROGRAPHS.

Dear Sir,—I have read with much interest the paper on Photo-Micrographs, by Mr. Bottone, in the News of 8th ult., and also carefully examined the sheet of reproductions accompanying it. But whilst acknowledging the excellence of such work done with a French triplet, I must emphatically beg leave to doubt the power of the objective being a $\frac{1}{4}$. Mr. Bottone has most certainly made a mistake in stating the power of his objective, since some of the prints shown on his sheet could not have possibly been taken by so considerable a power, and if they were, they would present a much greater magnification. No true quarter $(\frac{1}{4})$ of French or any other make can possibly cover the foot of a "dung fly" in its field of view. Any microscopist will at once know this to be the case, and any one can readily test the accuracy of my statements by submitting one of those easily procurable preparations to the searching lens of a $\frac{1}{4}$. If he can see the whole of the foot at one view, thus magnified 250 diameters, I will gracefully acknowledge my mistake; and if he does, it will certainly present a very different appearance to the print as fashioned in the News.

As before stated, Mr. Bottone's work is most excellent to have been executed with any French triplet, but most assuredly it was not done with the power of an ordinary English or American $\frac{1}{4}$. My measurements are in every case made at the time of taking each exposure, most carefully, with an accurate stage micrometer, and can be relied upon as correct.

Regretting that the pressure of other duties this week prevents me from mounting any of the prints sent herewith, or of even toning some of them, I am, yours respectfully,

W. H. Walmsley.

Philadelphia, *May* 20*th*.

DISTORTION IN PAPER POSITIVES.

Sir,—It is a good old adage which enjoins being always sure of the facts. Now, in 1858, the highly-glazed or "tea-board" photograph was an unknown quantity. In those days we were content with a paper glazed by white of egg without admixture of other substances, until 1858 or 1859, when a foreign production was placed on the market professing to work on an immoderately weak silver solution, and possessing a higher gloss than we had hitherto been accustomed to. The English markets were not slow to adapt themselves to the new requirement, and that they succeeded without injudicious admixture, let the out-put of Spencer amply testify. But the "tea-board" epoch, the "enamel" stage, was a development reserved for the latent ingenuity of a progressive (?) age, Mr. Debenham on the contrary notwithstanding.

The reference to the Photographic News, Vol. I, p. 168, requires amplification. A photograph printed on some of the foreign paper above referred to would be liable to distortion because the glazed surface had not been and could not be thoroughly coagulated by silver, and this because the aforesaid surface or glaze was not composed of pure white of egg. In proof of this it is but necessary to recal a common experience of the time when prints on this foreign preparation, suspended at the corners to dry, would permanently adhere if suffered to be in contact, whilst proofs on paper prepared with pure egg, and suspended in a similar manner, would part of their own accord as the moisture evaporated from them, and this simply because the surface had been absolutely coagulated, and adherence was an impossibility. The paper prepared by Mr. Horne, brother of Mr. Horne in Horne, Thornthwaite, and Wood, can be referred to as the basis of these remarks.

A glaze into which gelatine enters as a component part cannot receive this perfect coagulation by silver, and when the support or paper on which this imperfectly coagulatic glaze rests has been saturated with water, it is very easy to perceive how glazing material and support should give way with the structure of the paper in its weakest direction; but this cannot be pronounced a case of enlargement by expansion.

The carbon tissue is not to the point: here we deal with a certain portion of gelatine rendered insoluble to a particular depth of its surface, and treated on a rigid base, as of glass, or a support the texture or pores of which have been filled up so as to withstand moisture.

The "true cause of distortion" undoubtedly lies in the fact, as Mr. Debenham asserts, that the paper while wet expands in one direction—that is to say, in its weakest direction; and the obvious remedy for this true cause of distortion is to place upon the paper a surface that will be sufficiently strong to resist an expansive tendency. Such a surface is to be found in the pure white of egg thoroughly coagulated by silver. Gelatine is admittedly elastic, and it must as a consequence give way with the tendency to expansion on part of the paper. Gelatine and albumen are likewise elastic, but no albumenizer will be rash enough to assert that "pure white of egg duly coagulated with silver is an elastic surface," and it is this non-elastic surface which alone should be employed by those photographers who value reputation, and who are above the "tea board" school of art.

In one brand of paper, noted for its "surface," prints thereon shall give evidence of contraction when dry and before mounting: how is this consistent with cardboard theories and starch mountants? The prints have not yet been subjected to these treatments. Again, another albumenizer's work shall be tested; the surface is not what is termed "extra brilliant," but it is pure egg, and it shall not be possible on this make to produce a single example of distortion; the paper itself, in both cases shall be Rives. It is not the paper makers, but the paper "glazers," who are in fault. It is right to add that this extra surface paper was not dreamt of in 1858; its reference therefore to the News of that date does not affect the contention. There may have been slight evidences of contraction on the foreign material, but nothing approaching the mobile proportions of our own times. We did not, in the earlier days, attempt to produce a surface of glass on such a substance as that of paper; we drew the line at "tea-board" art. J. Harris.

A PRACTICL WAY OF MAKING PAPER NEGATIVES.

Sir,—Having long been firmly convinced that the use of glass as a support to the gelatino-bromide film was by no means a necessity, I have made numerous experiments with a view to dispense with its use, and have at last succeeded in doing away with what has for so long been a source of breakage, weight, and anxiety to the tourist.

I take a French paper free from grain, and coat it with the same emulsion as is used for glass plates. Then, cutting this paper into pieces half an-inch longer in one direction than the nominal size of the plate about to be used, I take a piece of thin ferrotype iron, and cut it to the size of the nominal plate. I lay the piece of sensitive paper down on the face, and place the ferrotype iron on the back, allowing the paper to project a quarter of an inch on two opposite sides, which I turn back over the ferrotype plate. I then take a short stiff camel's-hair brush, and with a little liquid fish glue (which is always ready for use) I glue these ends of paper on to the iron plate, and allow it to dry. You now have an iron plate coated with a gelatino-bromide film, which can be used in every respect as though that film was on glass, and on it you may get every detail as you would on the other. Develop with ferrous oxalate, *well restrained with bromide*, and largely diluted with water, as though it were a glass plate, and with a little patience you will get a negative with all the results you could wish. I can only say, try it; do not be deterred by theoretical objections. Remember that you here have everything for a picture that you have on a glass plate (save the weight and risk of fracture); and take my word for it, when you come to print from the paper negative so obtained, you will find nothing more objectionable than having to be a little longer than if your negative was a glass one, and I am sure that glass being dispensed with will more than compensate for that. I enclose you a specimen of a negative taken yesterday.—I remain, yours obediently, J. B. Holroyde.

[The examples sent by our correspondent (negative and print) are excellent, and although small, are remarkably detailed, and show no trace of the grain of the paper. We should like to have further details, especially as to the source of the paper used, and the means adopted for coating it with emulsion.—Ed. P.N.]

EXPOSING TO LIGHT AFTER DEVELOPMENT AND BEFORE FIXING.

Sir,—A paragraph appeared in your paper a few weeks since to the effect that it is not injurious to expose a negative to daylight between development and fixing. A little consideration will show that this practice, though common, is a very injudicious one. If the film retains any trace of developer, it is certain that exposure and development will go on together; even if the film is entirely freed from developing solution, the fixing bath may contain a little carried in by previously fixed negatives, and then development and fixing will go on together; in either case the brilliance of the negative will be diminished. The accompanying plates were exposed for a few seconds to a north light between development and fixing, a coin being placed upon each. The plate which had been exposed in the camera does not show the mark nearly as distinctly as the other which was developed without previous exposure; but in both the harm done by exposure to light before fixing is clear.—I am, sir, yours faithfully,

Gateshead, May 29th. Edwin Dodds.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 28th inst., Mr. Leon Warnerke in the chair.

Mr. A. Cowan showed a fine series of chloride transparencies to illustrate certain advantages gained by lowering the camera for landscape work.

Mr. A. L. Henderson passed round a business card, printed on thin sheet ebonite; the letter-press, which retained the polished surface, was in relief, the ground work being matt. He inquired how it was produced, and thought the idea might be useful for photographers.

The Chairman said that if a steel plate was etched in the usual way, a sheet of ebonite placed thereon, and subjected to pressure, a similar result would be obtained.

Mr. J. Barker spoke of a difficulty he had experienced in removing some gelatine prints from glass plates treated with white wax in benzole, and attributed it to an inferior sample of wax. Some discussion followed, in which it was advised to employ yellow wax in ether, applying it several times, and finally removing as much as possible before putting down the prints.

Mr. Henderson showed some examples of gelatino-chloride of silver printing on opal, paper, and glass (transparencies). The emulsion films, which were very vigorous, contained only 4 grains of silver to each ounce.

The question, "How to dry a bottle quickly," was answered by several members, who advised rinsing with alcohol, followed by ether, and the air driven off or exhausted.

The Chairman drew attention to an image of some printed matter which appeared upon the development of a gelatine print. This he had found to be due to light reflected from the paper padding used in the pressure frame; he had also seen a similar result when using very thin albumenized paper, and thought many transparencies were fogged by the non-employment of velvet backing.

Another question was then read as follows:—"Why is it that negatives exposed to light immediately after development take a longer time to fix?" Some doubt was expressed whether this was really the case.

Mr. W. Cobb had found it to be so;

And the Chairman remarked that some collodion emulsions exposed to light would not fix at all.

Mr. A. Haddon considered those portions of a plate that were exposed to light liberated bromine, and thus tended to make the gelatine more insoluble than the other portions, and consequently less permeable to the fixing bath.

A discussion then took place on Kelp, Lichens, and Gelatines, in which their respective solubility, setting, and drying properties were considered.

Some of the preparations from sea weed, the Chairman remarked, were largely used in the manufacture of confectionery, and were worthy the notice of photographers. Agar-agar, said by Mr. W. H. Harrison to be prepared from Ceylon moss, was stated to lose its setting properties in the presence of an acid; it required a high temperature for melting, and it could only be dried by the prolonged action of dry air, after which it would not swell as gelatine does. One speaker found this substance decomposed silver-bromide without the action of light. The discussion then turned to the subject of concentrated *versus* dilute fixing baths, the latter being found more energetic than the former.

Mr. Haddon thought the reason why a saturated solution of hypo acted in the manner stated was due to the affinity between the salt and the water being greater than the water for the gelatine; thus it happened that a plate might remain some time in a strong solution without swelling.

Birmingham Photographic Society.

A meeting of the above Society was held on May 21st, at 20, Paradise Street, W. T. Harrison, Esq., in the chair.

The report of the provisional committee was read and adopted.

The rules were next put forward for discussion, and were, with the exception of a few alterations, passed—That on and after July 1st next, gentlemen joining the above pay an entrance fee of 5s. Applications for membership to be sent to the Secretary, 43, Bull Street.

The meeting adjourned to June 11.

Liverpool Amateur Photographic Association.

The monthly meeting was held on the 28th May, Mr. J. H. Day in the chair.

The minutes of the last meeting were read and confirmed, and Messrs. Johnson Cook, J. Macdonald Bell, and Paul Lange, elected members.

The Secretary brought forward the business arising out of the minutes of the previous meeting, the first matter being the question of following in the steps of the Oldham Association. The Secretary suggested that steps should be taken to ascertain the views of the various other photographic societies, in order that by combination the various railway companies might be approached with more effect, and ascertaining if the President and Secretary of each society would sign a petition, naming the number of members, so that the request might carry weight. This suggestion was approved.

The next topic discussed was with reference to the substitution of prizes for the certificates annually issued to winners in the eleven competitions decided annually at the November meeting, and a resolution to the effect that for this year the money prizes remain unaltered, and that the Council be asked to consider the substitution of autotypes for the customary certificates, was carried.

The next business was the appointment of delegates to the Committee of the Annual Associated *Soiree* of the Learned Societies of Liverpool, the Council being authorised to renew the annual guarantee and appoint delegates.

A proposal from Mr. Beach, the President of the New York Photographic Society, with regard to the exchange of negatives for lantern transparencies, was named by the President, and it is to be brought more fully before the members later on.

The President then called on Mr. G. E. Thompson to exhibit a collection of views taken by him during a recent trip to the Mediterranean.

Mr. Thompson gave a brief account of his journey, illustrating it by two large albums filled with over two hundred views of the most artistic character. The members were greatly delighted with the number of splendid pictures, about 15 by 12, which adorned the room, and which were a source of pleasure during the whole evening. Some of them were taken under circumstances of peculiar difficulty.

The Secretary then opened the question-box, and a series of questions of photographic interest were read and answered. An exchange book was brought into notice, in which members entered the details of photographic apparatus which they desired to dispose of by sale or exchange.

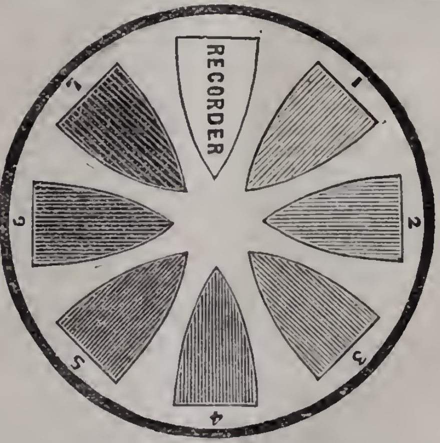
Amongst the exhibits of the evening were some views taken at Anglesea by Mr. Lange, and in the neighbourhood of Spital, by the Secretary. A series of exquisite large transparencies for window decoration, on plates developed with soda, were shown by the Rev. H. J. Palmer. A sliding metallic tripod was exhibited by Mr. Archer, and met with approval.

◆

Talk in the Studio.

Photographic Society of Great Britain.—The last ordinary meeting for the present session will be held on Tuesday next, June 9th, at 8 p.m., at the Gallery, 5a, Pall Mall East, when Mr. J. R. Sawyer will re-open the discussion upon Mr. Bird's paper, "On the Reproduction of Pictures in the National Gallery," and exhibit illustrations of recent discoveries in the photographic reproduction of colour; and Mr. Leon Warnerke will read a paper "On the New Sensitive Paper as a Substitute for Glass."

Green and Fuidge's Actinometer.—This is a small dial showing a scale of tints gradated from light to dark, and between the extremes of the scale is an opening behind which a piece of standard sensitive paper is exposed. By noting the time required to darken the paper, so as to make it correspond with any given tint, a very good notion may be formed of the exposure required. Of course, the results, in the first place, are purely relative; but the user soon learns to judge exposures by the actinometer readings. The apparatus may also be used by the carbon printer as a guide for exposure.



Mrs. Nottage, the widow of the late Lord Mayor, has received an intimation from Mr. Gladstone that, in acknowledgment of the position and services of her respected husband as Lord Mayor of London, the Queen has sanctioned her assuming the title belonging to the wife of a knight.

Mary Anderson's portraits have been getting more photographers and painters into trouble in England, as Mr. Vander Weyde seems determined to protect his rights, and at the same time work a pretty good advertising scheme, as he gets lots of free notices in the papers. It proves one thing, that the copyright laws in England will protect a photographer against pirates. —*The Eye.*

Obtaining Portraits for Papers.—How are the pictures of the "prominent" men and women obtained? This is a question not easily settled by the curious who know not the mysterious ways of the newspaper world. In the case of the men, a resolute young man goes boldly to the individual in demand, and asks for one of his photographs. If he is a politician, an author or actor, or before the public in any professional capacity, he knows that the publication of his portrait will be to his advantage, and he generally gives a cordial assent, coupled with his thanks, and takes some pains to secure a good photograph. Indeed, he sometimes overdoes the matter by sending around a photograph as big as a sign-board, in the belief that the more imposing it is, the more splendid will he come out in the contemplated cut. If he is a society man he deems it wise to demur at first, but never holds out long. Doesn't mean to when he begins. Sometimes he says he hasn't a decent photograph of himself, the only one he knows of is in the possession of his friend, Mr. Jenkins, and he supposes he wouldn't give it up. The solicitor takes the hint, and goes to Mr. Jenkins for the photograph, and gets it. The methods of obtaining photographs of women in society are more circuitous. Usually the photographer is called upon. Very often he refuses to surrender a picture, but he does not remove it from the sight of the seeker after celebrities, who probably makes a sketch of it while resting on the showcase and talking to the photographer. A daily newspaper of this city published a page of prominent churchwomen. It obtained them by sending an artist to church, who sketched them in their Sunday bonnets, "taking them unaware," as it were. The opinion prevails among newspaper artists that ladies object more from fear of being mangled in the picture-making process than from other motives. —*The Lithographic Printer.*

Photographing Criminals in Russia.—Of late the photographing of convicts has been receiving the attention of the Chief Commissioners of Prisons, and the result is an order to engage a photographer on the Civil List, whose duty it will be to photograph all prisoners and vagabonds sentenced to Siberia. This will be done at the central convict prison in Moscow, where the prisoners are collected from different parts of the Empire to be sent off in gangs to Siberia. The average yearly transport through Moscow is between 1,500 or 2,000 convicts, and 750 to 1,000 vagabonds and vagrants of both sexes. As regards the photographing of prisoners in those parts of the Empire where no Government photographer exists, the Commissioners of Prisons have asked the governors of the several provinces whether it will not be possible to have that carried out by private photographers free of charge—a rather naive request—or, at any rate, at the prime cost of the materials. Up to the present time it has been possible for convicts to change their names on the road, especially if they resembled each other; then, if either effected an escape, he could never be identified, because the passport remarks would not correspond to the person. Now the papers with the transports will have photographs attached in addition to the passport, and a duplicate copy of each will remain at the prison for future use if required.

Photographic Club.—The subject for discussion on June 10th will be "Toning Ready-sensitized Paper." The Saturday outdoor meeting will be held at Pinner: trains from Baker Street at 2.29 and 2.59.

◆

To Correspondents.

*** We cannot undertake to return rejected communications.

R. M. M.—There is no book on the subject, but articles have appeared from time to time in the Photographic News and the Year-Books.

Ignoramus.—When one says that the equivalent focus is so many inches, it means that this is the distance from the optical centre of the lens at which the image of a distant object (let us say the sun) is formed with a maximum of sharpness.

F. W. S.—That of Warnerke is usually employed, and, considering everything, it is probably the most convenient in use.

Florence.—1. Dissolve carbonate of soda in warm water, and add citric acid gradually until the solution is neutral to test paper. Evaporate until the salt shows signs of crystallisation, and allow it to cool. Collect and dry the salt that separates. 2. The varnish sold at the oil shops under the name "Crystal Paper Varnish" answers very well, and dries with tolerable rapidity.

Photographist.—They doubtless arise from contact with metallic particles.

Shutter.—1. We think it will act quite quickly enough for your purpose, and is very suitable for the work. Those you mention afterwards are not so suitable. 2. It is difficult to suggest any reason for the difference in colour, but sometimes a very trifling circumstance will make a difference in this respect.

G. Bender.—It is not by any means easy to trim the prints with scissors; the usual method of trimming with a sharp and somewhat pointed knife being much preferable. An accurate straight-edge of metal or glass must be used as a guide for the knife, and when many prints have to be cut to the same size it is convenient to make use of a glass cutting shape of the exact size, the knife being drawn along the outside edges of the glass. For trimming with the knife the print may be laid either upon a piece of thick cardboard, or a sheet of stout zinc. Plate glass is also very good when extremely sharp and clean cut edges are required; but it tends to blunt the knife rapidly, and at the same time it is liable to become scratched.

Beginner.—You have much under-estimated the difficulty of becoming a photographer, hence you are dissatisfied with the progress you have made. Not only are your plates very much over-exposed, but they are fogged by general exposure to light. Discard the cheap and worthless apparatus you have bought, and go to a respectable maker. You should also arrange with someone to give you a few practical lessons. Write to us with respect to any special difficulties you meet with.

Disappointed.—There is no silver in the old developers, which have been used for gelatino-bromide plates; hence your failure to extract any. The waste fixing solutions contain silver, and this may be precipitated by adding a solution of sulphide of potassium. The silver then separates as a black precipitate of silver sulphide, and this may be reduced by fusion with carbonate of soda.

Flare-Spot.—The diaphragm is in the wrong place. Move it outwards about a quarter of an inch.

Amateur.—It has become oxidised and useless by exposure to the air. Make up a fresh batch.

Lex.—Hardly fair to our correspondent; if you wish to say such things, you must at least permit us to publish your name.

Charlie.—The book you refer to is a mere trade circular for advertising goods sold by one particular firm. Obtain Abney's "Instruction in Photography," which is published by our publishers.

Workman.—Make the following solutions:—

No. 1.—Ammonia citrate of iron	2 ounces
Water	8 ,,
No. 2.—Ferricyanide of potassium	2 ounces
Water	8 ,,

Mix equal parts of the two solutions, and float the mixture evenly over one side of glazed paper, after which dry the sheet. These operations must be done in a photographically dark room. Expose under the original until the shadows take a strong metallic grey tint, and fix by well washing in water.

The Photographic News.

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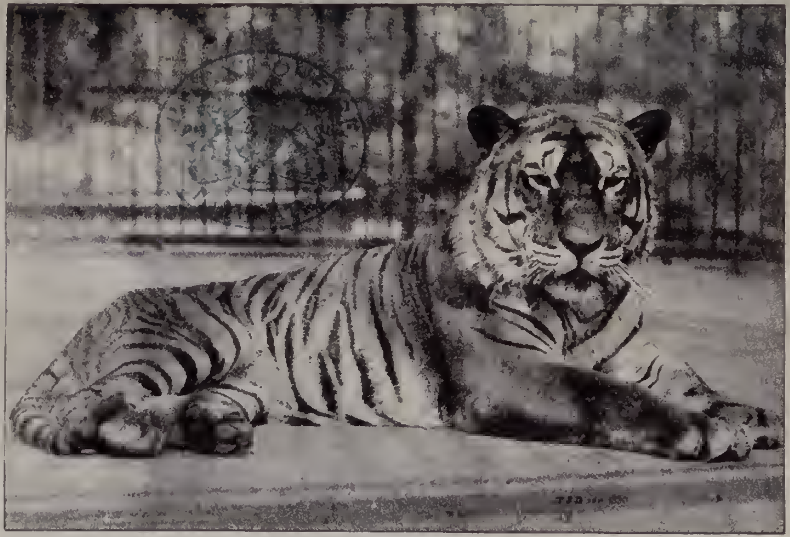

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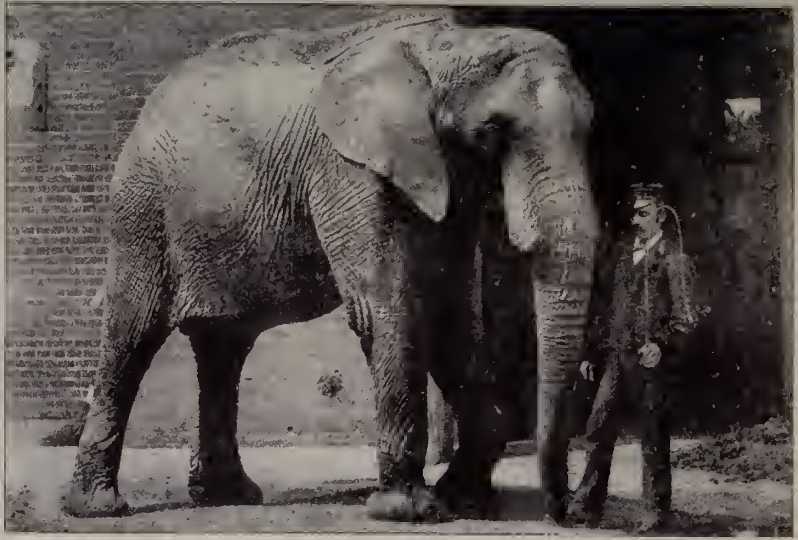

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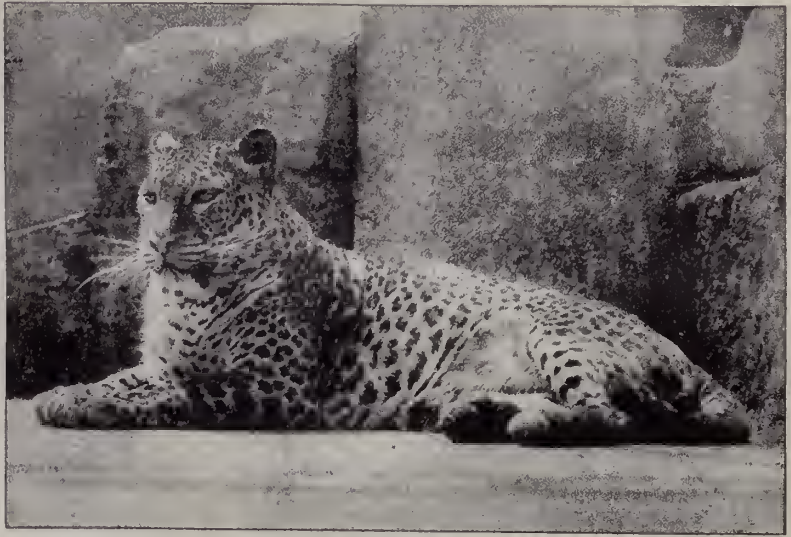

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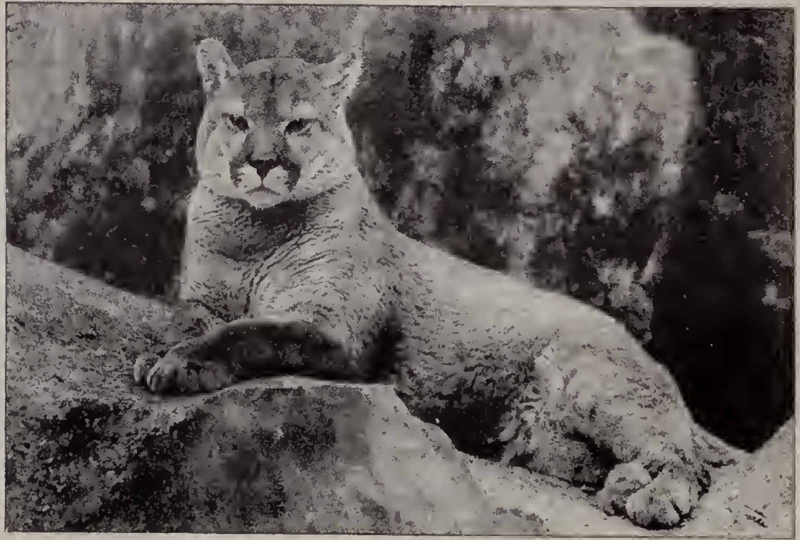

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1397.—*June* 12, 1885.

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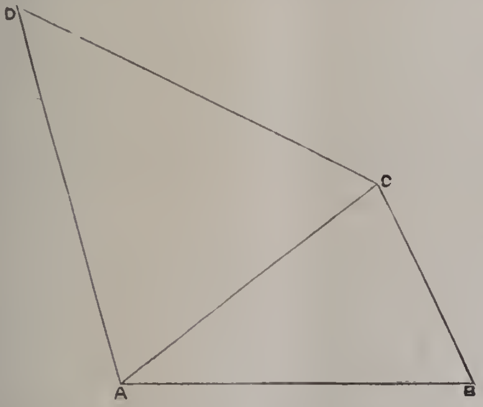
PHOTOGRAMMETRY.

We did not intend to go into a detailed description of any of the methods whereby the positions of points are determined in photogrammetry from the exposed and developed plates, but a communication in the *Photographiches Wochenblatt*, by Herr Stolze, describes one of them so very lucidly that we are tempted to give an abstract of his communication.

Probably most of our readers have an idea more or less definite as to the manner in which points are determined by triangulation in the case of surveying by means of the theodolite. A base line, A B, is carefully measured. To determine the point C, the angles C A B and C B A are measured with the theodolite, when, on the principle that

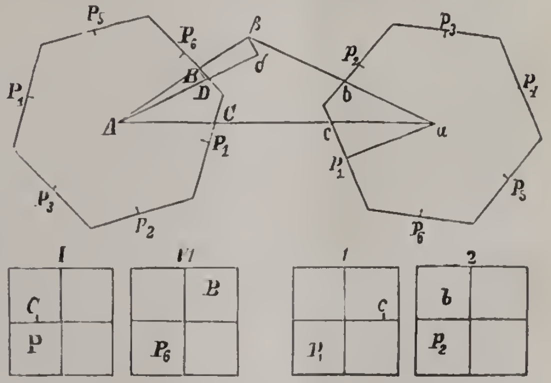


one side and two angles of a triangle being known, the whole triangle can be constructed, the point C can be determined. In the same way A C may, in its turn, be taken as a base line to determine the point D. Another triangle may be constructed on the other side of A B, and so on, indefinitely, one point being determined at a time. Now, there are various objections to this method. It requires two observations for the determination of each point, necessitating, of course, in consequence, continual work in the open air, so that unfavourable weather entirely stops the survey. Again, an error made in the observation of a single angle is repeated indefinitely, and when it is discovered that there *is* an error it is most difficult to trace it.

In the case of photogrammetry all this is quite different. When once the exposures—generally six in number—are made from each end of the base line, no farther out-door work is required to plot down all that is within sight of both ends of the base line. Moreover, if an error is made in reading from the plates, it has effect only in the case of one point, and is not indefinitely repeated.

Whilst the exposures are being made from one end of the base line a staff is fixed to mark the other end. The process is then reversed. It will be understood that the camera is in each case turned through 60° after an exposure, and that the angle included by the lens is such that each picture somewhat overlaps that on each side of it. It will be evident that in the case of each six plates the staff marking one end of the base line must appear in one plate.

The following cut will serve to illustrate the manner in which the construction is performed from the plates. A point A is marked on the paper, and around it is constructed a regular hexagon with the distance from A to any side equal to the focal length of the lens. The sides, P_1 P_2 P_3 P_4 P_5 P_6, now represent the horizon lines of the plates exposed at one end of the base line. The plates are so arranged that P_1 will be that in which the staff appears. It is represented as I in the cut, and C represents in it the staff. The distance from the vertical centre line to C is measured, and the distance P_1 C is set off on the side P_1 of the hexagon. The line A C produced now gives the direction of the base line, and the length of it A *a* is simply set down to scale.



Of the second series of plates we call that which shows the staff No. 1. Here *c* is the position of the staff. A right-angled triangle, $a\ p_1\ c$, is now constructed, in which $a\ p$ equals the focal length of the lens, $p_1\ c$, the distance of the image of the staff on plate 1 from the vertical centre line. p is now the centre of one side of a regular hexagon to be constructed around a, when the sides $p_1\ p_2\ p_3\ p_4\ p_5$ and p_6 represent the horizon lines of the six plates taken from the second end of the base line.

The determination of the position in plan of any object whose image is visible in any two plates is now exceedingly easy.

To take the simplest case possible, a flagstaff is shown in plate VI and in plate 2. It is represented by B and *b*. The distance of B from the vertical centre line of plate VI is now measured. and is marked off on the P hexagon as P_6B. The distance of *b* from the vertical centre line of plate 2 is marked off hexagon *p* as $p_2 b$. A B is now joined, and the line is produced away from the centre of the hexagon. *a b* is joined, and is similarly produced. The point *β*, where the two produced lines cross, is the position of the flagstaff.

The construction A B D, A *β δ*, is to determine the *height* of the flagstaff or other object. It is not necessary to enter into that matter here.

"It is not necessary in the case of all surveys, but merely in the case of those which are topographic, to expose so completely round each end of the base line. In the case of architectural surveys, not more than two overlapping plates are necessary."

It will be evident that by the method described it is impossible to determine the position of points in line with the base line, and that the precision with which points can be determined decreases as an approach is made to this line. For this reason it must be necessary in practice to expose from at least three different points.

SULPHITE AND HYPOSULPHITE OF SODA.

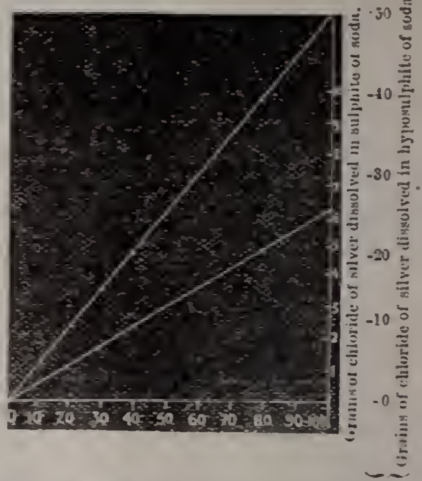
BY CAPTAIN W. DE W. ABNEY R.E., F.R.S.

Last week I treated of sulphite of soda as a fixing agent, but I promised to draw attention to it again in reference to its solvent power on silver chloride, or, more correctly, on silver sulphite, into which the latter is decomposed by the sodium sulphite. I thought it right to compare the solvent power of sodium hyposulphite with the sulphite, so as to bring out the true economical values of the two. I was quite aware that the hyposulphite was much more economical to employ, first, on account of its being cheaper, and second, because it dissolved more chloride. The hyposulphite possesses nearly eight times the solvent power of the sulphite when it is duly estimated, as the following table will show; but it has a trick of depositing crystals of hyposulphite of silver on standing, which reduces its solvent power to six times that of the sulphite.

Solution of Hyposulphite at 60° F.					Grains of Chloride Dissolved.
10 grains per ounce	...	...	...		4·46
20 ,, ,,	...	...	...		9·77
30 ,, ,,	...	...	...		13·50
40 ,, ,,	...	...	..		19·46
80 ,, ,,	...	...	...		39·[illegible]
100 ,, ,,	...	...	...		50·50

The following method was adopted of ascertaining the solubility as being sufficiently accurate. A certain number of grains of silver nitrate was weighed out and converted into silver chloride by common salt. It was washed by decantation, and then added to the solutions of hyposulphite and shaken up, and the undissolved part was filtered out, dried, and weighed, and deducted from the original chloride used. This gives, of course, the amount of chloride converted into hyposulphite of silver. The table shows the results. The effect of mass of the chloride was not taken into account; but it is believed that it would not have given very different results had the relative proportions of the chloride to the solvent been changed.

It was also found that bromide was almost equally soluble in the hyposulphite, an 80-grain solution dissolving 39·85 grains, and a 40-grain solution 19·15 grains. If the above table be calculated out, or, better still plotted out, as in the figure annexed, on squared paper, it will be seen that the solvent power goes almost identically with the degree of concentration, showing that if a solution be diluted there will be no deposit, a very important point in the washing of prints. Should it have happened that either one or the other dissolved proportionally less when dilute, it would have failed as a fixing agent.



I thought also that it might be interesting to try the solubility of an organic silver salt in the sulphite. For this purpose citrate of silver was formed by adding nitrate of silver to neutral citrate of potash. The precipitate was washed in cold water, and added in excess to the solutions of sulphite, and filtered. When filtered, the solution was treated with hydrochloric acid in excess, which decomposed the nitrate and the sulphates, giving a precipitate of silver chloride, which was dried and weighed. An 80-grain solution of sulphite took up silver nitrate to the amount of 31·35 grains, and a 40-grain solution to the amount of 16·03 grains. In this case the weaker solution seems to take up rather more proportionally than the stronger solution, which is in its favour when the washing of prints is taken into account. Now I have laid the case of sodium sulphite as a fixing agent before photographers in as clear a manner as possible. It is about ⅛ as effective as a solvent, and three times dearer. Since in moderate quantities hyposulphite can be got for 2d. a pound, and commercial sulphite of soda, which is sufficiently pure, costs 6d. a pound, the latter is thus apparently eighteen times less economical as the hyposulphite as far as dissolving out chloride of silver is concerned, though when organic salts are in question I believe it may be considered to be but twelve times less. Experience has shown that it requires one ounce of hyposulphite of soda to fix three sheets of paper, which is at a cost of about half-a-farthing. The cost of fixing with sulphite would then be about 1½d., not a very large addition to the cost of the prints.

Now as to the comparative safety of the two fixing agents, I feel sure that theoretically the sulphite will carry the day, for, as I pointed out before in my previous communications, there is no treacherous silver salt to decompose and start fading, which is a desideratum. My method of proceeding in using the sulphite is as follows. Make a 100-grain solution of the salt, and in such a quantity as to well cover the prints. Allow them to remain in this for a quarter of an-hour, then pass them—though this is not necessary—into a dish containing a 10-grain solution of the sulphite. Then wash in two or three changes of water, and hang the prints up to dry.

The fixing bath should then be placed in an earthenware jar, and commercial hydrochloric acid be added. This will cause sulphur dioxide to be liberated—which is an admirable disinfectant, by-the-bye—and the whole of the silver salt, organic or otherwise, will collect at the bottom, *and be saved*. Contrast this with the difficulty that is experienced in getting the silver from the "hypo tub," and I verily believe that the photographer will find the sulphite the cheaper to use in the long run.

I have devoted three articles to the subject of the use of this salt, and probably the reader of the News will consider it worked threadbare. I am not quite sure, however, that it is, as a new feature in connection with it has arisen during my experiments, and which I may describe at some future time. My wish is, however, for the present, that photographers should try the salt as a fixing agent, and give a report as to its merits or demerits, whichever it deserves. I may add that the toning must be carried a little further than with hyposulphite.

Review.

THE STUDIO: and What to do in it. By H. P. ROBINSON. 143 pages, small octavo, paper covers; price 2s. 6d. (*London, Piper and Carter, 5, Castle Street, Holborn, E.C.*)

HERE we have in the main a reprint of matter which has appeared in the PHOTOGRAPHIC NEWS, but with the addition of some original chapters; and those who wish to gather useful hints on studio management at the same time that they are being gratified by reading a pleasantly-written gossiping little book, would do well to make themselves acquainted with what Mr. Robinson has to say.

In the final chapter "The Education of a Photographer," Mr. Robinson says:—

> "I believe that a profound knowledge of the *science* of photography either in some way cramps the artistic faculty, or, what is more probable, shows an order of mind to some extent inimical to a feeling for art; . . . . it is the picture-making power of his art, its capacity for producing pictorial results, results than can be exhibited – and, I may add, sold—which is oftenest neglected, but should be the photographer's chief study if he is to put the art to its natural use."

A less plain-spoken person than Mr. Robinson might have hesitated to so candidly recite his photographic creed; but after the above open-hearted avowal on his part, we can quite understand how it is that he does not in this chapter refer to or seem to appreciate any educational value which the thirty or forty existing photographic periodicals may possess.

WIDE-ANGLE LENSES.

BY H. CHAPMAN JONES.

WE hear so much from time to time about the evils attending the use of wide-angle lenses, how that they destroy pictorial effect, distort objects, and set decent perspective at defiance, that any unknowing one would imagine he were doing photography a service by removing such instruments from the face of the earth. May I suggest that although the expression "wide-angle lens" is correct enough from the optician's point of view as describing what he can supply, the angle of the lens need have nothing to do with the angle of view in the picture, and that it would be just as reasonable to exclaim against the use of large plates as against the use of wide-angle lenses. I am not referring to those photograph makers who value their prints (perhaps correctly) at per square inch, or per square foot, as the case may be: but to the honest worker who is willing to make everything he has at command subservient to the production of the best results; to such I would say—

Do not trouble about the angle of your lens, or think that till you have a battery of lenses your work must necessarily suffer. It is not the lens at all, but the point of view that determines whether the perspective shall be pleasing. Therefore, although you have but one lens, choose your point of view, and determine how much of what you see will make the best picture, without letting the capabilities of your apparatus trouble your mind at all; and keep your view-meter, if you have one, in your pocket. Having fixed the position that is best, mount your camera there, and if your lens will only give a part of the picture on the plate, you cannot by any coaxing get that picture, and you suffer the disadvantage of having only one lens. But in by far the greater number of cases, if your lens has what the opticians call a moderately wide-angle, you will probably find that the picture fairly covers the plate, or else covers only a part of it. In any such case take the picture as you stand, for your aim is to get the picture rather than to cover a certain surface with it. If the picture is—for example—as photographed only 3 by 2, though taken on a half-plate, there is no waste, for you have the picture. When enlarged this will give the same picture as, if taken direct with a longer focus lens, from the same point of view.

Granting the covering power, every lens will give the same picture from the same point of view; and the focal length of the lens will decide what size the selected view is reproduced. Or, in other language, if from a given point of view you have got a bad picture, the point of view is at fault, and not the lens: a lens of different focal length would give the same bad picture, but larger or smaller as the case might be. Or, again, varying the sizes of your negatives, though not necessarily the plates they are taken on, is equivalent to having the use of a battery of lenses.

THE AFTER TREATMENT OF NEGATIVES.

BY JOHN WERGE.*

THE subject I intend to bring under your notice to-night is not new, nor do I hope to be able to place before many of you anything that is entirely novel in the after treatment of negatives, but I have sometimes been surprised to find that many things in the practice of photography that were old to myself were new to others. For example, some one has recently been to the Patent Office with a method of vignetting in the camera, although I had published, as far back as January, 1865 (PHOTOGRAPHIC NEWS, p. 39), six different methods of vignetting negatives in the camera—at the time of sitting—that is, prior treatment of negatives; but I have found it needed the same in the after treatment of negatives. Long before the introduction of the Lamberttype process I was in the habit of treating negatives in a similar manner, both as aids to the proper translation of colour, and in improving the effects of light and shade obtained in the camera. Here is a print from a negative slightly retouched both back and front, and here is a print from the same negative when the after-treatment was completed. I need not ask you to mark the difference, for that is obvious. Here is the negative with its paper backing, and example of after-treatment. The paper is damped and fastened down at the edges, and, when dry, it is as tight as a drum-head, and fits close to the glass. The effect is worked in with a stump and fine blacklead. This mode of treatment lengthens the time of printing a little in diffused light, but in direct sunlight it is quicker and better. For surface retouching I prefer and recommend the use of a thin white paper to receive the work, instead of working on the film itself. By that means the negative is not irretrievably ruined or the likeness lost, and almost any negative can be printed with a thin layer of paper between, and be better protected, and will in consequence yield a greater number of prints. I made many experiments in that direction when the late M. Salomon's prints were first exhibited in London.

There is another mode of after-treatment I should like to show you, and that is one that has not been employed so much as it might or ought to have been. When others were introducing natural backgrounds in the pictures by double printing, I was putting various backgrounds on the negative by an after-process, thus saving a vast amount of labour. Here are examples. The process employed was bichromated dextrine and plumbago.

I will now, if you please, say something about the photographic translation of colour, and the after treatment of negatives relative thereto. The heraldic engraver translates colour according to rule, thus:—argent or white by white paper, d'or or yellow by dots, gules or red by perpendicular lines, vert or green by diagonal lines, azure or blue by horizontal lines, and sable or black by vertical and horizontal lines combined. The line engraver translates colour by a combination of rule and art, more art than rule, and the mezzotint engraver translates colour by a series of tints. So does the photographer, with this difference—he has little or no control over his tints, unless he resorts to some prior or after mode of treatment. In the old Daguerreotype days the skilful photographer had considerable control over the preparation of his sensitive plate, and could, by charging his plate with various proportions of iodine and bromine vapour, regulate its sensitiveness and character to suit the complexion and dress of the sitter. When a "red coat" presented himself, the plate was charged with as much bromine as it would carry, so as to obtain the best translation of the prevailing colour, and to assist in the after colouring. I had recently a Daguerreotype copy of Frith's "May Day," which exhibited a better translation of colour than any collodion negative could yield. In the wet collodion days, imperfect translation of colour was largely due to under-exposure, either through the premature drying of the film, or indifferent lighting of the picture. Now that the gelatino-bromide dry plates are chiefly in use, there is less necessity for under-exposure, and better translations of colour can be obtained. For all that, the camera will not translate colour properly, and after-treatment is absolutely necessary. Here is an example. These colours are placed in the order of their luminosity, and ought to be translated by a succesion of deepening tints, according to this scale. But this is what the camera does—the darkest tint but one comes out the lightest, and I fear that there is no remedy for that but some mode of after-treatment. Much has been said about employing complementary colours, in the form of colour media, in copying paintings, but that is more easily said than done.

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* Read before the Photographic Society of Great Britain.

It is an easy matter for any one that is not colour-blind to ascertain what is the complementary of any colour, but it is not so easy to find an equivalent in any of the transparent colours of commerce. It is all very well to say that red is the complementary of green, and blue the complementary of yellow, but every shade of red, blue, and yellow has its own complementary tint, and there lies the great difficulty of making use of our knowledge of complementary colours in copying paintings. I have made some experiments in that direction, and will show you the results. This picture, purposely selected for its great contrast of colour, proclaims aloud what is the complementary of its prevailing hue, and I have photographed it without and with its complementary. There is a print from the negative taken without the complementary colour intervening—in its normal condition it is flat and monotonous; and here is one from the negative taken with the complementary colour intervening. But here it is quite evident that what is good for the goose is not equally good for the gander. The artist has employed the complementary colour, green, for a background to this brilliant red stocking, but, as the intervening tint has deepened the original green one, the detail of this part of the picture is not rendered at all, although the exposure was four times longer than that given for the negative without supervention. That is not the only drawback attending the employment of intervening media. In this negative the image is doubled, though I used glass of a pot-metal colour, and if a flashed glass had been employed the refraction would have made the picture almost unrecognisable. The third print of the same subject is from the first negative after manipulation, as previously explained; and in this you will see that the artist's ideas of colour, light, and shade are much better interpreted than in the print from the negative in its normal condition. In proof of this I will just call your attention to one or two points in the original picture. Look at the leg on the step. The artist has made that a warm luminous mass, relieved by a cool green, and if an engraver had translated those colours he would have made the leg the lightest tint, whereas the camera produces the reverse effect. To remedy this photographic contradiction, I have resorted to after-treatment, and, I think you must admit, with some success. From these experiments I am satisfied that not much is to be expected in translating colours photographically, either by the interposition of coloured media, or the addition of colours or eosine to the emulsion; and I think the best and surest way is to obtain a good fully-exposed negative on a gelatino-bromide plate, and endeavour to assist the shortcomings of photography by careful and artistic after-treatment. Of course, the better that is done the better will be the result, and a better translation of colour will be obtained; but neither photographic, lithographic, or mezzotintic translation is, or ever will be, equal to that of line engraving. The silvery lines that run and play through the shadows of a line engraving convey to the mind an idea of beauty, depth, and transparency, that no tint, or series of tints, can possibly accomplish. The most that can be hoped for in photographic reproductions of paintings is an imitation of a good mezzotint engraving, and if photographers wish to compete with engravers in the reproduction of paintings, they must pay more attention to the true translation of colour by some such mode as I have indicated and endeavoured to illustrate.

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HINTS FOR SUMMER WORK.

BY W. M. ASHMAN.*

The greatest charm photography seems to possess for the beginner lies in its power of enabling him to pictorially represent any subject of passing interest without very much apparent exertion on his own part, either mentally or of a physical nature. Such pleasant pastimes as the production of silver, Platinotype, and carbon prints, phototype blocks, Woodburytype, photo-lithographic transfers, zincography, and other mechanical printing methods, transparencies, enlargements, emulsions, ceramics, microscopic and lantern slides, &c., follow by degrees, and in the end prove to be equally attractive; but the man who expects to practically, as well as theoretically, master all these subjects, say within a few months of acquiring his first kit and receiving the usual free lesson, would have to work very hard indeed, and it is possible his project would be abandoned in sheer bewilderment or exhaustion. Nearly all, if not the whole, of the processes alluded to can be shown to be influenced more or less by atmospheric conditions; those in which gelatine is employed as a vehicle causing the greatest amount of anxiety. Year by year the many difficulties surrounding the successful manipulation of these processes have been gradually reduced, thanks to those practical men who have devoted their energies thereto; notwithstanding all that has been done, the conditions necessary to success are even now sufficiently numerous to induce a feeling of unfitness on my part to enumerate them; I will pass over the hot water, ice-well, and cold-air arrangements of the emulsionist and pigmented gelatine printer, in order to say a few words on topics of a less complicated nature.

The degree of pleasure derived from a summer outing depends in a great measure upon the condition of the apparatus—a hitch here and there tending to upset that equanimity of the mind so necessary for the full enjoyment of the undertaking. This remark will, I have no doubt, be fully appreciated by the experienced photographer as well as those gentlemen who have just purchased their first set. Thanks to dry plates, also the energy and skill displayed by the apparatus manufacturers, we are now no longer governed by those weighty considerations such as were familiar to most of us a few years ago; then the photographer might well have been seen wending his way along the country road in pursuit of the picturesque, aided in his excursions by no less an accessory than a pair of horses and a four-wheeled conveyance: now, the kit has been so far subjected to the "lightening" process, that material for a dozen whole-plate negatives may be carried in one's valise, or, better still, on a tricycle.

Regarding the improvements which have been wrought in cameras, dark-slides, and changing-boxes, it may be said that a high state of perfection has been reached; yet it is questionable whether the majority of slides are so well made as to permit of their being exposed to strong sunlight with impunity. The first and most important condition aimed at in the construction of a dark slide, as its name implies, is, that it shall absolutely exclude light other than those rays which are permitted to reach the plate through the lens. The remark also applies to cameras, and in both cases is more difficult of realisation than might at first be imagined. If an attempt be made to render a well-lighted room perfectly dark, some notion of the penetrating power of light may be gained, as well as the necessity for deep and well-formed grooves to act as light-traps. Apparatus failing in this particular is liable to admit a more or less appreciable amount of light to the sensitive film, resulting, as we know to our cost, in fog, reversal, and general flatness, which no mode of development has any power to rectify. Bearing in mind the difficulty alluded to, it becomes a question whether any dark-slide can be considered safe enough to allow of its being exposed to strong sunlight for a prolonged period. I think not, and therefore advise every beginner to shield his slides as much as possible. Pockets made of American leather or waterproof-cloth are handy for this purpose, and the much-abused focussing-cloth, used as a covering for the camera, may be the means of saving many a negative.

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* Abstract of a communication to the South London Photographic Society.

Minor difficulties may sometimes arise through the slides not working smoothly in the grooves; this is naturally more frequent with new apparatus than that which has become well seasoned by use. To avert annoyances of this kind, the grooves of the camera and slides should occasionally be lubricated with solid paraffin; graphite or talc answers the same purpose, but paraffin is, I think, preferable, and is certainly cleaner and more durable.

When the tripod slips about on uneven ground, a remedy may be found in shoeing the feet with pieces of cork; this will often save the labour of re-focussing, and the probable loss of the desired object if it be not stationary. Should the wind blow half a gale, making every timber shiver, stability may be temporarily maintained by suspending a stray rock, or anything else that is handy—provided it be of sufficient weight—from the screw beneath the head of the tripod, and thus little fear of a capsize need be entertained. At such times fine dust may, to a great extent, be prevented from settling upon the surface of the plate, and thereby causing transparent spots, if the precaution has been taken—previous to charging the slides with plates—to smear the interiors with olive oil, glycerine, or some sticky substance.

Experiments have been shown by Professor Tyndall, and repeated quite recently in this room by Captain Abney, for the purpose of showing that an increase in temperature has an influence upon the sensitiveness of an ordinary dry plate; that is to say, it increases the speed. That such a result may be anticipated is, of course, a reasonable supposition, which is capable of further proof by other means than those adopted in the experiments alluded to.

Practically, for the purposes of this paper, we may consider that, other things being equal, it is advisable to diminish the aperture of the lens, as the temperature exceeds a given standard, 60° Fahr. being convenient for the purpose, and to increase the working power of the lens when the mercury falls below that point. There are notable exceptions to this doctrine, which militate against its adoption in all cases, as instanced by the extreme actinism in the neighbourhood of snow-scenes and seascapes, or its scarcity in a highly rarified atmosphere and dimly lighted glens. In such cases experience can alone dictate the necessary exposure; if these are likely to be prolonged several seconds, a steel tape used as a pendulum is exceedingly useful; the distance travelled by a swing, when the length is thirty-nine inches, occupies about one second of time. Of course any piece of metal or a pebble suspended from the tripod by a corresponding length of string answers as well. Mr. W. K. Burton published a table quite recently which gives a fair idea how to estimate probable exposures under given conditions; directions of this kind are well worthy of attention, yet, as the author admits, it is impossible to fix any hard-and-fast rule for governing correct exposures, so long as we have to deal with uncertain qualities of illumination, and not a very perfect speed indicator of plates. Mr. Burton's table, however, approximates pretty closely the difference likely to be expected between such subjects as heavy foliage, open landscape, badly lighted interiors, seascapes, and brilliantly lighted street scenes. With a rapid type of lens of the doublet form, an exposure on a well-lit subject, say $f/$ and a rapid plate that registers 22 on the Warnerke sensitometer, a spring shutter would, at this season of the year, become a necessity throughout the heat of the day. Before nine and after five o'clock there is much less actinic power, so that a shutter working too rapidly would cause the negatives to be under-exposed. Subjects in motion, such as trains moving in a horizontal direction, or waterfalls in a vertical, are severe tests for the speed of a shutter.

Development is a very important matter at any time, and one which presents much difficulty to the beginner; even the experienced photographer cannot rely on getting the best negative a plate is capable of producing upon all occasions; more often than not his judgment must determine the manner of finishing development—that is to say, what proportion of restrainer or accelerator it may be necessary to add. When a plate is known to be under- or over-timed there is little difficulty in coaxing out a good printable image, but in most cases this can only be ascertained by developing one of the batch; as an instance, our respected member Mr. Frederick York, a gentleman of considerable experience in out-door photography, made quite a number of exposures last year in different parts of the States and Canada, giving each plate what he considered would be a suitable time; the majority of the subjects were taken with a drop shutter, and the aperture, we are told, was $f/11$. Proceeding to develop these plates several weeks afterwards, it turned out that they were nearly all much over-exposed, owing to the superior quality or actinism of the light on the American continent. Mr. York says he saved them all by soaking, previous to development, in a dilute solution of potassium bromide. Again, some of the finest interiors which have been exhibited in this country—viz., a series by the Baron de Kousoff, representing the ancient palace of the Czars of Moscow—were all said to be much over-exposed, owing to the extreme sensitiveness of the plates. The plates in question were soaked in a ten per cent. solution of potassium bromide for several minutes previous to development, and were then transferred without washing into the developer. The citrates of soda, potash, and ammonia salts, first recommended as restrainers by Mr. Watmough Webster, are preferred by some to the alkaline bromide method; they are, however, extremely powerful, and if used too concentrated render the plate undevelopable. Upon the whole, I think potassium bromide has found the largest number of friends.

In high temperatures frilling or puckering of the film may occur during development, or in the after processes of fixing and washing; this defect is wholly due to an absence of necessary precautions in the preparation of the plate, and is by no means a failing of the gelatino-bromide process in its present high state of perfection.

Home made plates, as a rule, have a greater tendency to frill than such as are obtained from commercial sources. When a batch of plates or a particular sample from a commercial house is known to frill, it is a good plan to store them in a dry room for a few months, when the evil generally ceases. Mr. Trinks, an accomplished amateur photographer, has recently detailed his experiences when working certain commercial plates in exceptionally high temperatures, something like 120° F. in the shade, I believe. Our summer does not approach this limit by many degrees—in fact, our hottest season is comparatively cool to this—yet the measures then adopted might occasionally prove advantageous here. Mr. Trinks says he placed his exposed plates in a fully-saturated solution of chrome alum for periods ranging from thirty minutes up to six hours, after which the images were developed by the ordinary means, the developing dish itself being surrounded with a freezing mixture. In no case was the image destroyed by the alum; but a peculiar colour was conferred upon the image which many persons might prefer. During the excessive heat in July of last year I happened to meet with some plates the films of which frilled from the glass supports soon after being placed in the developer—in fact, before the image could be half brought out. After trying all the remedies then known to me except collodionizing, and failing in each case to keep the film upon the plate, it occurred to me to slightly warm the developer, and so equalise the temperature. This was partially successful. Upon heating the developer still more—viz., to 150° Fahr., the remainder of that parcel of plates was used up without another failure.

Developing formulæ are about as numerous as days in the year; the quality of negative each is capable of producing does not differ enormously, however, so that a manipulator has the privilege of indulging his own particular whim. I have a partiality for one of the fixed alkalies, preferably soda in conjunction with pyrogallol preserved with sulphurous acid. If two ounces of sulphurous acid P.B. be poured into an ounce of pyro, and the bulk increased with distilled water to ten ounces, a ten per cent. solution would be obtained possessing good keeping qualities, and will work equally well with the alkaline carbonates or ammonia hydrate formula.

When a fixing bath is made according to the instructions supplied with the plates—viz., fifteen or twenty per cent. solution of sodium salt—fixing goes on uninterruptedly and with fair rapidity; when, however, the bath is exposed to air in hot weather, evaporation of water takes place quicker than decomposition by the ordinary process of fixing; it is found that bromide of silver dissolves very slowly indeed, and this is accounted for by the degree of concentration of the liquid, the addition of water proving at once a corrective.

Exposing negatives to white light after development and before fixing does not appreciably slow that process, as many suppose, but negatives so treated are not so clear unless they have been very thoroughly washed first; even then a more or less brown pyro stain remains after fixing, which confers printing density that cannot be entirely removed by the ordinary acidified alum clearing agents.

When negatives have remained too long in the developer—or, rather, when examined after fixing, they appear too dense—the excess of density may be readily removed in several ways. If it be desired to lower the intensity very little, it is generally sufficient to expose the plate to the open air—preferably in a strong light—before removing the sodium salt. Considerable reduction can at any time be effected by flooding the plate—which should have been previously soaked in the fixing bath—with a five per cent. solution of potassium ferri-cyanide, following this again with hypo; or the two solutions may be used together. The operation may be repeated again and again until the desired end has been attained. The method is energetic and reliable, but requires careful watching, or the negative will be rendered flat and useless. The yellow colour produced by the operation may, in a great measure, be removed by one of the usual clearing agents.

Thorough fixing and washing is of course a necessity. Theoretically considered, a film of gelatine swelled with a solution of sodium thiosulphate may be said to represent a mass of matter charged with a liquid of great density, the porosity of the mass being greatly inferior to many other substances familiar to the photographer. Water passing horizontally over such a surface would only enter very slowly indeed, and possibly never reach the base, because it would take too long; hence those negatives can never be sufficiently washed. The plan of supporting negatives in a vertical position is decidedly better, and the upper portions are doubtless entirely freed from the harmful salt; but it is questionable whether the same can be said of those portions of the plate which are located near the bottom of the vessel, unless the syphoning arrangement be unusually good.

In conclusion, let me say that all gelatine negatives that it is intended to preserve, ought to be protected as soon as they are dry, and before they are subjected to printing operations, more especially to surfaces containing free nitrate of silver, such as ready-sensitized albumen paper. Plain collodion, about eight grains of pyroxyline to an ounce of solvents, with one drop of castor oil added, forms a tough coating, which is really all that is needed. Spirit varnish is also good, and is an aid to retouching; it is likewise more economical, and easily removable for the purposes of reduction by the plan I have already mentioned, or of intensification when the proofs yielded are not brilliant enough. The common practice among professionals is that of soaking the varnished negative in methylated spirit, rendered slightly alkaline with ammonia hydrate, which soon dissolves the varnish. Washing the plate in a stream of cold water then follows, rendering the film in condition for required alterations.

One pint of white hard spirit varnish—commercial sample obtained from the oilman's—diluted with three pints of methylated alcohol, forms one of the best varnishes procurable, and it should be put on thin.

ON LANTERN SLIDES COPIED IN THE CAMERA.

BY ANDREW PRINGLE.*

MY object now is to suggest what I consider the best means of producing slides from negatives of such a size as to be well adapted for printing and exhibiting in any of the usual ways. If you ask any person what is the chief desideratum in a lantern slide, he will, ten to one, answer "clearness." And probably he will be correct. If the high lights of the slide are not literally clear glass, the slide will be a "waster."

I consider that the salient fault in ninety-nine slides out of one hundred is want of transparency in the shadows. I know that has always been *my* trouble, to keep every detail in the deepest shadow perfectly transparent; in my experience, if the least forcing is necessary in development, the shadows get a superfluity of reduced metal, and the slide is useless. For this reason I very frequently dodge the negative to be copied by putting matt varnish or other similar substance behind any shadows that are too clear in the negative. A slide must further possess a quantum of half-tones. No representation of anything can be artistic or natural if the lights and shades break suddenly into one another; there must be a gradation from light to dark, and this intermediate illumination I call half tone. My chief objection to the wet process for slides is the lack of half tone. For clearness nothing can beat the wet process, but I accuse it of want of half-tone, and in most cases of failure in my next essential, which is warmth of colour. Of late, gelatino-chloride plates have been brought largely to our notice, and they possess certain qualities of extreme utility in the production of slides. They reproduce detail in shadows as probably no other plates can be made to do without the very greatest care and skill, but I do not hesitate to say that for copying with in the camera they are but fickle, and they are certainly very slow. For contact printing I find these gelatine chloride plates not only convenient, but touching closely on perfection in the results. Very fine slides can be made with gelatine plates in the camera, but there is considerable uncertainty.

In making these experiments I kept a careful record of the exposure given, of the developer used, of the amount and nature of the toning where I used a toning bath, of the amount of intensification where I intensified, as well as of any other circumstances likely to bear upon the final result of my experiments. In the matter, for instance, of unwashed emulsion, my experiments have not been nearly so complete, and my results not nearly so perfect or so varied as my earlier attempts led me to hope. Still, I believe you will find great promise in the process, and for a worker who insists upon making his own emulsion, the unwashed emulsion process is vastly simpler—nay, and as equally sure—as the washed process.

The essentials for success are a frame to hold the larger negative, a camera to hold the small sensitive plate, and means to prevent the access to the small plate of all light except that coming through the negative and through the copying lens. I achieved failure and trouble in a great many ways with long boxes, with darkened rooms, &c., but I achieved success without any joiner work or tools at all. I have a 10 by 8 camera with a side-sliding front carrying the lens flanger. This front I removed, and stuck into the rectangular aperture, thus produced, the front of a small pocket camera without any swing-back to get off the square. The screw for pinching the sliding front of the big camera holds the little camera in position; the little camera can be shoved from side to side, but always remains parallel to the ground glass of the larger camera. The holes still left on each side of the little camera I blocked up with bits of cardboard cut to fit and meet all requirements. I used a little stereo wide-angle rectilinear. I always use stop No. 2, about $f/15$. I then stuck the big camera on a studio stand, and canted the stand a good bit—first, to point towards the sky, and second, to keep the negative from falling out of its place. I turned the big camera ground glass on to the top of the camera, and inserted its slider, which, of course, has carriers for all the sizes of plates that I use; I then pulled out the shutter and opened up the back of the slide. I put the negative into the slide, and a bit of fine ground glass an inch or two behind it. By working the rack of the big camera the picture is adjusted to size on the ground glass of the little camera, and using an ordinary eye-piece I focus the picture with the rack of the little camera. I then cover everything but the negative with a large waterproof cloth, and all is complete and ready for action.

I have invariably found that no amount of increase in exposure will make up for a bad light. If the light be dull or yellow in tint a good slide cannot be made, and the fact is more patent with a gelatine chloride plate than with collodion. I never yet have got a plucky or brilliant camera slide in a bad light, or late in the day.

On the other hand, I do not like the sun to shine on the ground glass protecting the negative; the contrasts are apt to be too violent, and with most negatives the shadows in the slide will be "bunged up," almost to a certainty. A negative stained in development, and not cleared with alum and acid, is a very bad subject to deal with. Even though I use sodic sulphite, I always clear my negatives after fixing. If a negative be clear, it matters but little whether it be very dense or very thin; in the case of over-density a longer exposure will put that right; in the case of thinness or lack of contrast, a short exposure, and intensification after fixing will make a first-rate slide.

I believe it to be false economy to use any but the best glass for lantern slides, and the covers must be as good as the slide-glasses. All solutions must be filtered, especially the varnish.

I shall now proceed to lay before you the steps I take for slide making with Mr. Brooks' washed emulsion; and I find it important to conduct every operation with care and exactitude, though the development allows of considerable exercise of choice.

The plates must, of course, be clean, and to ensure chemical purity I use new patent plates, either washed and albumenized, or cleaned in warm soda solution, washed, polished with spirits, and finally energetically rubbed with a clean chamois skin. In both cases, I edge with a solution of india-rubber in benzole or chloroform, preferably the latter. Mr. Brooks' emulsion appears very thick to the inexperienced, but so long as it will run it ought not to be thinned. On pouring the emulsion off the plate, do not return the surplus to the original bottle, but filter through cotton-wool into a second bottle. Shake the bottle hard half-an-hour before coating plates. Dry either spontaneously, or with a slight and perfectly equable heat. This is the time to "ware" dust. Take a good clear average density negative, and find by experiment the exposure for developer No. 1. On taking the plate out of the slide after exposure, I usually edge again with rubber solution. Put the plate on a pneumatic or other holder, and flood with equal parts of pure methylated spirits and water. Then put the plate (after the spirit has moved it about a minute) into a dish, and let the tap run on it while you mix your developer. The following solutions for development are Mr. Brooks', except that the quantities are halved, as the ammonia carb. solution does not improve by keeping.

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* Abstract of a paper read before the Edinburgh Photographic Society.

Make a saturated solution (cold) of carbonate of ammonia. Now your solution must be saturated, and your ammonia carb. must be the real "Simon pure." Ammonia carb. is largely adulterated, and if not adulterated by others it soon adulterates itself. The pieces must be clear, and not covered with a white crystal, and the bits must be flat and not round; and it takes days to properly saturate it. No heat must, on any account, be applied, or the ammonia will be volatilized. Having got your ammonia saturated, take a 6-oz. bottle, put into it—

No. 1.—	Bromide of potassium	30 grains
	Acetate of soda	60 ,,
	Water	4 ounces
	Then put in amm. carb. sat. sol. ...	2 ,,

Make up also—

No. 2.—	Carbonate of potash	180 grains
	Acetate of soda	60 ,,
	Bromide of potass.	30 ,,
	Water, up to	6 ounces

Likewise—

No. 3.—	Carb. of soda	180 grains
	Acetate of soda	60 ,,
	Bromide of potass.	30 ,,
	Water, up to	6 ounces

Furthermore—

Take the white of egg	1 ounce
Water	5 ounces
Stir in gently acetic acid glacial ...	8 drops

Let settle for about half-an-hour; then add—

Liq. amm. fort.	30 drops

Filter through wool or tow.

Finally take—

Pyrogallol	96 grains
Alcohol absolute	1 ounce

Filtered.

You are now ready to make a lantern slide in from five minutes or less up to two hours or more, of a fine warm, or a fine black tone, or a fine cold tone, or several very far from fine tones, according as you expose and develop. There must be no forcing whatever in the development. If you have exposed (say) ten minutes, you may force up the positive with soda, or possibly even with ammonia, but the result will not be a lantern slide. If you want a warm tone—a very warm tone—you need not attempt to get it by soda development; with potash you may get a chestnut tone if you have fully exposed, but you will not get a regular red tone. The ratios of necessary exposures for these three developers I take to be approximately:—Potash, 1; soda, 2; ammonia, 5. The warmth of tone I put thus:—Soda, 1; potash, 2; ammonia, 5. Soda tones can hardly be called warm at all; but a soda developed negative takes kindly to platinum toning, and a grand warm black can be made by a prolonged toning and subsequent intensification. If you want fine warm tones you must give a long exposure and use ammonia; if you are in a hurry, and don't object to chestnut tones, you can use potash. I do not myself like the soda in any shape. A mixture of potash and ammonia gives a splendid tone with a reasonable exposure. To make an addition to my tables, I suppose an average negative, on an average December day, stop $\frac{f}{15}$.

For ammonia development alone I should give (say)	1 hour 30 minutes
Soda ,, ,, ,, ...	25 ,,
Potash ,, ,, ,, ...	12 ,,
Ammonia and potash, mixed in equal parts	20 ,,
Ammonia and soda ,, ...	30 ,,

Potash and soda mixed I have no record of. It will be found that the following will increase the sensitiveness and also the density. After washing off the spirits, pour on and leave for a minute the albumen solution given above, then pour into the developing cup where the alkalies are ready mixed. I use a cup and not a tray for development, and I put in my cup about three drams of my alkali solution and about fifteen drops of the alcoholic solution of pyro. But the alkali must be run over the plate at least once before the pyro is added.

When I had written thus far, I started for Spain. After a few weeks I returned, developed about 150 negatives, the greater part of which were fogged, but proceeded to make lantern slides from the few negatives of architecture and interiors which had escaped the baneful effects of superfluous light. I may say at once I had no reason to change my opinions on what I had already written, nor did I find anything new to add except a formula for development, published during my absence by Mr. Brooks. I give the formula right off, and I shall call it the bi-carbonate developer, not because the bi-carbonate develops, but because it plays the part of a colourer to the slides.

Carbonate of potash	150 grains
Bi-carbonate of potash	75 ,,
Bromide of potash	30 ,,
Acetate of soda	60 ,,
Water	6 ounces

This ought not to be above two or three days old when used.

In my opinion this is the best all-round developer for slides copied in the camera; the exposure required is, if anything, less than with the potash developer, and the tone produced by this bi-carbonate solution is a magnificent chestnut, as nearly as I describe it. All my Spanish slides are made by this process.

Some slides, from the quality of the negative or from slight over-exposure, are apt at times to develop too rapidly and wanting in contrast. There is a certain cure for this. Stop the development as soon as every detail appears, wash, fix, and afterwards intensify sharply. If the colour is too warm you can tone it as you like. I always fix with cyanide; I do not weigh or measure it, but keep it strong, and I never saw it eat away the slightest detail; but the cyanide ought to be pure, or I cannot answer for the results. If parts of my high lights appear slightly clouded, as they will when the negative is thin in the sky, I apply some of my cyanide mixed with a little tincture of iodine. I do not measure this either, only it must not be too strong, or you will see your details eaten.

When I am going to intensify I proceed thus, but I would notice that I disapprove of re-development, or what is sometimes called "intensification before fixing." But to intensify after fixing I first pour on the slide a weak solution of nitric acid in case some alkali might be hanging about, then I wash again. My silver solution is:—

Nitrate of silver	50 grs.
Citric acid	50 grs.
Water	2 ounces

I take a clean cup, put in at a guess 4 grains of dry pyro and 4 drachms of water. I pour this once or twice over the plate, then put into the cup a few drops of the silver and acid solution. If I want to intensify the whole slide equally and gradually, I put less silver; but if I want to give the whole thing pluck, I put more silver, say 10 drops, and intensify sharply and rapidly.

You can tone with gold, but I prefer acid platinum. Thus—

Platinum bi-chloride	1 grain
Nitric acid	1 drop
Water	3 ounces

Keep the solution moving on the plate in a dish; if you want to finish with a fine warm engraving black, tone till the image on the plate is almost entirely converted into chloride, and so almost invisible, then wash and intensify. This I consider one of the features of this process; you can put on a screen what appears to be a gigantic engraving of a delicacy that no manual skill could hope to achieve. Dry your plate on clean white blotting-paper, and don't go and spoil it by using negative varnish, but use only the clearest crystal varnish, and see that your varnish is filtered.

Be careful and be artistic in your choice of a mask. A great deal of the beauty of a slide rests in the mask.

Notes.

Our supplement this week consists of a dozen out of an extensive series of photographs, by which Mr. Digaut, of St. Petersburg, has illustrated many phases of the work of the Imperial Russian Marine. Just now they have exceptional interest.

It is a well known fact that Mr. Inspector Denham, of the House of Commons Police, has an album containing photographs of very nearly all our members of Parliament. At the opening session of a newly-elected House of Commons, too, it is the practice for new M.P.'s to place their photographs at the disposal of the Sergeant-at-Arms, in order that the door-keepers and police on duty may have an opportunity of studying their lineaments. Thanks to this practice, our new legislators are very rarely called on to prove their identity at any of the entrances to the House.

But from a case which occurred last week, it would seem that it would be well for all members who, during a temporary absence, develop their hirsute appendages, to lodge a new photograph in the prescribed quarter. Had the member for Dorsetshire done this, he would not have been stopped at the door of the House, as he was, on the occasion of his first visit to St. Stephen's after his return from active service in the Soudan. Colonel Digby had, in fact, grown a beard in the desert, and being, moreover, well tanned by a tropical African sun, was regarded by the door-keeper on duty as an aggressive stranger, and promptly stopped on the threshold. Members who shave off their beards or whiskers, or take suddenly to blue goggles, or, in fact, who in any way change their facial appearance, should also be required to send photographic evidence of their altered looks to Captain Gosset, who is, by the way, himself possessed of a very interesting collection of past and present members' photographs, which in great part cover the walls of his private sanctum, admission to which is one of the most valued privileges of our M.P.'s.

"Is it not strange," asks an American publication, "that when we see grand or lovely sights in nature, we exclaim, 'How picturesque!' Again, in contemplating a master's fine picture, we exclaim, 'How natural!'"

Emulsion makers should look with suspicion on new glass vessels, if M. Bohlig's results are to be trusted From a new flask each 100 cubic centimetres of boiling water dissolved—in two seconds of time—as much alkaline silicate as will neutralize 0·1 c.c. of solution of oxalic acid containing 0·1 gramme of oxalic acid per litre. Not much, certainly, but enough to influence results in many cases. From old flasks and beakers no appreciable quantity of alkaline silicate is dissolved.

A series of photographs at the Inventions Exhibition is of particular interest just now. They represent the bed of the river Thames near Richmond in the time of drought. The late rains have probably made a little difference since last week, when the river presented a most extraordinary appearance at low water. The photographs referred to were probably taken last year, and are intended to illustrate a condition of things which the adoption of a particular kind of automaton tidal lock and weir (a model of which is in the Exhibition) would, according to the inventor, remedy. Whether this be so or not, the photographs are most suggestive, and somebody ought to send copies to the Thames Conservancy Board, a body of irresponsible gentlemen, very few of whom know much about the river which they are appointed to conserve.

An attempt was made on behalf of one of our picture papers to take an instantaneous view of the athletic ground at Lillie Bridge during the progress of the Civil Service sports on the Queen's birthday. The moment chosen was the finish of the open 440 yards handicap, which L. E. Myers, the celebrated American "sprinter," did in under forty-nine seconds. As he is said to have only won by a foot, the publication of the said photograph, if it really shows the finish of the race, will be awaited with great curiosity in running circles.

In New York is issued the "Amateur Photographic Print," a broadside edited, set up, and printed by a well-known amateur photographer, Mr. F. F. Thompson, of 2, Wall Street. It is the organ of the Amateur Photographic Exchange Club, and contains some smart writing.

It is curious to note how the old and discarded sometimes acquires a new value; one instance of this being the high premium which 'cyclists—especially those who take the camera—are willing to pay for Murray's Continental of the pre-railway era. Soon, however, the special value will again be next to nothing, as the 'Cyclists Touring Club is preparing a series of continental road books.

The President of the Notts Photographic Society places his dark room (58, Long Row) at the disposal of the members of any photographic club upon presentation of proper credentials.

Under the heading of "Caprices in Stationery," an organ of the printing trade notes that a fashion has sprung up among the wealthy to have their country seats photographed, and a print placed upon their letter paper instead of the address. After all, this is but a revival of the old-fashioned note paper which used to be sold at the principal watering places containing some favourite view. These pictures were always strangely unlike the originals; but as the printer always took the precaution to put the names underneath, no mistake could be made.

We were never more impressed with the changes which dry plate photography has brought than at Teddington two or three days ago. A camera was planted on the bank near the Weir, and the operators, two ladies and a gentleman, were busily engaged in taking pictures. There was nothing extraordinarily novel in this, save that the selection of the views was decided by consultation, in which the ladies seemed to bear the most prominent part. But what was most significant was the fact that all three operators were attired in aquatic costume of spotless white. There are no dandies in the world so scrupulous about their attire as river dandies, and to suggest photography to them in the days when "slops of silver," to use the expressive phrase of an American photographer, were in vogue, would have caused them to faint away. Now, however, photography is quite compatible with boating, and the leaders of aquatic fashion may use the camera without the least danger to their dress.

The very exhaustive discussion at the Photographic Society this week on photographing pictures should not be without interest to the portraitist and landscape photographer. Why should the efforts to translate colour into monochrome be limited to picture copying? The lengthened exposure necessitated by the use of coloured glass is, of course, an objection where portraits are concerned; but if the addition of certain materials to collodion or gelatine emulsion has the effect of rendering yellows and blues more manageable, there is no reason why the portraitist should not use these materials. A good test would be the portrait of a person with red hair, freckled face, and light blue eyes.

The art-critic of the *Deutsches Montagsblatt* comes down hard upon the Royal Academy. He remarks that the Exhibition reminds him of a kindergarten, or an institution for taking charge of little children. In two of the rooms he counted no fewer than "twenty-four babies, nearly all fashionably dressed!" In the matter of babies we fear most photographers live (no joke intended) in glass houses. Two-thirds of the portrait photographer's income may be said to be derived from children. But as regards photographic exhibitions, babies, save in the case of one or two specialists, are conspicuous by their absence.

When doctors differ, who can decide? The *Athenæum* persists in its assertion that the Blenheim Raffaelle has cracked and blistered since its removal to Trafalgar Square; Sir Frederick Burton, on the other hand, gives an "unqualified denial" to the *Athenæum's* statement. What a pity the picture was not photographed previous to admission! If the director of the National Gallery wishes to watch the effects of time and atmosphere on the invaluble master-pieces under his charge, let him have them photographed at intervals.

The *Court Journal* laments that no novel feature is likely to be forthcoming at the bazaars, the season for which is just commencing. No novel feature, and with amateur photographers springing up by thousands in all directions! It is no unsafe prophecy to make that before very long a photographic studio will be an indispensable adjunct to every bazaar. Amateur photographers will not be contented with taking the portraits of their relatives and friends, and will be sighing for fresh worlds to conquer. What better field for their talents could be found than a bazaar? And no one would grumble at the working for money when every farthing would be earned in the cause of charity. Besides, would not the visitors flock in hundreds if it were known they could have their portraits taken by the Honourable This or Lady That?

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Patent Intelligence.

Applications for Letters Patent.

6742. Frederick William Hart, 8 and 9, Kingsland Green, London, for "Improvements in photographic cameras: specially relating to the focussing arrangements."—3rd June, 1885.

6831. Thomas Samuels, 53, Chancery Lane, London, for "An improvement in photographic cameras."—4th June, 1885.

6973. Charles Wells, 25, Southampton Buildings, Chancery Lane, W.C., for "Improved means of obtaining photographic bird's eye views."—[Complete Specification.]—8th June, 1885.

Patent Sealed.

8724. William Samuel Atwood, 1, Lime Tree Villas, Chase Side, Southgate, Middlesex, Photographer, and Samuel Benjamin Goslin, 27, Jewin Crescent, Cripplegate, London, Engineer, for "Improvements in photographic cameras."—Dated 7th June, 1884.

Specifications Published during the Week.

4528. William Ford Stanley, of 4 and 5, Great Turnstile, Holborn, in the county of Middlesex, Mathematical Instrument Maker, for "Improvements in photographic cameras."—Dated 13th April, 1885.

A focussing bag or hood: the claim is,—the bag or hood to form a focussing cloth with a focussing lens either attached to it or capable of attachment, and a covering cloth also attached to the camera as described and shown on the drawings.

14,457. Cleveland Green, of the Woodlands, Alveston, Stratford-on-Avon, Warwickshire, Gentleman, and Louis Varley Fuidge, of Ivy Cottage, Stratford-on-Avon, aforesaid, Artist, for "A new or improved actinometer."—Dated 1st November, 1884.

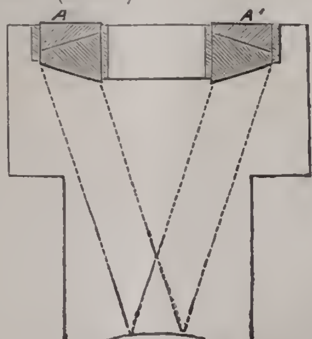
This invention is described on p. 367 of our present volume.

Patents Granted in America.

318,480. Dyer T. Kendrick, Providence, R. I. "Camera-tripod joint."—Filed Feb. 24th, 1885. (No model.)

A ball and socket joint with clamping plate.

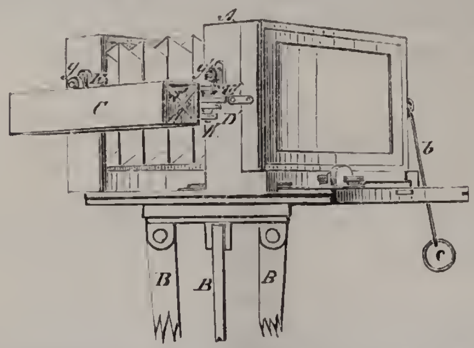
318,666. James A. Smith, Decorah, Iowa, and Alfred J. Athay, Sparland, Ill. "Object-lens for telescopes and cameras."—Filed Oct. 22nd, 1884. (Model.)



Claim.—A lens for telescopes, cameras, &c., consisting of two separated transparent sections of a lens of a given diameter, which sections are spaced from each other such a distance that the exterior surfaces of the convex portions are concentric, and the inner surfaces of the convex portions are also concentric with each other, substantially as set forth.

318,701. Henry Correja, Paris, France, "Photographic apparatus."—Filed June 9th, 1884. (No model.)

Claim.—1. The combination, with a camera for rapid or instantaneous photographing, of an attached sighting-tube arranged outside of or to one side of the instrument, provided with cross hairs or strips, dividing the field within it, and adjustable relatively to the camera to properly place the object on the sensitive plate of the camera as it appears in corresponding position on the field within said tube, substantially as specified.



2. The finder or side tubular attachment, C, constructed with vertical and horizontal cross hairs or strips, *d d*, at or near its one end, and diagonal cross hairs or strips, *d′ d′*, at or near its opposite end, for use in connection with a camera adapted to produce rapid or instantaneous photographing, essentially as described.

3. The ground glass G of the camera, having vertical, horizontal, and diagonal pencil or other marks, d^2 d^3, upon it, in combination with the tube C, adjustably connected with the camera on its outside, and provided at or near its one end with vertical and horizontal cross hairs or strips, *d d*, and at or near its other end with diagonal cross hairs or strips *d′ d′*, substantially as and for the purposes herein set forth.

4. In combination with the camera, the tube C, with its vertical, horizontal, and diagonal cross hairs or strips *d d′*, arranged as described, and the adjusting slotted bars D D′ and E E′, essentially as and for the purpose described.

318,908. Alvin P. Johnson, Boston, Mass. "Photograph album."—Filed June 13th, 1884. (No model.)

Claim.—1. A photographic album leaf composed of a picture-supporting leaf provided with two narrow bands of tough paper or cloth secured thereto by their ends only, and adapted to impinge upon two opposite ends of the photograph to hold the same in position, and a duplex matting in the form of an envelope to receive said picture-supporting leaf, provided with suitable openings through which to view the pictures, and adapted to be applied thereto or removed therefrom.

2. The combination of a picture-supporting leaf provided with bands, and having its upper and lower edges made slightly converging, and the mats secured to filling pieces arranged to form a chamber to receive the leaf and fit its taper edges, substantially as described.

3. The combination of the leaf hinged to the strip, and having its upper and lower edges made slightly converging, and the mats secured to the filling pieces arranged to form a chamber to receive the leaf and fit its tapered edges, substantially as described.

THE PHOTOGRAPHIC IMAGE.

BY CAPTAIN ABNEY, R.E., F.R.S.*

When white light is allowed to act on chloride of silver for a sufficient time to blacken it, I think every one will agree that, at all events in the presence of moisture, or moist air (as is all air unless chemically purified), chlorine is given off. I think, also, it will be allowed that when bromide of silver is acted upon similarly, bromine is given off; a gelatine plate when darkened absolutely smells of bromine, or some compound analogous to it. Further, experiment has shown that the rays which are chemically active are confined to that region of the spectrum which the silver salt absorbs. Let us take chloride of silver as the example on which to found an argument, for any reasoning which may apply to the one will equally apply to the other haloid salts of silver. I suppose I shall not be going beyond general belief, or, at all events, beyond the belief held by those to whom I care to address myself, that homogenous matter is made up of molecules, all having a similar composition, and that such molecules are themselves made up of atoms. In the case of bromide of silver, for instance, the atoms are bromine and silver. Now we are told in most text-books that silver is a monad, and that it requires only one atom of silver to combine with one atom of bromine, or rather, perhaps, that it requires only one atom of bromine to combine with one atom of silver; confining myself, however, to pure chemistry, without any reference to photographic action, the evidence of this is based on the behaviour of silver when combined with certain other elements. The opinion, however, that silver is a monad, is not allowed by some chemists of the highest repute. However, we will, for the purpose of argument, take it that the old idea is correct, and that Ag requires one atom of the halogens to combine with it. The first question we have to ask is, does such a body as a sub-chloride or sub-bromide exist? Now we will not go into photographic evidence, but confine ourselves to chemical evidence simply. In 1839, the year when Daguerreotype was discovered, Wöhler found that when hydrogen was passed over argentic-oxalate, mellitate, or citrate, when heated to the boiling point of water, half the acid was set free, and a dark brown argentous salt remained. The acid can be removed by washing, only a small portion of the argentous salt being removed, the solution of the latter forming a port-wine coloured liquid.

Further, Wöhler obtained argentous oxide (Ag_4O) by means of repeatedly boiling soda-ley with argentic arsenite. Argentous oxide is, of course, the base of argentous citrate, oxalate, or mellitate. Again, Geuther found that argentous oxide is formed by precipitating silver nitrate with cuprous hydrate. Again, argentous oxide is produced by the action of hydrogen peroxide on metallic silver. A bright silver plate immersed in a neutral solution of hydrogen dioxide becomes covered with bubbles of oxygen, and coated with a greyish white film, while part of the silver is converted into hydrated argentous oxide, according to the equation $2Ag_2+H_2O_2=2HAg_2O$. Argentous salts are also produced by passing hydrogen into ammoniacal solutions of silver salts.

Such is an outline of the chemical evidence of the existence of argentous oxide, and it would appear that such evidence is very strong; in fact, as strong as required under any circumstances. That this is not the work of only one chemist, adds more weight to the existence of such a compound.

Such being granted, the admission of the possibility of the existence of sub-chloride or sub-bromide of silver is at once apparent. Wöbler describes a method by adding to the argentous oxide a solution of hydrochloric acid, or by common salt. In this case we have .—

$$Ag_4O+2HCl=2Ag_2Cl+H_2O$$
$$\text{and } Ag_4O+2NaCl=2Ag_2Cl+Na_2O.$$

Argentous chloride is also formed by bringing silver in contact with a solution of sal-ammoniac, and the first action of ferric chloride or cupric chloride is the same. Argentous bromide or sub-bromide can be formed in the same way. By chemical analogy, if there is such a substance as sub-oxide or argentous oxide, there is the same reason for believing in the existence of the sub-chloride and sub-bromide. Now comes the question as to whether the same compound is produced by the action of light.

When silver chloride is exposed to the action of light, we know well that a violet-coloured substance is produced, and that such a coloration is also found when exposure takes place in the presence of nitric acid. We also know that metallic silver dissolves in dilute nitric acid. Now since chlorine is evolved, one of two things must occur—either the total liberation of the chlorine from the silver salt, or else its partial liberation. Which does it do? Under any ordinary circumstances it would be said that it was not metallic silver which was left, since it was unacted upon by nitric acid. Some years ago, Guthrie experimented on this subject, and he put it down that metallic silver was formed, but that it was in a passive state, similar to that state which iron can take. The connection between the two is not very apparent, considering the manner in which iron loses that state. I would further mention that Thorpe found that whilst nitric acid dissolved about 2 parts per 100,000 of white silver chloride, that when darkened by light only ·8 per 100,000 was dissolved. Now we have another exceedingly interesting proof that the salt formed by light and the argentous chloride are the same. If a collodion film containing silver chloride be exposed to light till it is lavender, and be exposed to the action of the spectrum, we get a coloured representation of that spectrum. Further, if a similar film be exposed to light, and the silver be reduced to the metallic state by a developer, and it is then immersed till it assumes a grey colour in ferric chloride or cupric chloride, the same colorific action takes place; or, again, if a metallic silver plate be treated in the same way, we have a coloured spectrum. It is curious that such should be the case if the compounds are different.

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* Read before the Photographic Society of Great Britain.

Guthrie's experiments show that a weighable quantity of the chlorides are converted into the coloured salt, but in any case the amount of chlorine liberated is small compared to what it should be theoretically. This acts against the metallic theory equally as against the sub-chloride theory. To my own mind there is no difficulty, however. It must be recollected that chlorine, as it is liberated from the chloride by light, has always sub-chloride beside it, and it is always more probable that it will combine with the sub-chloride and form chloride $Ag_2Cl + ClAg = Ag_2Cl_2$, rather than escape. For this reason the difficulty of finding a large amount of liberated chlorine is not present in my mind; in fact, I could not conceive well otherwise. The same argument applies to the formation of the sub-bromide from the bromide. Guthrie finds that the substance he gets in every case is insoluble in nitric acid, but that after treatment with ammonia the residue is soluble. This is exactly the behaviour of chemically-produced argentous chloride, and is a striking proof that the light-produced compound and this are identical.

It may be of interest to show the members of the Society sub-chloride in bulk. My friend Dr. Hodgkinson, Professor of Chemistry at the Royal Military Academy at Woolwich, has kindly isolated for me the sub-chloride formed by the action of light on the chloride. This he has done by exposing chloride to light under a proper chlorine absorbent, and then treating the mass of chloride and sub-chloride with a solution of sodium chloride, which dissolves the chloride, leaving the sub-chloride behind.* Further, I show a sample of the sub-chloride prepared by direct chemical means. The argentic citrate was reduced in a current of hydrogen at the temperature of 100° C., and then acted upon by a solution of soluble chloride, with the result that we have a sub-chloride. Both the light-produced and chemically-produced Ag_2Cl are unacted upon by nitric acid, but by treatment with ammonia split up into AgCl and metallic silver.

It is usually said, if silver bromide be exposed to light in nitric acid, that no change takes place in it—*i.e.*, that it remains as silver bromide. Now to test this I exposed silver bromide to light in nitric acid—in strong nitric acid—and subsequently treated the acid with silver nitrate. A faint precipitate immediately showed. To make this evidence of value, I asked Dr. Hodgkinson to make an experiment of the same nature, with the result that he obtained the same precipitate. If dilute nitric acid be used, the silver is dissolved from the sub-bromide.

For the visible image, then, I can conceive of no difficulty in the reduction of the sub-salt. I have here no intention of entering into the theory of development, which has recently been put down to an electrical or voltaic action. I would only remark that development must always be dependent on such action, and that the mere fact of reduction of a compound to an elementary body entails such an action, as is very well known. Chemical action and voltaic action are interdependent one on the other; neither one can take place without the other, as I endeavoured to show in my Royal Institution lectures of last year.

I now pass on to the photographic or developable image, and the general arguments apply whether it be assumed that metallic silver or the sub-haloid is produced by the prolonged action of light. In a small book which I published on emulsions some two years ago, I have assumed that the photographic image is formed by a sub-chloride and sub-bromide of silver, and I have recently been taken to task for not having proved the similarity between the visible and the invisible image. What I said was this:—"Evidence of the most unmistakeable character points to the chemical theory of the photographic image—evidence so strong and so well known that it would be out of place to record it here." Now I find that I have made a mistake. It appears that it would not have been out of place, and that the evidence is not strong. That being the case, I will endeavour, in a subsequent edition of the work in question, to supply the want, and meanwhile will give some of the evidence which is sufficiently strong to prove my assertion as to the truth of this theory. In continuation of the above quotation, I say, "Briefly, we may say that the action of light seems to be to reduce it to a simpler type, which we may call the sub-haloid. Thus—

$$\overset{\text{Silver bromide}}{Ag_2Br_2} \overset{\text{gives}}{=} \overset{\text{Silver sub-bromide}}{Ag_2Br} + \overset{\text{Bromine.}}{Br}$$

If any reader will not admit it, he should read all the various evidence that has been adduced since the time when Scheele first made his experiments with silver chloride, and we doubt if he can remain unconvinced—more particularly in regard to the visible image formed on the bromide and chloride." Two writers have seized this last sentence, and with an ingenuity which does credit to their labours at the desk, have endeavoured to make it appear ridiculous—not to strengthen their case, which I hold to be bad, but to weaken mine. I would seriously repeat my invitation to them as to their course of reading, allowing them to include the earlier literature from the time of Bacon, which one of them recommends for my perusal, and would still hope that they may profit by it. Continuing the same paragraph, I say, "It is a pertinent question to put as to whether the visible and the invisible (or developable) image are of the same nature; which may be answered by another question—Can the line be drawn where the image is invisible? If so, what is the boundary between the two? If we admit the theory of the formation of the visible image, it seems hardly logical to deny a similar formation for the invisible or photographic image. It is quite possible that beings with more acute sight than ourselves might be able to see the image which we cannot. As we know, certain insects can hear sounds which do not affect our auditory nerves. Coloured particles are visible when put together *en masse*; but if only a few coloured particles are present in a mass of colourless particles, it is quite certain that they may remain undetected." Now I have nothing to modify in these last sentences, and I invite the attention of the members present to the argument—Can it really be asserted that there is a boundary between the visible and invisible image? Take a couple of plates and coat them with emulsion, and place them in a conducting solution, and connect the films with a very sensitive galvanometer. Allow light for a second to fall on one plate; there will be a deflection of the needle, showing that chemical action is taking place on it; expose for a time sufficiently long to discolour the film, and the same result occurs. There is chemical action, then, in both cases: what is the difference between the two? The chemical theory of the photographic image is based upon the fact that where light of a proper kind acts on a molecule, the atoms are made to swing, however short be that exposure. If it be for a second, the average number of vibrations which light of a mean wave length makes is somewhere about 700 million millions (a goodly number), and which, if the blows by the ether be well timed, is sufficient to make an atom of chlorine or bromine fly off from the molecule; or, in other words, sufficient to make it swing out of the sphere of molecular attraction, particularly if some other molecule is near which is ready to abstract it and incorporate it with its atoms, and so to form a new body. Let us stop and see whether such is the practical and not theoretical action. Take bromide of silver emulsion in collodion, which, when pure, is almost an absolute neutral substance, and what occurs where it is used dry? It is sensitive to a certain extent, but add some bromide-loving preservative to the film, and the sensitiveness is much increased. If the condition of the bromide under the action of light were merely change in the arrangement of the atoms, but not a chemical change, what would be the use of the bromine absorbent? It ought to be positively detrimental. Let us take still another example of this. If a washed iodide of silver emulsion is prepared with excess of iodide, and a plate be coated with it, and exposed, no image is developable. Dip half of such a plate into a solution of tannic acid or beer, again expose, and develop. The half that has an iodine absorbent will develop, the other half will not. Surely the beer or tannic acid is not capable of allowing the physical molecular attraction of the molecule to be altered, which must be the case, adopting the physical hypothesis of the latent image. The chemical theory explains it immediately. One of the most remarkable proofs of the truth of the chemical theory of the formation of the photographic image is found in the explanation of some experiments which I made on the effect of the spectrum on mixtures of the haloid salts of silver, an account of which is published in the "Proceedings of the Royal Society." It is there shown that if you have a mixture of pure iodide and bromide of silver and expose it to the spectrum, that at the place where the iodide alone would show the greatest action or development, the image has been destroyed by liberation of bromine from the bromide which is in contact with it, and which is also acted upon by rays of the same refrangibility. Now no mere physical theory of the photographic image would account for this. Instead of the developed image being almost *nil* at this particular part of the spectrum, it would be increased in intensity, and such increased intensity is to be found if the two be exposed in the presence of silver nitrate, which will take up the bromine and iodine liberated by light.

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* Analysis showed that the proportion of Ag to Cl was within one per cent. of the fractional amounts required for Ag_2Cl.

(To be Continued.)

Correspondence.

MR. A. PRINGLE ON JUDGING PHOTOGRAPHS.

Sir,—Sarcasm, used skilfully, and on appropriate subjects at fitting times, is certainly a powerful weapon in the hands of the journalist. When sarcasm is crude, inappropriate, and misplaced, it becomes mere buffoonery, and the wit of your correspondent, "A Member, &c.," in your issue of yesterday, is a very fair sample of the latter phase of sarcasm.

The very "oblique ovation" of your correspondent conveys to the reader ignorant of the facts, several impressions of my first letter grossly exaggerated, and several absolutely false. This writer's style, coupled with his hiding under a general name, precludes the idea of my attempting to answer him further.

It is significant, or seems so to me, that the two persons who have attacked me and posed as defenders of the existing system of judging, one in your columns, the other in those of your contemporary, have both of them shone by reflected light; in other words, have taken refuge in names by which they cannot be identified. Does it mean that no one approves of the existing system sufficiently to say so boldly and openly? It looks like it.

I anticipate opposition, but I hope for manly, open, and gentlemanly opponents.—I am, yours, &c.,

Andrew Pringle.

Proceedings of Societies.

Photographic Society of Great Britain.

The last ordinary meeting of this Society for the present session was held on Tuesday evening last, the 9th inst., at the Gallery, 5a, Pall Mall East, James Glaisher, Esq., F.R.S., President, in the chair.

The minutes of the previous meeting having been read and confirmed,

The Chairman called upon Mr. J. R. Sawyer to re-open the discussion upon Mr. W. S. Bird's paper "On the Reproduction of Pictures in the National Gallery," and exhibit illustrations of recent discoveries in the photographic reproduction of colour.

Mr. Sawyer commenced by saying that it was quite unnecessary to insist on the importance of the subject referred to in Mr. Bird's paper, as the examples which had been shown proved that a real and substantial advance had been made. Mr. Bird had mentioned that he went to head-quarters for particulars, and Messrs. Braun refused to give any information beyond the letter which had been read. This he had analysed, and could get nothing out of it, beyond certain additions to collodion, and the employment of light of a complementary colour. He thought it was usual to add several substances to collodion for certain purposes. Then they declared that there was no retouching whatever employed, except a few touches, thus implying that the results were due to a secret substance in the film. There was certainly an advance; at the same time, it must not be supposed that it was entirely the outcome of an alteration of the sensitive condition of collodion. They had a proper studio, fitted with every appliance for the work in hand; the glasses could be removed from the pictures, and no pains were spared to thoroughly utilise any advantages the trustees had granted. The Berlin Company, who previously photographed the same subjects, had not similar facilities. Speaking of the influence of isochromatic plates, he said, scarlets remain unchanged; one great point seemed to be a retarding action upon blues, which he thought enabled a longer time to be given to the yellows: this would also account for the greater smoothness discernible. Dr. Vogel had spoken of eosine producing smoothness, and he (Mr Sawyer) found that whether it be used in collodion or a dry plate, this peculiarity was very noticeable. He did not think it likely that colour value would be gained in photography in the manner advocated by Mr. Werge, and some difficulty might be experienced in preparing and working plates sensitive to every part of the spectrum; still, while every nerve should be strained to improve the work by chemical means, yet some art would always be necessary. Mr. Sawyer then exhibited two carbon transparencies of large size, forming a scale of twelve tints each, ranging from vermilion to indigo: one produced from an ordinary wet plate negative, and the other from a Clayton and Tailfer isochromatic gelatine plate, wherein it appeared that the green and vermilion showed no difference in either plate; but there was considerable difference in the case of blues and yellows. In the Clayton and Tailfer plate the three tints of yellow were exactly the same; not so with the wet collodion; and this want of distinguishing degrees or shades of colour accounted for some of the failures in the reproduction of the pictures in the National Gallery. Several examples were then shown, among which were three reproductions of a coloured print: one by the wet process, direct and untouched; another reduced by the wet process; and a carbon transparency taken which had been carefully retouched, and then a carbon negative made from it, and a third made direct on an isochromatic plate (untouched). There was very little difference between the results of the two last named, but the details were pointed out, as also were similar peculiarities in Messrs Braun's reprodudtion of a Raphael and a Rubens recently photographed. Certain evidence of retouching was then alluded to, also the effect of eosine in emulsions and collodion. Coloured glass as a medium Mr. Sawyer did not think practical when large pictures had to be dealt with. Mr. Sawyer having concluded, the Chairman invited remarks.

Colonel Stuart Wortley had listened carefully to Mr. Sawyer's paper, and he had not discovered any evidence to show that Braun's results had any advantage whatever over isochromatic plates carefully retouched, or what had been done twenty years ago with wet collodion by Dr. Diamond. He had been to the Gallery that afternoon to compare a print from Dr. Diamond's negative, and one of the same subject recently made by Braun, with the original painting (one of Turner's). In the latter the yellows were all of the same tint; the old negative he considered perfect in that respect. The blue of the sky was rendered by comparison; in the new negative it was all white. The masts of the vessel had been carefully put in by the retouchers, and Turner had purposely left part of them out. Again, they had completely changed the shape of a cloud; and he would meet any committee the Society might appoint, and prove to them in the most emphatic manner that Braun's picture had been retouched enormously.

Mr. J. Werge said both Mr. Sawyer and Colonel Wortley had strengthened his arguments. The reds were not produced any better than formerly, and the claim advanced by Messrs. Braun was entirely due to retouching.

Mr. W. E. Debenham: Mr. Sawyer referred to coloured mediums as an objection. For large surfaces or for a number of different coloured mediums it would be an insuperable objection. The use of coloured illumination in a box or in the room, of any particular colour, would not be disadvantageous, and he had been working in that direction. Ives, Vogel, Eder, and others introduced dyeing films, and some thought they acted as optical sensitizers; but he thought it better to employ coloured illumination.

Mr. Sawyer's experiments led him to prefer placing the coloured medium over the sensitive plate.

Mr. W. L. Bird was glad to find his paper had elicited so much interest. Did the Colonel admit that the blues and yellows were affected in the specimen of Messrs. Braun?

Col. Wortley: Yes.

Mr. Bird had taken the opinion of Mr. Eastlake, the Keeper of the National Gallery, and he said the advance was very decided; also that of Sir F. Burton, who held that the point was beyond discussion. A month ago Mr. Sawyer held opinions something like those stated by the Colonel, that there was nothing new.

Col. Wortley: There is no novelty beyond what isochromatic plates could do with retouching.

Mr. Bird: Well, Mr. Sawyer was of the same opinion as Mr.

Werge and the Colonel, but he has changed it considerably in the interval. It has been shown to-night what can be done by certain plates without the slightest amount of retouching, and we have no right to doubt Messrs. Braun's assertion. Mr. Sawyer has shown there is an advance, and this Society should insist on increasing our knowledge in this direction. Collodion emulsion is said to be used at Dornach; Tailfer's plates are not used. The Berlin Company had the same facilities as Messrs. Braun. Regarding an alteration in the appearance of a cloud spoken of by Col. Wortley, he must remember that twenty years makes a great difference in a picture.

Col. Wortley: I challenge Messrs. Braun most distinctly to send their negatives here. The clouds have been carefully touched out of shape.

Mr. Leon Warnerke observed that the orthochromatic plate did not give all that is wanted, and he had tried several brands. Those used by Mr. Sawyer (Tailfer's) had colouring matter put into the emulsion, so did not require a coloured glass medium like Vogel uses. The effect was due to the colour, and some colours acted much better than others. He had tried a great number; he did not think smoothness due to eosine, because the most remarkable result he had obtained was with flashed glass; he used deeply tinted glasses, which increased exposure from 300 to 600 times. This was of little consequence with dry plates, but if they could find a means of reducing exposure, then so much the better. Captain Abney had asked him to say that he (Capt. Abney) was in favour of illuminating the picture in the manner just suggested by Mr. Debenham. He then passed round a chart containing all the spectrum colours, and reproductions therefrom. The Tailfer plate would not give sufficiently good results with his chart unless a coloured media was also used. These plates did a great deal, but not all. He found that coloured glasses did alter the shape of a figure on the chart, the green and red becoming exaggerated. The position of the glass had much to do with success, and he preferred using it just behind the lens.

Mr. Sawyer then replied. He said they might take it unofficially from him that the plates used recently by Messrs. Braun at the National Gallery were wet collodion. That firm added certain substances to collodion, and Tailfer mixed it with emulsion for his dry plate. He could prove that those pictures showing smoothness of texture were as sharp, or sharper, than the others, and he did not think the small prints shown by Mr. Warnerke were any guide. The proper position for a coloured glass plate was in the camera, and just in front of the plate.

The Chairman thought there was no subject of greater interest than the study of colour reproduction by photography, and he called for a vote of thanks to Mr. Sawyer for his paper, and another to Mr. Werge, which were duly accorded.

Mr. Warnerke then introduced the subject of a "New Sensitive Paper as a Substitute for Glass." Having remarked upon the inconvenience of glass negatives when travelling, he had, years ago, introduced a means of overcoming the difficulty, and now he had met with a new material, which he coated upon both sides, and obtained a rapid film capable of yielding perfect negatives as fine in texture as glass. An example was then passed round, as well as prints from the same, which left nothing to be desired. Mr. Warnerke pointed out that the material could be exposed in metal slides, or by means of his usual roller-slide, which had been improved to meet the requirements of this rapid substitute. It was very strong, and did not expand in water, so that development, fixing, &c., could take place in the ordinary way. The films could be dried on a glass plate and stripped, when they would have a glazed surface; or packed away in books, and dried with a matt surface.

Mr. W. England enquired how Mr. Warnerke would protect the films from the action of silver during printing.

Mr. Warnerke said there was no difficulty in applying a coating of dammar varnish to a plate upon which one of these films was placed, and stripping it off when dry.

The Chairman thanked Mr. Warnerke for bringing the subject before them, and hoped it would prove of great advantage. He then called upon Mr. Addenbrooke to read a paper on "An Improved Shutter," but, owing to the lateness of the hour, that gentleman preferred to explain one or two points, and reserve its further consideration until the next Technical Meeting, June 23. The Chairman then announced that all pictures intended for the next Annual Exhibition must be delivered by the evening of September 24th, after which none will be received. The annual *soirée* will take place on Saturday, October 3rd, when he hopes to see a good show of pictures, and meet all the members of the Society; and in the meantime he wished them an enjoyable holiday season.

The meeting was then adjourned until October 3rd.

South London Photographic Society.

The last ordinary meeting of this Society, previous to the summer recess, was held on Thursday, the 4th inst., at the House of the Society of Arts, John Street, Adelphi, W.C., Mr. C. Poirson in the chair.

The minutes of the May meeting having been read and confirmed,

The Chairman called upon Mr. W. M. Ashman to read a paper entitled, "Hints for Summer Work" (see page 372).

Mr. Ashman having concluded his remarks, some of which were practically illustrated, the Chairman invited a discussion.

He remarked on the usefulness of papers similar to that they had just listened to, and referred to a curious experience which he had met with only a few days before—*viz.*, that of the films breaking away in patches during development, or in the after washing, the particular sample of plates being so soft that a touch of the finger, or even the pressure from a stream of water, was sufficient to bring away small pieces of film. He wished to know whether, in practice, there would be any appreciable gain in passing the slit of a drop-shutter vertically or horizontally, according to the nature of the subject?

Mr. E. Pilkington handed round a drop shutter, which he was sure was the roughest that had ever been shown; nevertheless, he had succeeded in making a large number of London street views by its means, and he agreed with Mr. Ashman that the drop was the most useful form of shutter for out-door work extant.

The Chairman had made a similar arrangement to the one shown, but the heat of the sun caused it to warp, and thereby defeated the object.

Mr. Pilkington remarked that he used cigar-box wood, and the shutter had never yet failed. He then spoke of certain advantages to be derived from the employment of the blue printing process, by tourist photographers, when merely a few copies were wanted in a hurry, or when there was a scarcity of water for washing prints, as experienced at Continental hotels.

Mr. E. Clifton spoke in favour of the plain drop shutter, and he said it was really astonishing how accurately speed could be governed by the angle at which it was set.

Mr. Ashman then briefly replied to the speakers, after which he exhibited and explained the construction of "An inexpensive electric shutter for studio use." He commenced by saying: The arrangement I have now the pleasure of showing you is one that has been in constant use for seven years, and was described by me as far back as May, 1879; therefore I trust you will not take exception to its want of novelty and rough workmanship. The shutter was then shown in action. Continuing, he said: You will observe that it is constructed to work inside the camera immediately behind the lens, and that it occupies less room than any commercial shutter yet introduced, whilst it is certain in action, noiseless, and as rapid as there is any necessity for. These two doors opening from the centre are each very little wider than half the diameter of the lens; they are blackened pieces of cardboard—old photographs—and are swung open by means of knitting needles supported by brass arms, having small holes drilled through them to receive the pointed ends of the needles, thus reducing friction to a minimum. Beneath these doors is fixed an electro-magnet, and within the magnetic field is placed an iron plate or armature having a projecting fork soldered to it. Beneath the armature, and attached thereto, is another needle having a fixed metal plate at each end, through which the needle points pass, and thus the ends of the fork, when in action, describe an arc of greater dimensions than that of the armature plate, besides which the whole of the magnetic force is utilized. The fork strikes metal wedges which open the doors and retain them in that position until the circuit is broken. The rapid closing is in a great measure accelerated by light springs, the tension of which may be regulated as in the model shown, and in all cases must not be sufficient to overcome the power of the magnet. By making the pull less on one door than on the other, and gluing a strip of paper or other material at the edge of each, a lap is formed, when closed, which effectually stops the passage of light. You are all sufficiently acquainted with the science of magnetism and electricity to understand the precise action that takes place when a circuit is closed in which a coil of covered copper wire wound on a bar of soft iron forms a part, and you are doubtless familiar with the forms of batteries best suited for studio work. In my own practice I use the Leclanche pile exclusively. The porous pots before you have been in use three years, and there is something left yet; but they require care to get the most out of them. I never use these three cells for any other purpose than opening those doors, and they are only in action as long as the exposure lasts, the latter being determined by opening the circuit when all action on the battery ceases. Focussing is managed without the batteries, a lever being provided for that purpose; very long exposures, as in copying, are managed in the same way; but exposures of three or four minutes' duration would not distress the battery, provided a short interval elapsed between each exposure. It is important that all connecting points should be kept clean, and terminal screws tightened occasionally; the liquid should be filtered to rid it of the crystals of zinc chloride formed, strengthened after five or six weeks' use, and renewed (say) once in six months. I make a saturated solution of sal ammoniac, filter, and use six parts of this with two of water. The quantity used should be only sufficient to reach two-thirds of the distance up the porous pot. I always make my own zinc rods from old cisterns or any rough zinc I can get hold of, which is run down into a mould; when cold, filed up and amalgamated with mercury; this latter operation, if well done, saves considerable local action and loss of power by preventing the rapid formation of crystals of zinc chloride and general deterioration. It is a good plan to have metallic mercury loose at the bottom of the liquid, as it enables the zinc rod to replenish its surface as voltaic action goes on. The subject is too important to be dealt with in this manner, since it is not possible to briefly illustrate all that has been done in this direction; in fact, one gentleman, Mr. R. Offord, exhibited three years ago no less than ten different forms of camera shutters possessing great merit; these were all actuated electrically. I have made all the parts of the shutter now shown, and fixed them separately, so that a glance will be sufficient to enable any of the gentlemen present to make a shutter out of old photographs, a cigar box, three penny worth of wire, and a few old printing-frame springs.

After the usual vote of thanks,

The Chairman announced that the outdoor meeting would take place on the last Saturday in July (25th prox.), due notice of which would be given by the Secretary.

London and Provincial Photographic Association.

At the usual weekly meeting on Thursday, the 4th inst., Mr. T. Waltenberg occupied the chair.

Mr. G. Poirin passed round two negatives—one coated with a collodio-bromide emulsion, the other with the same emulsion, but in addition had been coated with a rapid emulsion over it. Upon exposure, it was found that the plate with the two films was about twenty times more rapid than the other; it showed, however, a very thin image.

Mr. J. Barker remarked that he had some years ago tried coating two films on one plate, but invariably found that he obtained better results from gelatino-bromide plates alone; he therefore gave up experimenting in that direction.

Mr. J. B. B. Wellington thought the silver on the gelatine film only had been reduced, and not the silver in the collodion film.

A question from the box was read:—"If a rapid gelatino-bromide plate be kept at a temperature of from 110° F. to 120° F. for some time, will that plate lose its sensitiveness? And if so, will the loss of sensitiveness be permanent?"

Mr. W. H. Prestwich mentioned a case of a batch of plates that frilled very badly. He ultimately had them subjected to a great heat, which completely cured the frilling without any loss of sensitiveness.

Mr. J. Barker said a similar case had occurred with him; some plates he had frilled. As a possible remedy he put them in an oven; this had the desired effect.

Mr. A. Haddon remarked that a friend of his had recently returned from Zanzibar; he had taken out with him two makes of rapid commercial plates. In one case an exposure of from four to five seconds would only produce an exceedingly hard image; with the other make, scarcely any image could be obtained.

Mr. Richard Jahr thought a high temperature in the last stage of drying gelatine plates an advantage when the plates were intended for use in a hot climate, to ensure their being thoroughly dry before packing. He stated that in some parts of America the temperature was as high as at Zanzibar, but it was not found to have any effect upon the sensitiveness of the plates.

Mr. J. B. B. Wellington passed round for the members' inspection a series of platinotype prints from negatives taken by him at Whitsuntide.

In reply to a question,

Mr. R. Jahr said platinotype was used in all the large cities of America by professional photographers for enlargements.

Sheffield Photographic Society.

The monthly meeting was held in the Masonic Hall on Tuesday, 2nd inst., Mr. W. B. Hatfield in the chair.

After the usual business of the evening, Messrs. W. W. Wood, Geo. Hirst, Jonathan Taylor, and E. M. Barker were elected members.

The pictures for the competition were then brought on for judgment, the subject being "Old Mill." More pictures were entered for this than any previous contest, and the whole formed a very interesting collection of "Old Mills."

The two winners in last month's contest took the same positions:—Mr. J. W. Charlesworth 1st; and the President 2nd.

The exhibition of and conversation on pictures of the Society's May trip to Kirkstall Abbey, near Leeds, then lasted some time. Very many beautiful pictures were got, the day being fine and sunny; and though the party was not so large as might have been expected, most of the picturesque positions of the Abbey were secured.

As this was the night on which the 1884 members were to select their presentation print from the best specimens of members' work, a most abundant and interesting collection lay on the table, and deeply interested a crowded meeting until a late hour.

The next trip of the Society will be to Lathkill Dale on Monday, June 15.

Hyde Amateur Photographic Society.

On Whit Saturday this Society had its third trip of the season, when thirty members and friends went by train to Bakewell, for Haddon Hall. Mr. F. W. Cheetham was the leader, and great praise is due to him for the very successful manner in which he carried out his duties. On going through the village of Bakewell, several members took various views of the river bridge. The party then proceeded by the main road to Haddon, which is about three miles distant. Having paid the usual entrance fee (3d.), the party at once set to work taking various views. Whilst several views of the courtyard were taken, several other members proceeded to take interiors, &c., including the banquetting hall, ballroom, and the bed in which Queen Elizabeth is said to have slept during her visit to the "King of the Peak." Others proceeded to take views of the Hall and garden terraces. Several members photographed the party on the steps leading from the garden to the terrace. After tea those who had not shot off all their plates at once sought suitable subjects on which to expose. About fifty views were taken, the weather being all that could be desired.

Glossop Dale Photographic Society.

The third out-door meeting of the present session was held on May 30, the place of destination being Miller's Dale, when, owing to the Whitsuntide holidays, the muster was not as large as was originally expected.

The route taken was down the valley, *via* Lytton Mills, Water-cum-Jolie, and Cressbrook—at each of which places several plates were exposed—on to Monsal Dale. The light during the latter part of the day, though good, was not so bright as in the morning, and at times there was every indication of rain, which, however, passed over. In the meantime the slides had been emptied and re-charged, and, when the party returned from Monsal Dale, a few more plates were "shot off" in Miller's Dale. On the average, about ten plates per member were exposed, and a fair percentage of good negatives was obtained.

The ordinary monthly meeting was held on Tuesday, the 2nd instant, at the Society's rooms, the chair being taken by Mr. Merry.

Several negatives and prints were exhibited, including some of the Miller's Dale out.

After the minutes of the previous meeting had been read and confirmed,

The Chairman called upon Mr. H. A. Rademacher, C.E., F.C.S., to read his paper entitled, "Notes on Sulphite of Soda," in the course of which, after a few introductory remarks on the terms used in the discussion of the structure and constitution of chemical compounds, he proceeded to represent on the blackboard the structure and relationship of the following compounds:—Water, soda crystals, crystallized sodium sulphate, crystallized hyposulphite, and sodium sulphite. Some simple tests were given for ascertaining the suitability or otherwise of hypo for photographic purposes. The chemical nature and various modes of action of sodium sulphite were next discussed, and the use of sodium sulphite or bisulphite, or, better still, the corresponding lime compounds, were recommended for use in paper mills making photographic materials, instead of the ordinary "antichlore" or "killbleach," which is hyposulphite. Mention was made of some other compounds of sulphurous acid and soda besides the normal sulphite, formed under different conditions of temperature, strength of solution, &c.

North Staffordshire Amateur Photographic Society.

The usual fortnightly meeting was held on the 20th ult.; the President occupied the chair.

Mrs. Hall and Mr. J. M. Parker were elected members.

Some excellent prints in silver and carbon from negatives taken on the occasion of the last excursion to Lichfield were passed round, several of the members having been very successful in the interior of the Cathedral.

It was resolved that an excursion be made to Keele, near Newcastle-under-Lyme, on Wednesday, June 3rd.

Permission having been given by the owner of Keele Hall for the members of the Society to photograph in the neighbourhood, a numerous party of ladies and gentlemen proceeded to the pretty spot, and the weather being almost all that could be desired, a very enjoyable day was spent. The ladies with their cameras evidently took as great an interest in the art as the gentlemen.

Bristol and West of England Amateur Photographic Association.

The May excursion meeting took place on Monday, 18th inst., to Radstock, from which place it was arranged to drive to Great Elm Rectory, whither the party had been kindly invited by one of its members, the Rev. H. B. Hare. The weather looked doubtful at starting, but before Radstock had been left very far in the rear the weather brightened, and the drive became enjoyable and bracing. Misfortune was experienced by the party on reaching a bye-road which branched off at a very acute angle, where the horses shied at a water-barrel in a field, on entering which through a luckily open gate, the break collided with the gate-post and carried away the splinter-bar. Camera straps, rope, &c., however, made a decently firm "cobble up" of the fracture for a time, and ultimately Great Elm Rectory was safely reached. After breakfast, thoughtfully provided by the reverend host, a good deal of work was done before the clouds joined hands in opposing the photographer's advance, which, however, they made later in the morning, and to such an extent that it was thought advisable to use the opportunity for having lunch. A very pleasant hour was spent in this way, and after examining some of Mr. Hare's negatives, the weather brightened, and at the commencement of what proved to be a most delightful afternoon the party again made a start for one of the most beautiful subjects in the neighbourhood, the Old Mill.

After a pleasant walk across pleasant fields, by the side of the picturesque stream, the mill was reached, and almost every one commenced without delay to expose plates on this charmingly composed subject. By this time the light had become almost too bright; it was evident, however, that some were taking the best means at their command for battling with this difficulty. A still further point on the river was reached, and some pleasing subjects photographed, when it was found that the time had flown, and a return to the Rectory was necessary. We must not forget, however, a most perfect subject which was formed by some cows coming down to the river to drink, the surroundings being also charmingly composed. Once more the hospitable board of the genial host was surrounded, and a high tea done full and appreciative justice to.

On the proposition of the President (Mr. Davey), a hearty vote of thanks was given to the Rev. H. B. Hare, who, in responding, expressed his great pleasure in having the members of the Society as his guests that day.

The break, excellently repaired, and withal very expeditiously, now arrived, and each stowed himself and his "traps" therein for the return journey, after a most pleasant excursion.

Mr. Frank Prichard was elected as an ordinary member.

Talk in the Studio.

A Reversing Tripod Top.—Mr. J. Pike, of Newcastle-on-Tyne sends us a very conveniently-constructed reversing tripod top which he has designed. It is, in the main, similar to that described by Mr. R. Keene on page 91 of the current Year-Book, but it is provided with a slide by which the camera can be brought more or less completely over the centre of the tripod. An arrangement of this kind is not only useful when one has occasion to direct the camera upwards or downwards, but also as a means of rapidly shifting the camera so as to make the long dimension of the plate either horizontal or vertical.

International Inventions Exhibition.—The jury for Group 29 (Photography), is composed of the following:—Warren de la Rue, D.C.L., F.R.S. (Chairman), Captain Abney, R.E., F.R.S. (Vice-Chairman), Colonel Stuart Wortley (Reporter), T. Bolas, W. B. Bolton, Hugh W. Diamond, M.D., F.S.A., W. F. Donkin, John Spiller, F.C.S.

Society of Arts Conversazione.—The Society of Arts Conversazione will be held, by permission of the Executive Council of the International Inventions Exhibition, in the Exhibition buildings, South Kensington, on Friday evening, the 3rd of July next. The entrances to the Exhibition in the Exhibition Road and in Queen's Gate will both be open. A reception will be held by Sir Frederick Abel, C.B., F.R.S. (Chairman), and the members of the Council of the Society of Arts, near the principal entrance to the Exhibition in Exhibition Road. The reception will commence at 8 p.m. Light refreshments (tea, coffee, ices, &c.) will be supplied at the usual buffets. No refreshments of any kind will be sold. The usual cloak rooms will be open, but there will be no special arrangements for receiving hats, coats, cloaks, &c., which may be required for use in the gardens. Further particulars as to the musical and other arrangements will appear in the Society of Arts Journal. Programmes will also be distributed on the evening. There will be no admission to the Exhibition except to persons provided with Society of Arts tickets; the ordinary season or other tickets will not be available.

The Berlin Exhibition, 1888.—This, it seems, will be strictly national, the representatives of Berlin commerce and industry having arrived at this resolution at a meeting held on May 20th. Amongst the reasons urged in favour of 1888 was the supposition that many exhibitors at the Paris display of 1889 would visit Berlin the year before, and thus see what Germany was doing in various branches of manufacture.

Paris Exhibition, 1889.—The Parisians are actively engaged in arranging the preliminaries of their great Exhibition, which is to celebrate the centenary of the Revolution, and which will occupy a space one-third larger than that of 1878. It will cover the Champ de Mars, all the quay, as far as the Ministry of Foreign Affairs, and the esplanade of the Invalides, on the left bank. On the right it will take in the Trocadero, and all the portion of the Champs Elysées comprised between the Seine, the Place de la Concorde, the Grande Avenue, and the Avenue d'Antin. The superficial area of the covered portion will be slightly over 3,000,000 square feet, the palaces of art and science each occupying about 360,000 square feet, and the remaining space being about equally distributed between the machinery hall and a number of intermediate constructions. According to a rough estimate, the cost is put at £2,000,000, but some French journals consider that the amount will more likely be double that sum. The Government does not propose to bring the financial provision for the scheme before the present Parliament, as it is so near to expiration. It will form the subject of deliberation after the election of the new Chamber; but it is already understood that the city of Paris will contribute the sum of about £240,000.

Notts Photographic Association.—The following excursions have been decided upon, and the Committee trust that members will make their arrangements so as to attend as many as possible:—Saturday, June 6, Weston-on-Trent and King's Mills; Thursday, June 11, Thurgaton; Thursday, June 18, Haddon Hall (the President, Mr. G. Shepperley, offers a prize of 10s. 6d. for the best photo. taken during this excursion); Saturday, June 20, Wilford and Clifton; Thursday, June 25, Wollaton and Lenton; Saturday, July 4, Quarndon and Kedleston Park; Thursday, July 9, Borrowash and Elvaston Castle; Saturday, July 18, Miller's Dale and District; Thursday, July 23, Thrumpton; Saturday, August 8, Bottesford and Belvoir Castle; Thursday, August 13, Melbourne; Saturday August 22, Newstead; Thursday, August 27, The Dukeries.

Method of Hardening Plaster.—By Julie (*Compt. Rend.*, 100, 797—799).—Plaster is the only material for building purposes which increases its volume after application, but it possesses the disadvantage of want of firmness. It is proposed to harden it by mixing 6 parts of plaster with 1 part of rich lime, drying the mixture, and then soaking it for a short time in the sulphates of metals precipitated by lime, of which the most convenient are those of zinc and iron. If the latter be used the plaster assumes, after a time, the characteristic tint of ferric oxide, but its resistance to fracture is twenty times as great as ordinary plaster. Such a mixture may also be used as a cheap substitute for parqueterie flooring.—*Journal of the Chemical Society.*

Obtaining Iodine in Peru. (*Dingl. Polyt. J.*, 255, 299.)—According to the *Génie Civil*, 1884, 5, 106, about 1600 kilos. of iodine are produced monthly at the works of Pernana in the province Tarapaca, in Peru, from the iodous mother-liquors obtained in the manufacture of sodium nitrate. The forms of apparatus constructed by R. Harvey and J. T. North in 1881 are employed for the preparation of the hydrogen sodium sulphite used to precipitate the iodine, and for distilling the latter. The hydrogen sodium sulphite is obtained by saturating a solution of soda with sulphurous anhydride. The soda is prepared by furnacing an intimate mixture of sodium nitrate and coal-dust. The essential constituent of the product of the reaction is soda contaminated with sodium chloride, sodium sulphate, earthy ingredients, and unburnt coal.—*Chemical Society's Journal.*

Potassium Dichromate as an Antiseptic.—By Laujorrois (*Chem. Centr.*, 1884, 676).—Potassium dichromate (1 per cent.) acts as an antiseptic, preventing the putrefaction of urine and milk. Three eggs were taken, of which one was left whole, the second was injected with 10 drops of a 1 per cent. solution of dichromate, and the third was injected with 10 drops of a 1 per cent. carbolic acid solution. After three months the first and second were undecomposed, whilst the third was quite rotten. Dichromate cannot be used for food preservation on account of its poisonous properties.—*Abstract of the Chemical Society.*

Action of Bromine on Chlorides. By Berthelot (*Compt. Rend.*, 100, 761—767).—Concentrated solutions of hydrochloric acid and of metallic chlorides absorb considerable quantities of bromine with evolution of heat, thus pointing to the formation of additive compounds, the perbromides of the chlorides. The resultant solutions slowly give up bromine when a current of air is passed through them. Their formation is always accompanied by the displacement of a small quantity of the chlorine by bromine, attended possibly by the generation of chlorobromides. In this paper, the exothermic reactions of bromine with hydrochloric acid and the chlorides of barium, strontium, and calcium, are studied.—*Chemical Society Reports.*

Photographic Club.—The subject for discussion at the next meeting, on June 17, will be "On the Use of Sulphites and Bisulphites in Photography." The Saturday out-door meeting will be held at Pinner; trains from Baker Street at 2.29 and 2.59.

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To Correspondents.

*** We cannot undertake to return rejected communications.

D. F. G.—The marginal definition should be sufficiently good to satisfy an ordinary critic. Study to select a suitable point for focussing, so as to as far as possible distribute the faults over the plate. We do not think that it is advisable for you to obtain a quicker lens, unless you intend it for much smaller pictures.

J. H. Goldie.—There are so many circumstances which may modify the application of the law to such a case, that we should not feel justified in advising, even if we were well acquainted with all the circumstances. It is probable that the main question is the length of time that your studio has been in existence.

Ebbw Vale.—Thoroughly clean the glass with such detergents as you mention, and then wax one side of it in the following manner:—Warm the plate to a temperature somewhat over the melting point of wax, and rub it with a lump of the genuine article (yellow); after which diffuse the wax evenly over the surface with a small piece of flannel, and polish off the excess with another piece of flannel. Of course the glass must not be allowed to get cold during the operation of waxing.

W. C. W.—As the burden of your letter is what "I" saw, "I" experienced, and "I" think, it must be signed with your name if inserted at all.

E. D. Adcock.—The Silvertown Company, 100, Cannon Street, London, E.C.

H. P.—Use it just as it is; perhaps your sample was alkaline.

E. H. Mickelwood.—1. As far as our recollection goes, the method has not been referred to in the Photographic News: indeed, it has only a very remote bearing upon photography. 2. Water should answer, but it would be necessary to apply it with caution; perhaps as fine spray, and only a very little at a time. You might also try a dilute solution of silicate of soda.

C. Stuart.—1. It is generally the case when water is supplied under high pressure, and the only remedy is to occasionally move them about, or to use water from another source. 2. See page 371.

J. Hawkes Smith.—The idea is one which has much to be said in its favour, but the disadvantage is that one cannot work with a lens of short focus, or, indeed, any lens suited for a plate much smaller than the largest which the slide will take. The apparatus has been returned to you by post.

A. F.—1. The black deposit is silver, and you can more or less perfectly prevent its deposition by varnishing the metal with Brunswick black. But why not use trays of earthenware, ebonite, or gutta-percha? 2. Make it of wood, and line with gutta-percha. If, however, you are resolved to use metal of some kind, line it with lead.

A. M. Corkindale.—Write to Mr. Henderson at his studio in King William Street, London Bridge; he will perhaps tell you where it is.

Broad Arrow.—1. It seems that for some reason you have not made the general ground sufficiently repellent of the fatty ink. Try etching rather more strongly. 2. Only on the ink; but the ink fills "the corners of the steps," as you define them, so the resin covers these also. Probably the whole difficulty arises from your not having a roller in a sufficiently "springy" condition. Take a look through a lithographic shop, if you have a chance.

W. H. Sedgwick.—Try developing much more slowly—let us suppose, by very largely diluting the developer.

Photographs Registered.

Mr. R. H. Lord (Market St., Cambridge)—2 Photos. of Bishop Hannington.
Mrs. E. E. Cox (Nottingham)—3 Photographs of Cats.
Messrs. Appleton & Co (Bradford)—Photo. Group of Heads of Wesleyan Methodist Representatives.
Messrs. Turner & Drinkwater (Hull)—Photos. of Prince of Wales and of Lord Alcester; 2 Photos. of Admiral Sir H. Keppell.
Mr. W. J. Byrne.—Photos. of Princesses Louise and Victoria of Schleswig-Holstein.
Mr. T. Percy Graham (St. Mary's, Bedford)—Photo. entitled "Our Darling."
Mr. Thurston (Luton, Beds.)—Photo. entitled "A Summer Day."
Mr. D. Barnett (Coteswold, Leckhampton, Cheltenham)—Photo. of Old Inn Yard, Nailsworth.
Mr. H. Webber (Leytonstone)—Photo. of Mr. W. Pierce.
Mr. Edward Hill (Darlington Street, Wolverhampton)—Photo. Group Miss R. Berryman and Miss L. Cresswell.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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THE TREATMENT OF UNMOUNTED PRINTS ON ALBUMENIZED PAPER.

To the professional photographer who sends out large numbers of unmounted prints, it is a simple enough matter to so flatten them that they will be quite manageable, showing no inclination to curl up inconveniently. It pays him to have a large press with roller and hot plate, and he simply passes the prints through this.

With the amateur photographer the matter is in most cases very different. He cannot, especially if he work a large size, afford to purchase a rolling machine to pass his prints through, and he is often irritated beyond measure by the condition which they assume when they have dried, especially if the paper have a high surface. They are found to have curled themselves up with the albumenized side inwards, sometimes into a little roll no thicker than a lead pencil, and any effort to unroll them usually results in tearing the paper, and always in a deterioration of the surface by the cracking of the albumen film.

Ordinary single albumenized paper does not curl up in such a totally unmanageable manner as does the very high surface double albumenized paper now frequently used, but still it is very troublesome. The prints, if they are allowed to curl up, may be flattened in one of two ways. The first and most popular is by laying them face downwards on a pad of blotting paper, or some similar material, and passing a hot iron carefully over the back. With small prints this treatment is usually quite satisfactory. With large prints, unless the amateur have the skill of a fairly expert laundress, he is certain to cause folds and wrinkles in the paper which can never be eradicated. Moreover, he is liable by the slightest over-heating of the iron to turn the whites of the pictures into yellow.

The second method is that of passing a blunt paper-cutter over the back of the print whilst it is laid face downwards on a soft pad. This method has the objection that it is almost certain to crack the albumen film to a greater or lesser degree.

By far the best way of treating prints which are not intended to be mounted is, in our opinion, to so dry and treat them that they are never permitted to roll up. There are various ways of doing this. If prints be allowed to drain for a few minutes, and then be laid between sheets of blotting-paper—or, still better, between drying boards, which are simply very thick sheets of blotting-paper with a smooth surface—if the sheets be piled one on the top of the other with a weight over all, and if the whole arrangement be allowed to stand for a few days, the prints will at the end of that time be found to be dry, and will have but little inclination to curl up.

A method which we prefer is the following:—The prints are removed one by one from the washing water, each being allowed to drain till water ceases to drip from it. It is now blotted off with white blotting-paper, which ought to be that which is made specially for photographic purposes, and which is guaranteed to be free from hyposulphite of soda.

The print, when it is blotted surface dry, is laid face downwards on clean blotting paper. The albumenized surface being downwards, the weight of the paper restrains the inclination that there is for the edges to curl inwards, and the prints may be allowed to get very nearly dry without curling into a condition at all unmanageable. When they are very nearly quite dry—which is indicated by their beginning to curl stiffly inwards at the edges in spite of their lying face downwards—they are piled one on the top of the other, no blotting paper or anything else intervening between them. A weight is laid on the top of the pile, and it is left for several hours or any longer time. If the prints be on single albumenized paper, they will without farther treatment have been sufficiently flattened. Double albumenized paper is, however, very obstinate, and requires something more than merely lying flat under a weight.

A thin wooden roller is taken—one about an inch in diameter is suitable—on to this, one of the prints is rolled, albumenized side outwards; the end of the print is caused to overlap the beginning of a second one by half-an-inch or so, and then the latter is rolled up till it overlaps and catches a third, and so on. By this means a far tighter roll of prints can be made than by rolling them as they lie one on the top of another. The prints are allowed to remain rolled up for a day or more, when, if once laid out flat, they will remain so.

HYPO IN GELATINE NEGATIVES.

Mr. Bell, writing to the *Philadelphia Photographer*, makes some pertinent remarks on this subject. He says:—When is the hypo out of gelatine negatives? was asked from the question-box, Philadelphia Photographic Society. This important question got but few answers, and those but "ill-digested." The writer has for guide—viz., plates that develop and fix quick, hypo washes out of quickly. Plates slow in developing, and very slow in fixing, will be very slow in having the hypo washed out; in fact, with such plates one is never sure that the hypo is ever got rid of. Such plates give up the hypo better by soaking than being washed directly under the tap. Hypo in gelatine negatives is not so destructive as in collodion, but finally will destroy them. I have gelatine negatives five years old that have hypo in them, and yet are used to produce good prints from them. To test whether hypo is out of any gelatine negative, take a plate that has been given the supposed washing to rid it of hypo, put it on a levelling-stand, cover it with water, let it remain there some twenty minutes; now pour this water into a weak solution of the blue iodide of starch, and, if this is decolourised, the washing has not been sufficient.

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THE PHOTOGRAPHIC HOTEL.

(A Peep into the near Future.)

"He thought that amateur photographers might reasonably expect that hotel keepers would begin to realise the necessity of providing accommodation for them." This is the opinion of the President of the Manchester Amateur Photographic Society. What a prospect it opens up! No more waiting till dark before plates can be developed, and sitting up half the night coaxing out an under-exposed and obstinate picture. No more vexations because your stock of dry plates is exhausted, and the loveliest views you have yet seen cannot be taken in consequence. No more agony arising from an accident to your camera and the inability to procure another. No more—but really the possibilities springing out of Mr. Palmer's suggestion are so numerous that they can be only dealt with adequately in a dramatic form.

[Scene.—*The Camera Hotel: Enter Photographer with kit.*]

Photographer (*to Manager of Hotel*). Tell your fellows to be very careful of my luggage.

Manager.—You need not be under the least anxiety, sir; I will send our photographic waiter to you. Will you be wanting the use of our dark room?

Photographer (*astonished*).—What, have you a dark-room?

Manager.—Certainly, sir; very commodious, and with a properly tested non-actinic light. The charge is one shilling per hour, including chemicals. If you use your own chemicals, the tariff is one half.

Photographer.—Dear me. That is exceedingly convenient.

Manager.—Oh, we are determined to move with the times. If you would prefer it, our man, who holds a first-class certificate from the City of London Guilds and Institute, would develop your plates. The tariff for developing plates commences at 2s. 6d. per dozen quarter-plate size.

Photographer.—Really, I wish I had known it. I should not have troubled to have lumbered up myself with bottles. As it is, owing to the number of things I had with me, I have lost the flange of my most useful lens.

Manager.—Do not trouble, sir. If your flanges have the standard screws adopted by the Photographic Society, we can supply you with another.

Photographer.—I am much obliged. Possibly also you have some material which would do for a focussing-cloth. Unfortunately, I left mine among the hills yesterday.

Manager.—We have, sir, every photographic requisite that you can possibly want. That, sir, is our manual of instructions, and I think you'll find that by using the Hotel apparatus you will save both money and trouble. A telegram or letter stating the kind of picture you wish to take—still life, architectural, out-door groups, or instantaneous—will receive prompt attention, and on arriving here you will find everything ready and in perfect order.

Photographer.—Good gracious! You astonish me.

Manager.—Or if you prefer it, you can have a locker in which to put your own apparatus, so that the bother of dragging it up to town is entirely avoided. We derived that hint, sir, from the fishing hotels, where similar lockers are provided for rods, nets, and gear generally.

Photographer.—And can I have proofs printed here? It is so convenient to be able to see how a negative prints.

Manager.—Well, sir, we have printing arrangements in contemplation, but they are not yet completed. Our intention is to introduce the new direct printing process by development; but we should like to be satisfied that it is thoroughly reliable before we introduce it to our customers.

Photographer.—Quite right. I see I can leave my apparatus in your hands with perfect safety.

Manager.—Oh, yes. (*To photographic waiter*) Simmons, see to this gentleman's things, and supply him with one of our landscape time-tables for the month.

Photographer.—Landscape time-table—what is that?

Simmons.—This is it, sir (*gives card*). Shows the best times of the day for photographing the various places of interest in the neighbourhood. We have also artistic guides attached to the hotel, who will assist you to pick out the best spots, and pose, if necessary, as a figure in the foreground, to give life to the picture. All information as to fees on the back of the card.

(*Photographer takes card, and retires to coffee-room overwhelmed.*)

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METEOROLOGY FOR PHOTOGRAPHERS.

BY J. VINCENT ELSDEN B.SC. (LOND.), F.C.S.

Chapter II.—Temperature of the Atmosphere—Thermometers—Fluctuations in Temperature—Influence in Photography.

Nearly all atmospherical changes depend ultimately upon the temperature of the air, the accurate determination of which is, therefore, one of the most important, and at the same time perhaps one of the most difficult, of all meteorological observations. The history and mode of construction of thermometers cannot be discussed in detail here. It will be enough to mention that the inventor of the thermometer is unknown, and that both the Florentine spirit thermometers and the Dutch air thermometers were in use before 1693, when Halley suggested the employment of mercury, as well as the adoption of the boiling point of water, as one of the standard temperatures. The adoption of the freezing point of water, as the zero of the scale, had been previously recommended by Hooke, in 1667.

Since, at the present time, both mercury and alcohol thermometers are in common use, it may be useful to compare the relative advantages of these two liquids as thermometric substances. Mercury possesses the great advantage of expanding uniformly over a large range of temperature, its boiling point being 350° C. (660° Fah.), and its freezing point 36° C. (−38° Fah.). This advantage is not possessed by alcohol, the expansion of which is irregular, increasing with the temperature, so that the length of a degree on an alcohol thermometer varies in different parts of the scale. The great advantage of alcohol is its utility for measuring very low temperatures, for it has never yet been frozen; but since it boils at 79°·2 C. (174°·2 Fah.) it is useless for high temperatures. Mercury, however, possesses other advantages. It can easily be obtained pure. Its specific heat is very small, so that it does not take much heat away from the substance of which the temperature is being measured. Lastly, being a metal, its conductivity is very great, so that it quickly assumes the temperature of the substance in which it is placed.

Unfortunately, considerable confusion has been caused by the adoption, by various countries, of different modes of graduating thermometer scales. Fahrenheit took as his zero, not the freezing point of water, but the temperature of a freezing mixture of powdered ice and salt. He also divided the distance between the freezing and boiling points of water into 180 equal parts. He thus found 32° between his zero and the freezing point of water. In the centigrade thermometer, invented by Celsius, and in almost universal use on the Continent, as well as in this country for scientific purposes, the freezing point of water is the zero, and the distance between this point and boiling point is divided into 100 equal parts. Thus, the degree Fahrenheit is the $\frac{1}{180}$ part of the distance between freezing point and boiling point; while the degree Centigrade is the $\frac{1}{100}$ part of the same distance, and is therefore greater in the proportion of 9·5. Hence we obtain the following rules for converting Fahrenheit into Centigrade degrees, and *vice versa* :—

To convert Fahrenheit into Centigrade degrees, subtract 32, multiply the remainder by 5, and divide by 9.

To convert Centigrade into Fahrenheit, multiply by 9, divide the product by 5, and add 32.

It would be impossible to mention here all the different forms of thermometers in use at the present day, but one or two of the self-registering instruments, commonly used for meteorological purposes, must be briefly described. One of the oldest contrivances for marking the highest and lowest temperatures reached in any given interval of time is Six's thermometer (fig. 1). This consists essentially of a bent tube with a bulb at each end, one bulb being larger than the other. The two bulbs are filled with spirit, a bubble of air being left in the smaller one. The bend of the tube is occupied by mercury. At the top of each column of mercury is a steel pin. When the temperature rises, the spirit in the large bulb expands, and pushes the mercury and index before it. When the temperature falls, the spirit contracts, and the pressure of the air-bubble in the small bulb drives the mercury back again, leaving the index in each case at the highest point reached by the mercury, the maximum being on the side of the small bulb, the minimum on the side of the larger bulb. The instrument is set by bringing down the index to the top of each mercury column by means of a magnet. These thermometers have serious defects, and are not much used, except for greenhouses, and where great accuracy is not required.

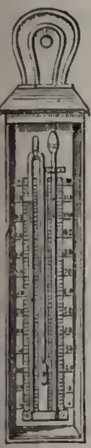
Fig. 1.

Phillip's maximum thermometer is an ordinary thermometer, in which a small portion of the mercury is detached from the main column by an air bubble, the detached portion remaining at the highest point reached by the column. This instrument is set by swinging it bulb downwards, until the detached mercury resumes its position as close as possible to the main column.

Negretti and Zambra's thermometer (fig. 1) is also in common use for registering the highest temperature reached. In this instrument there is a contraction near the bulb, so that while the mercury is allowed to pass in expanding, on contraction the column in the tube is broken off, thus registering the maximum temperature.

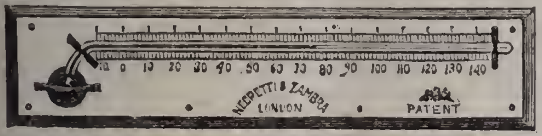

Fig. 2.

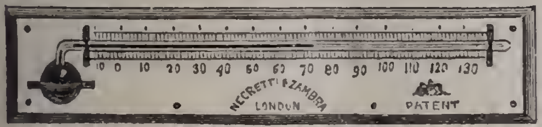

Fig. 3.

Rutherford's minimum thermometer is filled with alcohol, containing a small index, which is carried back by capillary attraction, and left at the lowest point reached by the alcohol, which on expanding flows past it without disturbing it. The great objection to this instrument is the liability of some of the spirit to condense in the upper part of the tube, thus shortening the column and exaggerating the minimum readings. This probably explains many of the very low temperatures occasionally published in the newspapers. Negretti and Zambra's minimum thermometer, which is similar in principle to the above, is represented in fig. 3.

We now come to the consideration of the principal errors in thermometric readings, and the corrections to be applied. Any thermometer can be verified at the Kew Observatory for a small charge, and a certificate obtained of the necessary corrections. The Meteorological Office advises the rejection of all instruments having a greater error than 0°·3 in the space of 10°. Even the best mercurial thermometers, however, are liable to a gradual contraction of the bulb, which causes the readings in the course of time to be too high. If a thermometer is heated even a little above the boiling-point, the zero point is sometimes considerably displaced. Crafts in one instance got a displacement of 26°·4 after a prolonged exposure to a high temperature. The amount of correction for this *displacement of zero* may always be found by placing the instrument in melting ice or snow, and reading the height of the mercury. Any difference from the true reading (0°C or 32° Fahr.) should be noted down, and *always subtracted* from all future readings.

But even with the most accurate observations, and with the most carefully-constructed instruments, it is a matter of great difficulty to obtain the true temperature of the air, owing to the influence of radiation from surrounding objects. To obviate this difficulty a thermometer screen (fig. 4) is employed. This is made of wood, painted white both inside and outside, and louvred all round so as to secure a free circulation of air. The screen should be placed on posts upon an open grass plot, and should face the north in our hemisphere. If such a position cannot be obtained, the screen should be attached to a garden wall in such a way that the air can circulate freely behind it. For isolated observations of shade temperature, Arago's method of swinging the thermometer, attached to a piece of string, is recommended, and gives correct results whether in shade or sunshine.

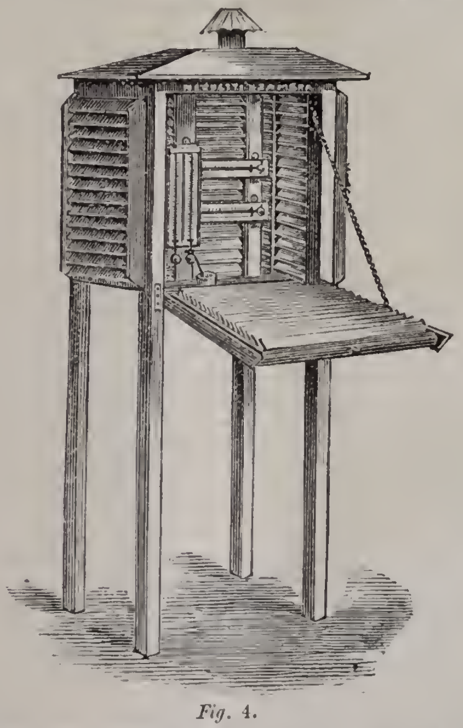
Fig. 4.

It was found by Brewster that the mean temperature of the day can be very closely obtained by taking the average of two readings at nine o'clock morning and evening, and this method is recommended by the Meteorological Office wherever a continuous record cannot be kept. Of course, if maximum and minimum thermometers are employed, the mean temperature is represented by the average of the maximum and minimum readings, taking care to set the instruments always at nine o'clock in the evening.

In a subsequent chapter we shall consider the chief circumstances upon which temperature depends, as this is a subject belonging properly to the discussion of climate. It must be borne in mind that temperature consists of two factors—sun-warmth, derived from solar radiation, and air-warmth, derived from terrestrial radiation, and constituting what is known as *shade temperature*. The former of these—sun-warmth—will be the subject of another article.

As regards the daily fluctuations of air-warmth—that is, of shade temperature—it is found that, although the heat of the sun increases with its altitude until noon, the terrestrial radiation does not quite keep pace with it, so that the hottest part of the day is not until about two o'clock in the afternoon. The coldest part of the day is just before sunrise, since the influence of the sun has then been withdrawn for the longest possible time, during which the earth has been parting with its heat by radiation into space. For the same reason the hottest month is July, a little later than the time of the sun's greatest summer altitude, and the coldest month is January instead of December.

Mr. Scott has pointed out that, as regards London, the lowest mean temperature occurs in the night, from the beginning of January to the end of March; and that while in the summer time the coldest time is between three and five o'clock in the morning, in winter there is not much change between four o'clock in the afternoon and eleven o'clock the next morning. The winter range of temperature, also, does not exceed 5°, while in summer it amounts to 16°, and the spring equinox is at least 10° colder than the autumnal.

We shall conclude the present chapter with a brief summary of the chief effects of temperature in photography.

To begin with the effects of low temperatures, it is needless to mention the inconvenience arising from frozen water-pipes and the bursting of bottles in the laboratory. Even lenses suffer from the effects of frost, owing to the contraction of the brass rim, and the consequent risk of distortion. Condensed moisture on lenses in cold weather is also a source of frequent annoyance. All who are familiar with the wet process have experienced the frequency of streaky markings, owing to moisture from the hands. It is often necessary also to add more ether to the collodion to prevent its slow and uneven setting in cold weather. The sensitizing bath and developer are also slower in their action, and the former should be well agitated from time to time, as the effects of frost often cause a separation of the solution into two layers, the lower one rich in silver, and the upper one chiefly pure water. Glycerine is sometimes added to the bath to prevent its freezing. With respect to fixing and toning, longer time is required in cold weather. The toning bath should be warmed by filling the dish with boiling water previously. A little extra silver should be added to the sensitizing bath in very cold weather.

To turn now to the effects of high temperatures, we find in the wet process blotches and stains more frequent, owing to the increased chemical activity of the organic impurities in the bath. Oyster-shell markings become more plentiful, and the rapid drying of the films becomes a serious difficulty where long exposures are necessary. Even dry plates suffer in an increased tendency to frilling and blisters, while fog is the almost inevitable result of emulsion making in hot weather. But it is in carbon printing that we find the most serious effects of undue heat. Thus the tissue is liable to dissolve in the sensitizing bath unless alcohol is added. The rapid drying of the tissue, also, causes undue solubility, resulting in hard prints, owing to the loss of the half-tones. The remedy for this is to damp the floor of the drying-room. Even after development there may be a partial solution in the water tank in very hot weather. It is necessary also to weaken the action of the sensitizing bath, as too sensitive a film causes printing to take place right through to the sensitive paper behind, which will not then strip off on development. Neither should development be long delayed in warm weather, on account of the continuating acting of light in the presence of unaltered bichromate.

Further effects of climate and weather upon photographic operations will be mentioned hereafter.

(To be continued.)

THE PHOTOGRAPHING OF SMALL OBJECTS.

How to Suspend the Accommodation of the Eye when Focussing with the Eye-piece.

BY WM. THOS. JACKMAN, M.R.C.S., ETC.

The precision with which it is necessary to focus small objects in order to obtain a clearly-defined impression on the sensitized plate is attained by removing the ground glass from the camera, and with an ordinary microscopic eye-piece focussing the image of the object about to be photographed as it is formed in the air.

There are two points of essential importance in carrying out this plan: one, that the sensitized plate must be placed exactly in the position of the image; and the other that the eye of the operator, when focussing, must be in a condition of rest—that is, must be such that it is not under the influence of its accommodation power.

The first difficulty I do not propose to discuss, merely hinting that the exact position of the sensitized plate can only be decided by careful experiment.

The second difficulty, that of keeping one's eye at rest when focussing the image, I hope to be able to lessen considerably by pointing out a few suggestions, the following out of which, will enable any one to acquire this power after a little patient practice.

The power to keep in abeyance, by the will, the accommodation of the eye is a "knack" which can be acquired by practice; but the reader will be able to follow my remarks on this point more easily, and with more certainty of success, if I explain in as few words as possible the mechanism of accommodation in a normal eye.

By the accommodation of the eye, we mean the power it has of bringing to a focus on the retina an image of any object situated between the most distant point of vision (which is at infinity), and the nearest point (usually about 12 c.m.), and this adjustment is brought about by the alteration in the curve of the crystalline lens.

This lens is so shaped that in conjunction with the other refractive media of the eye—the cornea, aqueous humour, and vitreous humour—it brings parallel rays of light to a point on the retina. Rays of light from an object at any distance further than six metres from the eye are practically parallel, and therefore, to see objects at and beyond that distance, no alteration in the shape of the lens is required. The lens, which is elastic in its character, is retained in the condition necessary for focussing the parallel rays by means of its suspensory ligament. This ligament, being on the stretch when the eye is at rest, and capable of focussing parallel rays, as it is attached to the capsule of the lens, prevents the elastic force of the lens from coming into play; but directly the ligament is relaxed the lens bulges, and its surfaces, chiefly the front surface, become more and more convex in proportion to the relaxation of the ligament.

Rays of light falling on the eye from an object nearer than 6 metres are more or less divergent. Now it is a fact we can easily prove by experiment that in order to focus on a screen, at a certain distance behind a lens, rays of light coming from a point, the distance of which from the lens is being varied, we must either move the lens to or from the screen, or replace it by one having a greater or less curve. For instance, say a lens placed at a distance of x c.m. from a screen focusses accurately rays of light coming from a point 6 metres distant from it; when the light is approached to the lens, say, 2 metres, the lens must be replaced by one more convex, if its distance from the screen remains x c.m.; the nearer the point is approached to the lens the more convex must the lens be. This is the principle upon which depends the accommodation of the eye: as objects looked at are approached to the eye, the distance between the lens and the screen of the eye (the retina), being always the same, the lens itself must become more convex. As shown above, this is accomplished by the suspensory ligament being relaxed, so that the elastic power of the lens may come into play.

It only remains for me to state that this relaxation of the ligament is brought about by the contraction of a muscle in the eye, the ciliary muscle; hence, in order to look at a near object without making the lens more convex than is necessary for focussing parallel rays, we must be able to keep in check the contraction of this ciliary muscle. As the action of this muscle is called into play automatically by reflex excitation, it is a matter of difficulty to prevent its action.

The effort of accommodation of the eye for near objects is accompanied by what is called convergence of the eyes; *i.e.*, as an object is brought nearer and nearer to the eyes, their axes are turned more and more towards the middle line. When looking at an object six metres or more distant, the axes of the eyes are parallel to each other. It has been proved that these two actions, accommodation and convergence, are very intimately dependent upon each other. Hence it will be clear that if we can keep the axes of our eyes parallel—or, in other words, look straight in front of us—and at the same time look at an object a few c.m's. distant, we shall be able to lessen the amount of accommodation considerably by using only one eye to view the object with, and keeping the other open, and, ignoring the image formed on its retina, direct it parallel to the line of vision of the eye we are using. This, then, is my first suggestion: when focussing with the eye-piece, and viewing he image which is in the eye-piece, and only a short disance from the eye, use only one eye, and keep the other open and directed into space in a line parallel to the eye-piece. There remains, however, a certain amount of accommodation over and above that which is closely dependent upon the convergence, and neutralized by the above plan, and this can only be overcome by practice. Take a lens of 3″ focal length, and hold it distant from this print exactly 3″, and look through the lens at the print, placing the right eye close to it. At first the letters will appear indistinct, but by keeping the left eye open and directed into space and parallel to the direction of the right ye, after a little practice the print will appear quite clear. The accommodation of the right eye is now completely elaxed, as it is able to focus the parallel rays as they come rom the lens, and the operator will be conscious of a peculiar sensation in the eye which I cannot describe, but which will be soon understood, and he will always be able o tell by it when his accommodation is relaxed.

But it may be asked, why is it necessary to relax the accommodation of the eye when focussing with an eye-piece? The answer is, because the rays of light from the image ocussed are parallel as they emerge from the eye-piece and all upon the eye.

It is difficult to explain, without a diagram, the formaon of the image in the eye-piece, and the fact that the ays which leave the eye-piece from the image are parallel, ut the careful study in any book on optics of the formaon of the image in the eye-piece of a microscope will make clear how it is that the image formed of the object to e photographed through the lenses of the camera is placed the focus of the eye lens. Now it is a law of optics that he rays of light from an image situated at the focus of a convex lens are projected through the lens as parallel, and the eye lens is simply a convex lens; hence, in looking at an image through the eye-piece, we are looking at one close to the eye, but on account of the presence of the convex lens between it and our eye, it projects to our eye parallel rays, such as we have seen distant objects alone send. We have, therefore, to keep the accommodation of the eye at rest, and I trust the above hints will enable any who are interested in the art of photographing fine objects, and using the eye-piece to focus them, to acquire the power of checking the accommodation of their eye; and if my remarks succeed in removing a stumbling block from the path of any such, my object in writing them will be attained, and my wish to help, in however small a degree, towards the progress of amateur photography fully gratified.

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THE LATEST PROGRESS AND INVENTION IN TAKING PHOTOGRAPHS BY ARTIFICIAL LIGHT.

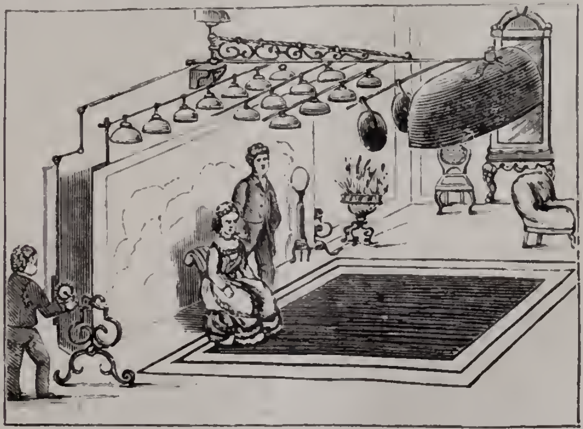
BY CAPTAIN EUGENE HIMLY.

Up to this time the cost for an electric light apparatus for taking photographs by it are very high, so that only few photographers had wealth enough for introducing this artificial light for permanent use in their studios. Not alone that the price of the electric apparatus is enlarged by the necessary steam or gas motor, but also by the permanent expense for an engineer who has to supervise the dynamo and the other motive machines.

I have already published in the Photographic News of January 2nd, 1885, an essay upon my invention, which has been patented by me in many countries, as well as by Her Majesty's Letters Patent. Since, I have made many experiments for the purpose of introducing cheaper sources of light for the use of photographers, to enable them to take good negatives, equal to those taken by daylight at any time of day in ordinary rooms. In large cities, as London, Paris, Vienna, Berlin, &c., most of the studios are either located very high, so that the customers have to mount three or four flights of stairs, or it is very often such dark and foggy weather, which does not allow to make good negatives and poses. All this is unpleasant for the public, as well as for the artist.

After many fruitless experiments and great exertions and expenses, I have finally succeeded in arranging a good and reliable method for illumination in studios, either by gaslight or electric incandescent light.

The experiments which I had to make before I had entire success I will not mention further, and will give a short description of my system.



In the first part, it is necessary to illuminate the background by a row of Argand burners with reflectors which spend their light downwards, illuminate the whole background, and partly the rear of the models. Just in the centre of the background, but above all this, the crane is fastened to the wall, the use of which has been patented by me for photographic purposes. On the swinging arm of the crane I fix cross beams with several rows of small sources of light, as, for instance, Argand burners of sixteen normal candles, over which suitable reflectors, either of glass or metal, are placed. These lights spent a good top light. At the end of the crane arm a reflector is fixed which is similar to a prompter's box. This reflector has posted in its midst a powerful regenerative Siemens' gas burner of about 250 normal candles. To enlarge the reflecting power of this reflector, it is lined inside with thin sheet iron nickled or tinned and polished. The bottom is closed by a movable screen of the same material. Above this reflector, I place a row of Argand burners with reflectors, which are fastened diagonally against the same, so that they spent their light downwards. In this manner the rays of light cross themselves many times, so that no heavy shadows can be formed. To lead off the products of combustion, a pipe is fastened to the crane, which is in connection with another one leading to a chimney. At the same time, ventilation for the room must be provided for. The heat which is occasioned by the burning of many flames may be considered lowered by turning the main part of the gas off when no sitting takes place. All the burners can be regulated separately, and also it is possible to regulate the whole of them at once. The crane can be easily turned by a lever movement with the aid of a crank, which is fastened sidewards out of the way. Not alone that it is possible to give different poses of illumination; the system can be used after having the desired illumination selected, either by using the system in a fixed position, or by moving the same during the exposure. It can be easily comprehended that many different methods of illumination can be made in this way, also even Rembrandt effects.

Of course it is very necessary to work with rapid lenses, large stops, rapid dry plates of 24 Warnerke. The exposure is about twenty seconds. I also recommend to develop in the following manner, which has been found out by me, during the trials of all kinds of developers, to be the best method. Those artists who take views of interiors, as well as instantaneous views, and those who make negatives by artificial light, must have observed that the deep shadows are inclined to remain glossy without details. To obviate this, I bathe the plate before developing in a solution of hyposulphite of soda in water (1·2000 of water), and add one drop of a saturated solution of corrosive sublimate. I leave the plate in this bath for two minutes; longer is not advisable, also no stronger solutions. This bath makes that when the plate has been washed, and afterwards put into the developer of iron oxalate, 1 : 3 (Dr. Eder), the deep shades develop instantly together with the high lights, so that during the development the negatives can be easy controlled. Never mind that at first the plates seem to be dull; they gain strength by-and-bye in developing, and all the deep shades are brought out. After developing, I wash and fix as usual.

JOTTINGS.

BY MAJOR J. WATERHOUSE, S.C.,
Assist. Surveyor-General of India.

Formation of Fulminating Silver from Mirror-Silvering Solutions.—*Apropos* of the editorial remaks on silvering mirrors at page 225 of the present volume of the News, it may be well to warn incautious operators of the danger of leaving the mixed silver ammonia and potash solution to rest for any time before use. It recently happened here, that after the silvering solution for a 9-inch mirror had been mixed up, the deposition had to be postponed for about twenty-four hours, at a time when the weather was unusually hot. It was then found that the sides and bottom of the beaker containing the solution were thickly coated with a dark coloured precipitate. The solution appeared to have decomposed; it was thrown out and precipitated to recover the silver. The beaker was filled up with water, and put aside to be cleared with the mixture of nitric acid and bichromate of potash usually employed for that purpose. As, however, the dangerous nature of the precipitate was suspected, it was touched very cautiously with a drop of the solution at the end of a glass rod, with the immediate result of a violent explosion, which, fortunately, did no further damage than shattering the beaker. Investigation showed that the precipitate was the ammonia oxide of silver, or Berthollet's fulminating silver, an exceedingly dangerous compound, which may explode at the slightest touch, even in a moist state. Care should, therefore, be taken to use the solution as soon as mixed, and to quickly clean the vessels containing it. On a previous occasion a somewhat similar accident happened with a glass that had been put aside dirty and forgotten. In this case pouring in nitric acid produced an explosion.

Use of Silver Precipitate in Electrotpying.—In connection with the silvering of mirrors, it may be mentioned that the fine muddy precipitate which falls to the bottom of the dish during the silvering has been found to be an admirable material for rendering electrotype moulds conductive. The use of precipitated silver for this purpose is well known, but the precipitate thus obtained is much finer than that formed by copper in solutions of nitrate of silver, and takes beautifully on wax surfaces. It is also useful with gelatine or other surfaces, applied either dry or in a moist state, and brushed off after drying. It may also be mixed with plumbago.

Wax Compound for Moulding from Gelatine.—An excellent substance for making moulds from moist gelatine is the wax composition recommended some years ago in the *Correspondenz* for 1874, p. 185, by Herr Leipold, of the Bank of Portugal, Lisbon, in connection with the Pretsch process of photo-engraving. It is as follows:—

Spermaceti	425 parts
Stearic acid...	200 ,,
White wax	170 ,,
Asphalt	70 ,,
Plumbago	70 ,,

The asphalt is first melted, then the spermaceti wax and stearin are added, and finally, when by constant stirring all have become fluid, which they quickly do with a heat of about 190° F., the given quantity of graphite is mixed in.

The advantages of the composition are—its melting at a moderate heat, and consequent easy hardening on the soft relief. It hardens completely after cooling, and is not injured by brushing with plumbago. It separates easily from the gelatine relief. It is also useful for moulding from medals, the latter being previously rubbed over with a little glycerine; instead of spermaceti, paraffin may be used.

The New Development Printing Process in India.—It may be interesting to Indian readers of the News to know that the new process is quite suitable for use in India, and is not much more trouble than the old method, while there is a far greater chance of the prints being permanent, and in this case any extra trouble is of small account.

I have not yet had much experience of the process, or the opportunity of trying the various developers recommended; but Morgan's developer, as given at page 109 of this year's News, seems to answer very well. With the Alpha paper an exposure of two to three seconds in bright diffused daylight in a verandah, for a gelatine negative of ordinary density, gives good tones in the double fixing and toning bath recommended by Warnerke in a recent number of the News. Dense negatives will require more exposure to get good tones, and thin ones less.

It is noticeable that the accidental touching of unfixed prints with fingers wet with hypo from the toning and fixing solution is not followed by such dire results as in the old process, and herein appears to lie a strong element of permanence in the prints. At any rate, there is a marked absence of a tendency to the brown staining and discolouration of the ordinary silver prints.

The early disappearance from the prints of the sweet but strongly-metallic taste which albumen prints retain, even after comparatively long washing, is also very marked. It is necessary to evenly and thoroughly wash the prints from the alum before fixing, otherwise the toning will be patchy. The toning should not be carried too far, as the prints dry off much bluer than they appear while wet. The use of a second alum bath, after fixing and washing in several changes of water, appears to slightly improve the tones, and may be useful in getting rid of the last traces of hypo more quickly. After a few more changes of water, the prints may be taken out and dried. It is essential to give the prints a strongly glazed surface, otherwise they dry very dull, and lose all the beauty they have while wet. As I did not succeed in stripping the prints from glasses rubbed with French chalk, I oiled the glasses well, and then rubbed them over with a cloth so as to leave a thin even coating of oil. This answered perfectly.

I have found no difficulty in keeping the whites clear, if the prints are well washed before toning and fixing, and are not over-developed. A great advantage the paper will have for Indian amateurs is that it will keep good and fit for use at any time, whereas the ordinary ready-sensitized albumenized paper cannot be kept much more than two or three months without spoiling. I have not found the use of ice necessary, though the gelatine surface gets very tender in this hot weather, and is liable to be rubbed and damaged.

The prints make excellent transparencies, and show far more detail in the shadows than is visible by reflected light.

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THE PHOTOGRAPHIC IMAGE.

BY CAPTAIN ABNEY, R.E., F.R.S.*

One form of physical theory of the photographic image is that the light sets up vibrations, and that whilst no chemical change is wrought, yet that it is the increased vibrations which give the developing power, and that when the vibrations cease the image is non-existent. This is a theory which to me seems like one to be found in a story by Jules Verne, and to be one of those ideas which have to be relegated to the same limbo as perpetual motion. We hear of a gelatine plate being exposed, and developed with unimpaired vigour after a lapse of twelve or twenty months. I myself have kept gelatine plates a year, and developed some of them every three months. These plates were exposed behind a sensitometer, and kept to ascertain if there were any fading of the image. Plates which gave 22 on the sensitometer at first, after a lapse of a year from the time of exposure gave an image showing 21. Hence we have to conclude that the vibrations commenced at a certain time kept of the same amplitude, or nearly so, for the space of a year. The question is, can that be so? If a collodion plate is treated in the same way, the image will die out much more rapidly. A couple of months is sufficient in most cases to obliterate nearly every trace of an image, and yet it is the same material acted upon in both cases. Why should it act differently in the two cases? The answer to this is somewhat hard, I imagine, on the vibration hypothesis; but it is perfectly easy on the chemical theory of the photographic image. I scarcely need repeat papers which have appeared in the Journal on the destruction of the photographic image, in which I have shown the cause of such destruction on the chemical theory. Exposure to the atmosphere, or to a substance which can oxidize the image, has been shown to destroy the developing capacity of the image, and the difference of the exposures of the bromide in the gelatine and collodion plates fully explains the reason why the destruction is more rapid in the one case than the other. Again, we can absolutely show that if increased amplitude of vibration be given to the atoms of a bromide plate, that such vibrations subside rapidly. If we take a hot iron and press it to the back of a gelatine plate, and expose it to light whilst hot, and then, after cooling, develop the plate, we get an image of the iron shown by increased blackening of those parts which were in contact with the glass heated by the iron. If, however, the hot iron be applied to the back of the plate as before, then the plate be allowed to cool, and after such cooling the plate be exposed to light, no trace of the iron shape is visible; the plate returns to its normal condition.

In the one case we have the amplitude of the vibrations of the atoms of the molecules (which, when at any temperature presumably above the absolute zero, are always vibrating) increased by the application of the hot iron, but not sufficiently to throw off the atoms. Where light of proper colour impinges on these atoms, which are already swinging with increased amplitude, they are more readily swung off than when it has the whole of the work to perform upon them, and as a result we have the image of the iron shown by the increased number of molecules which have been de-atomized. In the other case the plate is heated, and the increased amplitude of vibration must still be there, as in the other case, and, according to the vibration theory, should continue; but the fact is that it does nothing of the kind. The atoms resume their normal swing when the plate is cold. It is for those who hold the physical theory of the formation of the photographic image to explain why the increased amplitude due to the heating dies away, whilst that due to light does not. The chemical theory, then, fully accounts for these experiments, which, as far as I am aware, no other theory does.

Let us take another experiment. Take a bromide collodion film, and expose it in a solution of peroxide of hydrogen, a solution of permanganate of potash, or hydrochloric acid, and attempt to develop an image. The result will be failure. Expose another plate in any substance that will absorb bromine, such as sodium sulphite, potassium nitrite, and an image is at once obtained. There is no reason for these opposite results according to the physical theory of the photographic image, but there is according to the chemical theory. In the one case the developing power of the image is destroyed by oxidizing agents as fast as formed, in the other the liberated bromine is taken up at once, and the image is preserved. A certain experiment by Mr. Carey Lea has been quoted against the chemical theory. He took pure iodide of silver on a clean plate, and on it he could at first develop an image after exposure to light, and that a similarly prepared iodide plate which had received also an impression of light faded away and refused to develop. The paper already quoted on the destruction of the photographic image disposes of this, and is certainly no crucial experiment as to the vibration theory. I hardly know that I need continue these ordinary every-day proofs of the truth of the chemical theory. A simple molecular change of form will not do it. That a change in molecular form is possible we know. In a gelatine plate the range of spectrum sensitiveness is far greater than in a collodion emulsion of the ordinary type; whilst in the special green form of collodion emulsion we have a still different molecular arrangement, in which the atoms are so placed that they answer to the swing of the dark rays below the red. Yet these molecules are still bromide of silver, and not capable of development till they have received the well-timed shocks of light. Sensitiveness means placing the atoms which compose the molecule in the state of most indifferent equilibrium possible, so that a small shock will set free the halogen. One word more. When a substance which is in a state of tottering equilibrium is made to take up a position of stable equilibrium, energy is given out (thus a gun-cotton molecule when detonated gives out energy); but the energy it gives out is exactly that which it would take to set the atoms from the position of stable to tottering equilibrium. So in preparing an excessively sensitive salt of silver, energy has to be applied to set it in this equilibrium, hence we arrive at the measures taken in a gelatine emulsion to change the molecular form by applying heat and so on.

I should be glad of hearing of any single experiment which can be explained by the vibration theory, and which cannot be as easily, and in all probability be better, explained by the chemical theory. On the other hand, I think I have given experiments which can alone be explained on the latter theory. Let me say that the chemical theory is more than a mere working hypothesis. Experiment after experiment proves its truth, and there is not, so far, a single experiment, to my knowledge, which disproves it.

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* Continued from page 380.

Notes.

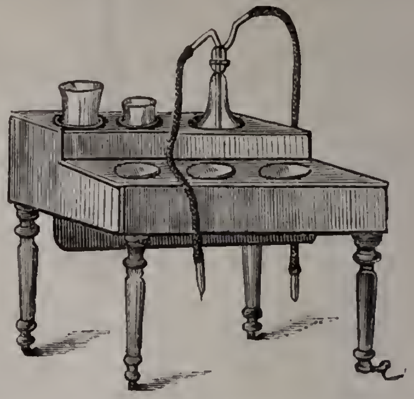
That the camera may do good work down in the depths of a coal mine is evidenced by our supplement of this week. The interior of the Kohinoor pit at Shenandoah, U.S.A., is represented, and Mr. Bretz tells us that he gave an exposure of about ten minutes; the electric arc light being used.

There cannot be the slightest doubt that the great majority of members of the Photographic Society who were present at the last meeting are at one with those who support the theory that the "improvements" in Messrs. Braun's copying process are due to retouching. The remarks of Mr. Sawyer, Col. Wortley, and Mr. Werge elicited loud and spontaneous applause; and while it was felt that Mr. Bird's defence was exceedingly able, there was to it but a feeble response. We are inclined to think, however, that in some unconscious way the applause was intended to convey a protest against the notion which, rightly or wrongly, the National Gallery authorities are charged with having—namely, that our English photographers are not as fully competent as Messrs. Braun to carry out the important work of copying our national collection of pictures. After all, to use a homely simile, the proof of the pudding is in the eating, and if it can be shown that better copies can be produced by the aid of retouching than without, why should not retouching be used?

We cannot conceive that photographers are such purists as to object to retouching *per se*; indeed when, exactly a twelvemonth ago, Mr. Sawyer, at the Photographic Society, advocated retouching as a means of overcoming certain difficulties, his observations were received with much favour, and it was considered that a decided advance had been made. It is curious, therefore, to find the same audience condemning what they formerly approved, unless other considerations were bound up with their expression of opinion.

Most people would have said that last year, the summer of which was unusually bright and protracted, had more than its share of sunshine. But according to the Greenwich Observatory Report this was not so; there were, in fact, 100 hours of sunshine less than the average of the seven preceding years. Like the gentleman in "Martin Chuzzlewit" who was so grateful to Dr. Jopling, the medical officer of the "Anglo Bengalee Assurance Company," for being corrected in an erroneous impression as to the situation of his stomach, the public's ideas are not always scientifically accurate.

The combined water-bath and hot filter of Landolt should be useful to the emulsion-maker, and we imagine that any worker in sheet metal would construct it for a small sum. It is constructed of sheet copper, is fifteen inches long and ten inches wide, the front portion being three and a-half inches deep, and the rear portion four and three-eighth inches. The latter portion serves as water-bath, and contains several openings into which flasks, beakers, &c., may be placed. These rest upon a perforated plate elevated over the bottom of the box. The front portion has three copper-funnels soldered into it, these being destined to hold glass-funnels for hot filtrations.



It would seem that amateur photography has already been turned to account at a bazaar in the West of England. At a fancy fair recently held in the thriving borough of B——, we are assured that the photographic studio, under the direction of a local baronet and his sister, was one of the most profitable of the bazaar annexes. It may be of use, moreover, to other bazaar committees to add that, after securing admission to the temporary photographic tent, two courses were open to the bazaar patrons: they might either pay eighteen pence and be taken, or half-a-crown and be allowed to depart unfocussed. To guide them in their choice, a few specimen portraits, taken by the amateur operators, were exhibited in a prominent part of the studio; and the statistical returns show that, after inspecting these photographic samples, the well-nigh invariable course adopted by the inveigled public was to pay their half-a-crowns and get out of the range of the camera as quickly as possible.

A series of the coloured illustrations of the summer number of the *Graphic* is devoted to depicting the humours of amateur photography, which, as we remarked last week, becomes an adjunct quite compatible with boating, and other forms of fashionable recreation. A photographic hamper is, indeed, fast becoming as indispensable an adjunct to the modern picnic as the luncheon basket itself; possibly because in such an uncertain climate as ours it is always wise, at an *al fresco* spread, to have an ample reserve of "dry plates."

The annual report of the Astronomer-Royal contains no reference to the photographing of stars—a branch of astronomical observation which has been actively pursued in other observatories, especially in America. "Sun spottery," of course, occupies a prominent place in the report, but whether we are any better for the 173 days which have been devoted to photographing the sun, and for the information that the "mean spotted area was slightly less in 1884 than in 1883, and slightly greater than in 1882," remains to be seen. Perhaps, as Mr. Christy asks for the means to procure a larger refractor for spectroscopic observations of the stars, the funds at his disposal for photographic purposes are very limited. If so, would it not be as well to leave the sun alone for a time, and devote a little more attention to photographing the stars, to avoid the reproach of being so far behind other countries in this respect?

All the bodies at the Paris Morgue are photographed. From 400 corpses received in 1830, the number has now reached nearly 1,000 annually. What a horribly grim album these photographs must form! An article on photography at the Morgue appeared some time ago in these columns.

The fact that Mrs. Langtry should have the back of her neck and her shoulders photographed has excited some comment. But there is nothing extraordinary in the selection of this pose. It only shows that the lady is perfectly well aware that from this point of view her figure shows to the best advantage. It is no crime, we presume, to regard an actress with a critical eye, and Mrs. Langtry must forgive us if we say that artists consider the upper part of the torso as seen from the front as not absolutely faultless. Besides, monotony in the eyes of the fashionable world is put down among the seven deadly sins, and the much-photographed Mrs. Langtry must be truly grateful for the slightest novelty in her portraits.

A correspondent points out that an old concertina bellows may be pressed into the service of the amateur camera-maker; but it is scarcely necessary to break up a concertina for the sake of the bellows. Concertina bellows can be had at prices ranging from a few pence upwards at stores where they sell materials for making musical instruments. We have obtained them from Dawkins, of Charterhouse Street, E.C.

In the semi-technical journals there have been of late paragraphs and anti-paragraphs as to the possibility of cutting glass under water by means of an ordinary pair of scissors. The truth, however, lies midway. The glass can be readily chipped under water to any desired form provided one does not take off too much at a time; but more than this can hardly be said. The operation of glass chipping is decidedly bad for the scissors.

It is certain, from the minutely-detailed accounts which have appeared in the papers of late, that Lord Salisbury's front door in Arlington Street must have been closely watched during the past week, for no one seems to have either entered or emerged from his lordship's mansion unnoticed. What is more, at least one artist seems to have been also on the watch, and busily engaged in making thumb-nail sketches of the marquis's visitors. But this is an occasion surely when instantaneous photography would have proved invaluable. A collection of the photographs of all the callers at No. 20, Arlington Street, would have been simply invaluable to the political leader-writer and news-paragraphist. What ample material for comment and conjecture a clever journalist would find, for example, in the comparison of but one pair of these instantaneous photographs, viz. (1) "Sir Stafford Northcote's face on entering Lord Salisbury's house at 11 a.m., and (2) "Ditto ditto on leaving ditto at 12.5 p.m."

A permanent photographic record of Lord Randolph Churchill's expression before and after his interview with his nominal leader would be equally valuable; and a close study of the facial features of certain veteran Tory politicians on quitting their chief's town house could not fail to supply reliable hints as to those who were to get office again, and those who were to be left out in the cold. Only fancy the new interest that would be developed were articles on the Crisis to be illustrated with portraits taken in the way we have proposed! What are now merely prosaic details would become quite fascinating reading. The dry bones of political rumour, in fact, would be made to live.

Patent Intelligence.

Application for Letters Patent.

7084. **Herbert John Haddan**, 67, Strand, Westminster, for "Improvements in instantaneous shutters for photographic cameras."—(Carl Lutken, Denmark.)—10th June, 1885.

Patent Sealed.

8852. **Frederick Woodward Branson**, Leeds, Yorkshire, Pharmaceutical Chemist, for "Improvements in the means for uncapping and capping the lenses of photographic apparatus."—Dated 11th June, 1884.

Patent on which the Fourth Year's Renewal Fee of £10 has been Paid.

1881—No. 2527. **W. B. Woodbury**, "Printing surfaces."

Patent Granted in America.

319,359. **Ransford E. Van Gieson**, Brooklyn, N.Y., for "Automatic clasp and lifter for photographic plates." Filed January 29, 1885. (No model).

Claim.—A photo-plate-holder constructed of two connected diverging arms whose outer ends are provided with inwardly-projecting lips, in combination with an elastic band encircling said arms to draw them automatically together, substantially in the manner and for the purpose herein set forth.

PHOTO-MICROGRAPHY BY LAMP LIGHT.

BY W. H. WALMSLEY.*

I shall now describe the apparatus I am using at present, passing unnoticed the various stages by which its comparative perfection has been reached. Four essential parts make up the complete outfit. A microscope with its object glasses and other accessories, a camera with long extension bellows, a suitable lamp for illumination, and a solid platform to carry the entire apparatus. Any microscope with joint to the body, permitting same to be inclined to a horizontal position, may be employed, but the essentials to accurate and comfortable work are as follows: A heavy, solid stand, perfectly firm in all positions, with a short body (the 6-inch Continental model is admirable), good coarse adjustment for focus and a very delicate fine one, the latter controlled by a large milled head, in the periphery of which a groove is turned to admit the focussing cord, hereafter to be described. A solid mechanical stage rotating in the optic axis, and a sub-stage moved by rack and pinion, capable of carrying an achromatic condenser, polariscope, &c., are almost indispensable. The objectives should be the very best, specially corrected for photography in all powers under one-fifth of an inch, and of moderate angular aperture. Perfect corrections of chromatic and spherical aberrations, with the greatest penetrating and defining powers, are essential features in objectives designed for photography. Without making any invidious comparisons, I may remark that all these features are embraced in the object glasses of R. and J. Beck, and can heartily recommend them for this purpose. A binocular microscope can be used quite as well as a monocular by simply shifting the prism; but if an instrument is to be selected purposely for photographing, the latter is recommended in preference to the former. In either case the tube is to be lined with black velvet or flock paper, otherwise there will be a reflection from its inner surface, which will cause a ghost in the negative. An accurately centred double or triple nose-piece, carrying as many objectives of different powers, will also be found an immense convenience, saving much time and labour in choosing the proper object glass for any particular object. I use a triple nose-piece, upon which are always screwed a two-thirds, a four-tenths, and a one-fifth inch objective, being the powers most generally used. If the one-fifth is to be employed in making an exposure, the object is readily brought into the centre of the field under the two-thirds, by a simple rotation of the nose-piece; the one-fifth is now brought into position, when the object will be found to occupy the centre of its field of view. Much valuable time, which would otherwise be expended in finding a minute object under so considerable a power, is thus saved.

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* Continued from page 349.

Most chemical crystals, being colourless and nearly invisible under ordinary illumination, require to be examined and photographed by polarized light. For this purpose, the polariscope prisms should be of large size, and both mounted in revolving settings. The lower prism should also fit into a sub-stage capable of carrying an achromatic condenser above, in order to properly illuminate the field with any objective above the two-thirds inch. The achromatic condenser itself should consist of, at least, two combinations of different powers, and of wide angular apertures. It is always necessary to employ a condenser of greater power than the objective. If a one-fifth is used, the illumination should be by a four-tenths to get the best results, whilst a one-tenth should be illuminated by a one-fifth. For lower powers, the ordinary bull's-eye condenser, in connection with a diaphragm of varying apertures, will be found alls-ufficient.

For the great majority of workers the following powers of object glasses are recommended: 2 inch or $1\frac{1}{2}$ inch, $\frac{2}{3}$ inch, $\frac{4}{10}$ inch, $\frac{1}{5}$ inch, and $\frac{1}{10}$ inch, the latter an immersion, capable of being used with glycerine, since water evaporates too rapidly for practical use. With these powers, and a camera having thirty inches extension of bellows, a range of powers from about ten to six hundred diameters may be obtained; whilst the addition of an achromatic amplifier will increase the power of the $\frac{1}{10}$th to more than one thousand diameters without perceptible loss of light or definition.

All of the foregoing features are combined in the microscope I am using for this work, and, in enumerating them, I have but described that very perfect and complete instrument. We pass now to the second part of our outfit—the camera.

Probably the most convenient and generally useful form is one with bellows extending some thirty inches, and capable of carrying both quarter and half-sized plates, horizontally or vertically. My box is a square one, carrying plates from the 4-4 size ($6\frac{1}{2}$ by $8\frac{1}{2}$) down to $3\frac{1}{4}$ by $4\frac{1}{4}$. The bellows are in three divisions, extending fully four feet, giving altogether nearly six feet from the microscope stage to the focussing screen when fully drawn out. It is very carefully made of hard wood, and the framework carrying the bellows moves with the utmost smoothness upon its V-shaped ways. A short cone front receives the microscope tube, and all extraneous light is shut out by a wrapping of black velveteen around the opening, secured by a rubber band. The focussing screen (which is only used for arranging the object in the field or plate, and is entirely removable) has a space of the precise size and shape of a lantern slide pencilled in the centre, as a guide to the making of $\frac{1}{4}$-plate negatives. An object filling this space on the ground glass will necessarily occupy the same position on the quarter-plate when the holder containing the latter is made to take the place of the focussing screen.

The arranging of the object in the centre of the field (under a low power) and the coarse adjustment of focus are done with the bellows tightly closed, which brings the focussing screen so near to the microscope that, whilst the operator sees the object thereon, his hand can readily reach the milled head controlling the stage and other movements. But when the bellows are extended to the length affording the desired magnification, it will be found that the object, whilst retaining its central position, has lost in sharpness, necessitating a final and careful focussing, which is no longer possible in the same manner as before, since the ground glass and microscope are so widely separated that the one cannot be reached whilst looking into the other. Some special device becomes necessary in this emergency, and many have been made, mostly complicated and costly. The method I have adopted is the old and simple one of a fine cord passing around the periphery of the milled head controlling the fine adjustment, in a groove cut for that purpose; thence through a series of screw-eyes to the rear of the framework, carrying the bellows extension, where it is kept taut by a couple of small leaden weights. The slightest tension upon this cord causes a corresponding movement of the fine adjustment, and nothing can exceed the delicacy of its working or its freedom from derangement. A fine fishing line makes an admirable cord for this purpose.

As stated, the ground glass is used only for centering the object in the field, and for coarse adjustment of focus. It is impossible to grind it finely enough to accurately focus any delicate tissue, with high or even moderate powers. Many suggestions have been made and devices used, but all I have tried proved unsatisfactory, until the following appeared in an English journal:—

"An evenly-coated gelatine plate is to be exposed to a flash of white light, developed to a very slight intensity—a mere smokiness—fixed and washed as usual, then bleached with mercury, washed and dried. The result is the most perfect focussing surface imaginable. To use: Remove the focussing screen from the camera, and replace it with the plate holder, from which the slide and back have been removed. The bleached gelatine plate (which, of course, must be of proper size to fit holder) is to be placed therein with the film side towards the microscope. Now place a focussing glass against the back of the plate, apply the eye to it, and adjust the focus by a delicate pull upon the cord. Nothing can be more satisfactory. When the proper adjustment is determined upon, secure it from possible change during exposure, by winding the cord once or twice over the screw eye at the rear of the camera frame."

The plate-holder (single) opens at the back to receive the plate, and being square like the camera box, admits of the negative being taken vertically or horizontally, as may be desired, a matter of no small importance in many cases. This feature in connection with the revolution of the stage enables one to place any object upon the plate in the best position for printing. The full size of the plate carried by my holders is $6\frac{1}{2}$ by $8\frac{1}{2}$, but by the employment of removable rabbett kits, plates $5\frac{1}{2}$ by 7, $4\frac{1}{4}$ by $5\frac{1}{2}$ and $3\frac{1}{4}$ by $4\frac{1}{4}$ can be used. It is desirable to have two or three additional holders as time-savers.

For our work to possess any real uniformity or value, it is absolutely necessary that the magnifying power used with each exposure should be ascertained and noted. To make the necessary measurements each time would be a waste of that precious commodity, to avoid which I have adopted the following device.

The bed or framework upon which the bellows extends is divided into spaces of one inch, and the same plainly marked thereon. Suppose this extension is thirty inches, and that by the extension of the stage micrometer we find the $1\frac{1}{2}$ inch objective to magnify twenty diameters with the bellows closed, and fifty, fully extended. This gives the value of one diameter to each inch of bellows drawn out, and if the magnified object reaches the desired dimensions, at, say, twenty inches extension, we at once know the power to be forty diameters. Suppose, again, a power of one-fifth is being used, magnifying 125 diameters with bellows closed, and 275 with same extended thirty inches, this gives a value of five diameters to each inch, and if the desired size is reached at twenty-five inches of extension, we have a power employed of 250 diameters. By making these two measurements (closed and open), for each objective habitually used, and recording the fame in our note-book, an accurate and readily adjustable table of measurements is ready for all future work.

We now pass (thirdly) to the important subject of illumination, in many respects the most important in photo-micrographic work. It goes without saying that to the favoured few whose time and means permit the harnessing of the sun's rays in their service, no artificial light can be produced which will quite take the place of the great luminary; but for the many, some other means must be sought.

When the promised days arrive that are to place in every man's house electric lights, cheaper than gas and as easily controlled, the problem will be satisfactorily solved; but at present we must content ourselves with prosaic paraffin (or kerosene), seeking only for the most practical method of utilizing its brilliant light.

After many experiments I have settled upon a flat, broad-based, lamp of good oil-holding capacity, which is attached to a heavy retort stand with movable arm, enabling it to be carried to any desired height. A duplex burner, and tall chimney, producing perfect combustion, afford a light of thirty candle-power, rendering possible the following average exposures with the plates I am now using; the variations in time being caused by differing densities and actinism of the tissues or substances to be photographed.

$1\frac{1}{2}$ inch objective ...	... 3 to 45 seconds
$\frac{2}{3}$ " " ...	... 7 to 90 "
$\frac{4}{10}$ " " ...	... $\frac{1}{2}$ to 3 minutes
$\frac{1}{5}$ " " ...	... 2 to 7 "
$\frac{1}{10}$ " " ...	... 4 to 10 "

This lamp produces sufficient light for use with the highest powers, requiring the employment of a diaphragm to reduce its intensity. Too brilliant an illumination, flooding the field with diffused rays, will almost certainly produce a blurred and indistinct image.

Microscope, camera, and lamp being ready for use, it becomes necessary to provide a suitable support for each, in order to form a complete working outfit. Some writers have described and illustrated their apparatus as being carried upon two or more separate tables or trestles. This I have found to be a most objectionable method in our city houses, since the vibration produced by passing vehicles is unevenly communicated to camera and microscope, producing inevitably a distorted or blurred image, especially when high powers are employed. By adopting, however, a long, solid platform, carrying all of the separate parts of the apparatus, this objectionable feature is removed, any vibration is communicated to camera and microscope alike, and there is no blurring of the resulting image whatever. In my apparatus this platform is about five feet in length, with a raised portion at one end, upon which the camera is firmly clamped by a milled head operated from beneath. The cone-front extends towards the platform upon which the microscope (inclined horizontally) is secured at such a height that its tube precisely enters the middle of the cone. Thus a straight line drawn from the object upon the stage through the microscope tube and camera should fall upon the focussing screen in the centre of the latter; and if all the parts are properly put together this will be the result, and the whole field will be equally illuminated when the lamp is placed in position. The stand of the latter is not secured to the platform, but is left free to be moved about and placed nearer to or farther from the microscope, as may be found necessary to secure the best results. A bull's-eye condenser upon movable stand, placed between the lamp and stage of the microscope, is necessary to concentrate the light upon the object, or upon the achromatic condenser when the latter is used, and to aid in the equal illumination of the field. The latter is of great importance, since the result of an uneven illumination will be a negative of differing densities in different parts, marring its beauty, and at times rendering it utterly worthless. Too much stress cannot be placed upon the necessity of securing an even, brilliant light of proper intensity for the object under examination.

Having sketched the various portions of the apparatus, and brought the whole together in its complete form, a few random extracts from my note-book may not prove uninteresting or valueless to some who are working in this direction.

Gelatine Plates.—For photo-micrography, the requisites of a perfect plate are great sensitiveness, combined with extreme latitude in length of exposure and density in development. It should be of a fine texture, showing clearly the most delicate lines and markings, evenly coated, and free from spots or blemishes of any sort. It is most provoking to have an otherwise perfect negative marred or ruined by opaque or transparent spots appearing in its most important portions.

Development.—Ferrous oxalate, or alkaline pyro, are equally useful, and either may be employed, as suits the fancy or convenience of the operator. My own preference is for the latter, and I always use it with ammonia, well restrained, having had no success with either soda or potash in this class of work. For all objects possessing much colour. it is best to continue the development until full density is obtained; but for very thin or transparent subjects, such as diatoms, or unstained vegetable tissues, it is far better to stop the development as soon as all details are out, and resort to after intensification; for which purpose, bleaching with mercury, followed by a 10 per cent. bath of sulphite of soda, will be found eminently satisfactory. I always use the alum bath, and invariably secure a clean negative of a cool grey colour, resembling iron development.

Printing.—The best ready-sensitized paper can be depended upon for producing satisfactory prints, showing the most delicate lines and markings of diatoms, and toning to any desired shade. Avoid over-printing; wash but slightly in two changes of water, the last slightly acidulated with acetic acid, and use an acetate-of-soda bath. Undesirable portions of the negative may be stopped out with a mat of suitable shape. An ordinary cabinet card makes a neat mount of convenient size, upon which may be written the name of the object or specimen, objective and magnification employed, and any other matter referring to print or negative which it may be necessary to note.

A carefully kept note-book is a most important aid to the worker in photo-micrography, and it should contain a record of his failures and successes alike. Notes should be made of the specimen, objective, magnification, exposure, plate and developer, which, carefully studied, will almost certainly enable him to make a success of each exposure.

Lantern Slides.—It is well to make the negative as far as possible of a suitable size for producing the positive by contact-printing, which is convenient and satisfactory, though there can be no doubt that reproduction in the camera affords better results. Slow gelatino-bromide plates, such as Carbutt makes for this purpose, produce very satisfactory work, but the chlorides are so far superior that there can be little doubt of their being exclusively employed for positives in future. There is a richness of tone combined with great transparency in the shadows, and clear glass in the high lights, quite unattainable with bromide emulsions, and rivalling the best wet work. I shall show to-night slides made by both processes, and think there can be no doubt as to your verdict upon the question which is the better. Though neither may be what we should like, the chlorides most certainly have the advantage in all particulars.

Opaque Objects.—These may be photographed by the light from a lamp quite as well as transparent ones through which the light is thrown, a matter of which I have thus far spoken only. A strong illumination must be obtained by the employment of a suitable bull's-eye condenser, or a silvered reflector. The most satisfactory method, however, is by sunlight, allowing its direct rays to fall upon the object without the intervention of any condenser whatever. Very short exposures suffice for such illumination, varied only by the reflecting capacities of the object itself. A successfully-exposed plate of this class of subjects will give a print of the object standing out most brilliantly upon a black ground.

To secure the best results, most objects should be specially mounted for photographing. Some are best in a resinous medium such as Canada balsam, but most delicate tissues are obscured or entirely obliterated in this medium. So far as possible all preparations should be mounted in a fluid of some description that will distinctly render visible many tissues and markings which would be lost in balsam. This subject, however, is one of so great extent that it would require a special paper, and I merely refer to it now because of its importance, hoping at some future time to enlarge more fully upon it.

You will notice that my remarks have been confined to work that may be done with objectives of low or only moderately high powers, in no case exceeding one thousand diameters, having preferred to speak only of that which I have demonstrated by actual work as being practical. From recent experiments, I am fully convinced that the lamp-light, such as I have described, is capable of producing satisfactory work with very much higher powers, and shall hope at no distant day to show prints made from magnifications of not less than two thousand diameters, that will be satisfactory in all respects.

AN ATTEMPT TO PHOTOGRAPH THE SOLAR CORONA.

BY W. H. PICKERING.*

Judging by the tone of Dr. Huggins's communication in *Science* for May 15, I think he fails to understand a point I particularly emphasised in my communication of April 3—namely, that I was not criticising his work, but merely stating the results of my own investigations. I have not, as yet, had an opportunity to experiment with a reflector; but when we consider the greater visibility of minute companions of bright stars in refractors as compared with reflectors, it does not seem evident how chromatic aberration and internal reflection from the surfaces of a lens can totally unfit it for work, which, according to Dr. Huggins, is perfectly possible for a reflector. In the meantime, an account of some experiments which I have recently made with my refractor may be of interest.

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* Communicated by the Author.

Dr. Huggins suggests that the dark fringe on the negative which was obtained, around the sun, is largely due to diffraction at the instants of opening and closing my shutter. If this were so, the darkening should extend farthest, and be most marked in the direction parallel to the line of motion of the shutter, and should be almost *nil* in the direction at right angles to this line. A careful inspection of my results shows no such effect, the greatest darkening lying sometimes in one direction, and sometimes in another. I therefore think that this objection, although theoretically sound, is not of practical importance with my apparatus. The real causes which would tend to produce a dark fringe around the sun's image are fourfold, and may be classified as follows:—(*a*) the solar corona, (*b*) the atmospheric reflection, (*c*) instrumental defects, (*d*) photographic properties of the plate. In the last class I include chemical reduction of the particles of the silver salt contiguous to reduced particles of metallic silver; also halos produced by insufficient backing, and irregularities in the film itself. At the time of a partial solar eclipse, the effect of the corona alone is removed from around a portion of the sun's limb, the other three causes of the darkening remaining. By photographing the sun when its disc is half hidden behind a high neighbouring building, the first two causes alone of the darkening are removed. By pasting a strip of black paper across the middle of the plate in such a position that the sun's image shall fall half on the paper and half on the plate, and then, before development, removing the paper, the first three causes alone of the darkening will be removed, leaving the fourth. By these devices the effect of each of these four causes has been sifted out, and the relative importance of each determined.

Dr. Huggins claims that my results are due almost wholly to instrumental defects, and not to atmospheric reflection. In this, I think, he is mistaken. The dark fringe is in part due to both causes; but, even in the clearest weather, the part due to atmospheric reflection is still prominent. Dr. Huggins says, "When the sky is free from clouds, but white from a strong scattering of the sun's light, the sun is well defined upon a *sensibly uniform** surrounding of air-glare, but without any indication of the corona. It is only when the sky becomes clear and blue in colour that coronal appearances present themselves with more or less distinctness." I do not know what to make of this statement; for it certainly runs counter to all that one would naturally expect, to all visual experience, and to all my photographic results. As every one knows, whether the sky is clear or hazy, that portion of it in the immediate vicinity of the sun is considerably brighter than those portions more remote. To test the matter photographically, on a hazy day such as he describes, I took a picture of the sun when it was half hidden behind a high building. If, as he claims, the dark fringe was due solely to instrumental defects, it should be equally well marked all round the semicircular image of the sun. If, on the other hand, it were due solely to atmospheric reflection, the part protected by the chimney should be entirely devoid of halo. On development, a very strong halo surrounded the sun's image, going as far round as the brick wall. Here it abruptly ceased, and was replaced by a barely perceptible darkening along the straight side of the image. This increase of brilliancy on approaching the sun's limb was very marked. This appearance can be verified by anyone visually with a piece of coloured glass.

It therefore appears evident that a great part of the corona-like fringe shown in my photographs is due to causes outside of the instrument, and hence cannot be diminished by changes in the latter. On the photographs taken at the time of the eclipse, the fringe was as strongly marked in front of the moon as on the other side of the sun. It therefore appears that the effect of the corona was imperceptible as compared with the effect of the other sources of light, although the atmospheric conditions were exceptionally favourable. On a clear day the atmospheric reflection is less marked than on a hazy one, but is still always present. I hope soon to repeat the experiment with an instrument closely resembling that of Dr. Huggins, although the advantages of his form of apparatus do not seem very evident to me.

There are one or two points raised in Dr. Huggins's article which should be answered here. As stated in *Science*, April 17th, all the plates employed were backed with asphalt varnish. The image of the sun obtained through the violet glass was not reversed, although there is no question but that it would have been, as Dr. Huggins suggests, by a longer exposure. I did not care for a "different result," and merely made the statement as one of the facts observed under the conditions named. Dr. Huggins objects to my reference to Dr. Lohse, maintaining that his "published statement reads differently." But, in fact, Dr. Lohse only states, that, after overcoming certain difficulties, results were obtained which justify a continuation of the experiments. He does not state that he considers his results coronal, but merely that the continuation of the experiments would be desirable, in which statement I thoroughly agree with him. As I do not feel at liberty to print a private letter, I have written to Dr. Lohse for an exact expression of his views.

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* The italics are my own.

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PHOTOGRAPHIC REMINISCENCES OF A JOURNEY FROM LONDON TO ROME.

BY GEORGE E. THOMPSON.*

To be towed out stern first by a dirty little tug does not seem to be a dignified way of leaving one's native shore; yet such was our fate on sailing from the London docks on board the P. and O. S.S. *Malwa*, February 4th. The scene was one worthy of record, and it formed the subject of my first photograph. The afternoon was dull, and the picture is eminently so. Our crew consisted mainly of cut-throat looking but well-meaning lascars and negroes, with a few English officers to manage them. We passed many beautiful subjects on the Thames, among which the hay-laden barges were very picturesque, but drizzling rain precluded photography.

As we neared the terrible Bay of Biscay, the number of passengers at meal-times diminished, and nothing more exciting than the photographing of the motley members of our crew occurred until we reached Gibraltar. The weather in the Bay was frightful, and I do not think that a hundred pounds would have tempted me to take a photograph during those days of trial. As we passed down the coast of Portugal, we basked in the warm sunshine, and life was once more worth living.

Permission has to be obtained to photograph at Gibraltar. I had written from Liverpool to the Commandant, and on calling at his office I found the permit ready. It is barely safe to photograph the rock from a steamer, as the authorities have been known to observe the proceeding through a telescope, and to send aboard and have the photographs destroyed. By dint of much climbing, and hard, hot, though enjoyable work, I obtained photographs from many good points; the best, perhaps, are those from the Signal Station, showing the precipices on the Mediterranean side. Half way down a sheer precipice of nearly 2,000 feet, a pair of sea eagles have built their nest; the ledge is just wide enough, and through the powerful telescope at the Station, we could see the mother-bird sitting.

Living at Gibraltar is very expensive, and we wished to hasten on to Tangier; taking passage in the new little steamer *Gebal Tarik*, we arrived in Tangier in about three hours. Here we seemed to be in another world, and one that was two thousand years behind our own—a world peopled by Moors, who stalked about in the long white bernouse or other turbanned picturesque garment, and whose habits and customs constantly reminded one of Old Testament life; women passing to and from the wells with old red water pots on their heads, among whom one naturally looked for a Rebecca; but alas! the Moorish woman is bound to keep her face nearly covered, and when by accident we did get a peep, the features revealed were of such a miserable hard-worked type of beauty, that we felt no sorrow on the covering up of the same. The male water-carrier filled the sewn-up skin of a goat, and toted that along on his shoulder, or else had a pair of skins over a donkey's back. There were fine-looking old Moors, grand old men, whose apparent mission in life was to walk leisurely about; also negroes of good build and blackest hue, and many Jews. The main street runs right through the town, with a line of shops on either side; these shops are merely square dens, just large enough for the proprietor to sit in cross-legged, or to lie down with his head over the doorstep; the customer stands outside in the street.

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* Read before the Birkenhead Photographic Society.

The most lively sight in Tangier is the "Soko" or market-place, a large piece of ground above the town. Here on Sundays and Thursdays may be seen hundreds of people, many of them living in tents, also numbers of camels and other animals. I took some instantaneous views of the "Soko," but the Moor is an aggravating individual, and, except collectively, he strongly objects to be photographed. You have to be rapid in your arrangements, or, by the time you are ready, your subjects have quietly decamped. Their religion forbids picture-making, and the Moor has an erroneous idea that Ross's rapid symmetrical lens is an evil eye, that will cause his death within a year of the time it has looked upon him. An instantaneous shutter with a pneumatic ball and tube is most useful, for you can then stand inadvertently with your hands behind your back, gazing vacantly about, and when your victim unwittingly crosses your path, a squeeze of the ball and you have him; and as he does not see the manœuvre, he probably survives the coming year. Seeing a picturesque well, with many coming to draw and to converse, I pointed my camera at it; but though I loitered round for half an hour, the wary Moor came not nigh, neither did his wife nor child consent to fill their vessels thereat. The next subject was a crowded well on the sea-shore; but the careful Moor, valuing his life more than water, skidaddled instanter, and only one or two, who possibly did not observe their imminent danger, were left. In spite of the Moor, however, I obtained many good pictures, comprising distant views of Tangier, photographs of the "Soko," street views, &c. The picture of the Court of Justice is interesting. The Governor sits under the arched front of a room open to the outer air; the lawyers and others are outside. A couple are coming to have a dispute settled; this Court was sitting at 9 a.m., and we left it still going on at half-past five in the evening. The Governor reclines upon a couch between each case.

A short paper of this nature only permits of a mere notice of the photographic work at the various places, and we must hurry on. Leaving Gibraltar by the magnificent P. and O.S.S. *Carthage*, in a little more than three days we landed in Malta; but as it was dark, and as the *Carthage* left at 2 a.m., I could not obtain a photo of her. Valetta is the hottest, sunniest place I was ever in. The houses and roads are white, and there are no trees; the atmosphere is very clear, and during our short stay of two days I obtained some excellent harbour and street views. I was very anxious to visit and photograph the interior in St. John's Church. In the Pall Mall Photographic exhibition last year, a medal was awarded for a photograph of this interior, the lines of which were not upright. I wished to see if there was any difficulty in obtaining straight lines. On the afternoon of my departure I turned in to look, and was told by the custodian that I could not photograph it that day. Upon this information I went to my hotel, and coming back with my camera, proceeded to set it up. The custodian gave me some more advice in a foreign tongue, which evidently meant that I must shut up; he, however, understood a sixpence, and signified that ten minutes must be the limit. The church has a good interior for photography, and is well lighted, and I fail to see why a medal should be awarded, especially when the lines are out of the perpendicular.

Leaving Malta at 6 p.m. by a dirty little Italian steamer, the charge for which was as great as the unpleasantness experienced on board, we landed at Catania at about three the next afternoon. Catania is a fine large city, with one street at least that equals any of those of our English cities. The Strada Etna is perfectly straight, and more than a mile in length; and as you gaze up it, the towering form of snow-clad Etna (whose summit is thirty miles away) fills up the vista. The street gradually slants up, as Catania is built on one of the slopes of Etna, and has been overwhelmed, to a great extent, six times. There are many interesting subjects for photography in and about the city. The public washing-trough with the two rivers running through, and 150 women and girls washing all the day, is one of the most novel I have ever seen. The many beautiful colours of the clothes, the picturesque, sunburnt women, and the splendid sunlight, combine to make a picture that is feebly pourtrayed by photography.

One of the swiftest of steeds, and one of the smallest of carriages, conveyed us through the streets, and wherever we came upon a good subject, it was rapidly taken, and we rushed on. The workhouse, with its inmates quietly basking outside in the warm sun, the antique aqueduct, and the groups at the fountains, were among our captures. Much difficulty was experienced at the fountains through well-meaning officious idiots endeavouring to clear the people off, that we might have a good view of the fountain. Not understanding the language, we had to resort to stratagem, and, by turning the camera in the opposite direction, and then suddenly wheeling it round, we caught our group.

From Catania, we took train along the coast for Taormina, described to us by many as the most beautiful place in Europe; and truly I think they are right. The old town lies about 300 feet above the level of the sea, and we ascended the long zig-zag road on a bright moonlight night, Etna standing out like frosted silver. The most celebrated view is that obtained from the top of the Greek Theatre, but the colours are so beautiful that a photograph can never do it justice. In the foreground is the grand old theatre of brilliant red bricks and white marble pillars. We look down over the quaint motley town, and Etna forms a noble background; to the left, far below, is the lovely blue of the Mediterranean.

Finding we had at last reached perfection in air and landscape, we stayed a week, and were loth to leave at the end of it. Taormina abounds in fascinations for sketchers and photographers. One old Dominican Convent has three cloisters adjoining, and in the third I spent many hours with the camera and the brush. The street scenes are very lively, as the people live mostly out of doors, the women and girls generally spinning, and varying their employment by a peculiar species of hunting, as shown in one group; the young man is home for dinner hour, and he lays his head in the lap of the girl he loves best, while it undergoes a careful examination at her hands. Small-tooth combs are a great article of commerce in Sicily. Would that soap were as much appreciated.

While at Taormina, we visited the small town of Mola, situate on a rock 2,000 feet above the sea; the only entrance is through a narrow arch at the top of a flight of steps; the views from Mola, and during the ascent, are very fine. The people were much interested in our movements, and liked to look on the ground glass; in such a case it is better to hold the cloth high, so that it may not hurt a hair of one of them. I took a photograph of a dog at the hotel at Taormina, which its owner described as "unique," and I cannot describe it by a better word; it was an immense beast, and looked like a cross between a poodle and a Newfoundland. This photograph was the only one out of my 236 which was developed before reaching home. I took the photograph to Signor Bruno, a photographer of Taormina, and stayed while he developed it; we could not understand each other in the least. He was such a careful man, and taxed my patience to the utmost. By my watch he took a quarter of an-hour to make ready his dishes, developer, &c.; to mix the latter his wife brought in a charcoal stove, and held the bottle in the embers. I gallantly came to the rescue here, feeling like Alfred with the cakes. Meanwhile Signor Bruna lit the lamp, and then vanished with the developer, &c., into a small tent, where he stayed another quarter of an-hour; there was no ventilation, and it is no wonder the poor man looks ill. You can imagine the want of air in that tent when he emerged.

A great conversation was now carried on by tongue, hands, shoulders, &c. When I tried to make him understand that Herr Grandmont would order prints from him after I had left Taormina, he seemed to take it all in. We shook hands, and I departed, feeling that I had done great things; but imagine my sensations when at dinner our landlord came in, and whispered to Herr Grandmont, who in his broken English said to me, "The photographer is here, and he understands not one word of what you said to him this morning!"

Taking train to Messina, and tarrying there an hour or two, we took ship and came to Palermo.

I had taken photographs of Messina last year, and this time I merely got the view from St. Gregorio, and a view in the harbour.

The sun and we rose as we entered the beautiful harbour of Palermo.

Early breakfast, and a boat ashore, a horse and trap, and in an hour and a-half we were at St. Maria de Jesu, where a celebrated view of Monte Pelegrino and Palermo is to be obtained. The wind being high, and the Cypress trees being also high and waving, I was obliged to take this view instantaneously, and the foreground is black, whereas a Sicilian foreground is not. From there a long drive up the hills brought us to the town of Monreale. All pilgrims to Palermo visit Monreale, for its grand cathedral and world-renowned cloisters; the latter are of immense size and beauty, every pair of pillars being different, and many of them being a mass of mosaic. Four good negatives of the cloister, and one of the interior of the Cathedral, were taken.

The neighbourhood of Palermo being somewhat infested by brigands, the road to Monreale is guarded at various points by soldiers; you thus escape the risk of giving your friends the trouble of ransoming you at a higher rate than they might consider you to be worth; while to hurry the negotiations (and to show that you were still enjoying hill life) your captors might send them down a joint of your little finger, or a tooth.

Returning to our steamer in the evening, the view of Monte Pelligrino and the harbour was taken; but it is undertimed.

I looked out of our cabin porthole as the sun was rising next morning, and saw that we were then passing the Island of Capri. The early morning mist, and the precipitous rocks in shadow, with the sun rising over the island, made a grand effect. An hour more of fine early morning effects saw us into Naples—noisy, busy, frivolous, light-hearted Naples. Two custom-houses have to be passed here, one directly after the other; your goods are no sooner through one house, and piled on a truck, than they are stopped, and again examined. This is trying to the nerves of one who, like Martha, is anxious about many things, and, we may add, about dry plates in particular. The most suspicious thing in the eyes of the intelligent customs' officer was an uncut lead pencil (4½d. per dozen)—this he confiscated; his eagle glance was next directed to the tin box containing my dry plates; this, he said, must be opened, and then one of the packets of exposed plates. With face of ashen hue I endeavoured to make him understand that such a course would be utter ruin, and I was about to go on my knees, and beg him to take my life, but to spare the chield, when he commanded that the box should be closed, and that the cavalcade should move on.

(*To be continued.*)

Correspondence.

INTERNATIONAL LANTERN SLIDE EXCHANGE.

Sir,—I still want three or four more members to complete the number wanted to form the basis of the exchange of small negatives or slides with Mr. Beach, of New York.

The membership will not be an imposing affair, as all that will be needed is for each member to send to me by the end of September ten negatives (quarter-plate preferred), or ten positives reduced to 3¼ square, and a subscription of 5s. to pay expenses.

These negatives, &c., will be sent in bulk to Mr. Beach, of New York, who in like manner will send his negatives, &c., similarly collected in America, to me. On arrival I shall take contact copies of all, to be prepared against breakage in transit or other injury, and the bulk would then be made into batches and sent round to all the members in order that they might take copies, or prints, as they might prefer.

With twenty members subscribing ten negatives each, we shall have control of two hundred modern American views of interest, taken in all parts of America. The negatives must be of approved quality, and consist of views of objects of interest. An early response is requested.—Yours faithfully,
H. Smith.

River Cottage, Hornsey, N.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 11th inst., Mr. A. Cowan in the chair.

Mr. L. Warnerke, in referring to the use of alum for hardening gelatine emulsions (page 351), said he employed a five per cent. solution, and not saturated, as the latter would be too strong. He then passed round examples of large heads taken by means of a single landscape lens with a stop placed behind instead of in front, and it was claimed that a lens so used had greater defining power.

Mr. W. E. Debenham remarked that some large pictures exhibited by him at Pall Mall were taken with a Grubb's aplanatic lens. He then illustrated by means of diagrams on the blackboard the effect of placing a stop as Lieut. Pavloffski had done in this instance, and at a similar distance in front. In the former case there would be a gain in illumination equal to one-fifth, which would be counterbalanced in definition or so-called depth of focus.

Mr. W. Cobb asked Mr. Debenham if he considered it desirable to use single lenses for large work.

Mr. Debenham: No; only if a large aperture must be used, a single lens will answer; there were, however, slight advantages to be gained by their employment.

Mr. A. L. Henderson then demonstrated the process of compounding the following gelatino-chloride of silver emulsion for direct printing:—

No. 1.	
Gelatine	60 grains
Water	2½ ounces
Acetate of soda (enough to combine with one-third of the silver) ...	11⅓ grains
No. 2.	
Nitrate of silver	42⅓ grains
Water	1 ounce
No. 3.	
Citrate of soda...	7½ grains
Water	1 ounce
Chloride of sodium (pure)	5 grains

Nos. 1, 2, and 3 were dissolved separately over a water bath, and then mixed, the bulk of gelatine (half-an-ounce previously swelled) being then stirred in; when dissolved, the mixture was ready for coating, the quantity being nearly twelve ounces. Mr. Henderson stated that he believed paper so prepared would keep well. He had used acetate of soda years ago in the preparation of ready-sensitized paper, and that kept white a long time. He found that by adding an excess of sodium acetate to the silver, and putting the chloride in afterwards, a very much finer emulsion was the result. Paper coated with this mixture printed a little quicker than ordinary paper, and toned in any bath. He employed the usual acetate toning with borax added, but the same emulsion on glass would not give satisfactory tones. Glycerine and deliquescent salts increased the rapidity of printing, and he found that one-third of citrate and two-thirds of chloride gave the greatest vigour.

Mr. Debenham had obtained exceedingly plucky prints with five parts of chloride to one of citrate.

Mr. Stewart could increase the printing speed of ordinary sensitized paper at least one-third by passing it over the surface of a citric acid solution immediately after sensitizing.

Mr. Warnerke noticed that the demonstrator used toughened glass beakers; his own measures, flasks, and beakers were of the same description, and to illustrate its power of resisting blows he used a toughened glass vessel to drive a wire nail into a piece of beech, and the vessel was equal to the occasion; but on dropping it on the carpeted floor it dispersed in numberless fragments. Several instances were then mentioned in which toughened glass vessels had burst without any apparent cause.

The Chairman passed round an extemporised knife for trimming photographs, which he said was the best he had ever met with for that purpose. It was a short length of what is known as crinoline steel secured between two pieces of the same material, a knife edge being ground upon it.

Manchester Amateur Photographic Society.

The monthly meeting was held on Tuesday evening, the President, the Rev. H. J. Palmer, in the chair.

The following gentlemen were elected members:—Messrs. James Wagstaffe, John Eaton, Herbert Hoole, Samuel Jacob, William Copeland, and W. Fildes.

Mr. A. W. Duncan gave a communication on the copying of diagrams and prints, chiefly for lantern purposes. After showing a simple addition by which the focussing distance of the camera could be increased, he spoke of the necessity of equally illuminating the picture to be copied. If one lamp or gaslight only be used, not only will the side farthest from the source of light be much more feebly illuminated, but the texture and inequalities of the paper will be more or less evident. Although sunlight is preferable, amateurs generally work during the winter evenings, when artificial light has to be resorted to. For convenience and the saving of time, there is nothing to equal the magnesium light. In using this, he placed a piece of stout cardboard on the top of the camera, so as to project as far over the lens in the direction of the picture as convenient, say about half way. The magnesium ribbon is burnt just above this and near the extreme edge, the cardboard protecting the lens from the direct light. The burning magnesium must be moved backwards and forwards, parallel to the picture, so as to get equal illumination, working with an aperture of about $\frac{f}{12}$. In copying a photograph, about four inches of magnesium ribbon (weighing $\frac{3}{4}$ grains) is required. In developing a negative exposed to artificial light, the image takes about twice the time to appear that it would had it been exposed to sunlight; and it must be kept in the developer a long time to obtain sufficient density; indeed, it is frequently necessary to afterwards intensify.

The Chairman remarked that he did his copying in the open air, the picture being placed on the ground, and the camera fixed immediately above, pointing downwards. In this way he got equal illumination.

Mr. E. Ward said that his difficulty was to obtain density. He had found it best to use a weak developer, containing not more than one grain each of pyrogallic acid, bromide, and ammonia, and to leave the plate for a long time in the developer.

The Hon. Secretary (Mr. William Stanley) referred to a series of illustrations which recently appeared in the *Microscopical News*. The drawings had been prepared by him originally four times the size of the figures required, and reproduced by the process of zinco-photography with very satisfactory results.

Mr. C. Jumeux also made a few remarks on copying by ordinary gas-light, and showed some successful negatives and transparencies thus produced.

The third ramble of the season was to Worsley, on Saturday last. Reaching Worsley a little before two o'clock, the members made their way without loss of time to the lake and boathouse; a fine sheet of water, which adds an additional attraction to the general picturesque beauty of the neighbourhood. Many and various were the views here taken, after which the entrance to the Duke of Bridgewater's subterranean canal attracted attention. The Court-house, a stock-subject for both artist and photographer, is a fine example of that charming and familiar antique style commonly called Magpie, as seen in its most elegant conception at Bramhall. Several views were taken of this, and also of the triumphal portico erected over the spot on the canal-bank, where the Queen landed upon the occasion of her visit to Manchester in 1851. The party then made its way to the Church, which is in the pointed geometric style of architecture. A visit to the monument completed the afternoon's work, as unfortunately permission to photograph either the New or the Old Hall could not be procured, the earl and his family being away from home. The party was a large one, and the weather, photographically speaking, all that could be desired.

Manchester Photographic Society.

The trip to Barden and Bolton Woods and Abbey came off on Saturday, June 6, and those who joined it at Manchester left Victoria Station by the Lancashire and Yorkshire Railway train, and on arrival at Skipton were driven over to Barden, the route being by Skipton Castle, Embsay, Eastby, and Barden Moors, a distance from Skipton of about six miles. The ascent from Eastby to the highest part of the road is very steep, but the walk is somewhat interesting to those who love to see nature in a wild garb. When the summit of the road has been attained, a most delightful expanse of hill, dale, and moorland scenery is in full view, which was (on June 6) greatly enhanced by a fine clear atmosphere, and the sun, which shone in all his splendour. The rich and varied colours of this romantic scene gave a charm to the foliage in the woods, of the valley below, and the lofty summit of Simon's Seat, together with Barden Moors, clothed with a rich brown heath tinged with purple, added to the beauty of the prospect. From the highest point of this moorland road can be seen Rumbles Moor, which closes in the south-east side of the valley of the Wharf, near Benriddings. From the highest part of the road its descent is rapid, and requires to be driven over with great care, even with the safest-footed animals. A slow and careful drive over this part of the moorland is compensated for by the delightful views of the valley below; and after passing through the moorland boundary gate, and in less than one hundred yards therefrom, one of the finest views of Barden Tower from Skipton Road came in sight, and here, as by enchantment, all the cameras were quickly unshipped and planted across the road, each owner being determined to have a good shot at the ruined old tower.

After a repast, the varied scenes on the banks of the Wharf were invaded by the owners of the cameras, and some beautiful views were secured which will form delightful reminiscences. The rocky bed and banks of the river were richly bordered with fine oaks, the foliage of which were rich in colour, and elms, plane, and other trees were luxuriant and grand; but the celebrated ash trees of this locality had not got into leaf; this contrast made the scene more varied and beautiful. Between Barden and Bolton Abbey thousands of fine photographs may be taken, and, when time will permit, the deep glens of Gyll Beck and Fosforth Becks; splendid views may be obtained when a suitable mellow light is passing over them. The waterfalls in these two glens, though not high, are very beautiful. Amongst the islands almost an endless variety of pictures may be secured.

A considerable number of very satisfactory and beautiful views were taken between Baden and Bolton Abbey. The best views of the abbey were taken on the margin of the river below the Moss seat, which is considered the most picturesque to be obtained of the abbey and its surroundings. The locality was so very interesting that the party had to be hurried reluctantly away to enable them to be in time for the train for Manchester.

Birkenhead Photographic Association.

The sixth ordinary meeting was held on Thursday, 11th of June, at the Birkenhead Free Public Library, the President, Mr. J. Alexander Forrest, in the chair.

A cordial vote of thanks was proffered to Mr. Richard Hartley, for the use of his studio up to the present time. The flourishing condition of the Society, however, having caused it to rapidly outgrow the accommodation so kindly provided, the committee of the Birkenhead Free Public Library was applied to, and ultimately decided to grant permission to the Society, under certain specified conditions, to hold its meetings in a commodious room at the Library, and upon receipt of a communication from the librarian to that effect, the hearty thanks of the Society were passed to the Library Committee.

Messrs. William Griffiths and James Shillinglaw were elected members of the Association.

A vote of thanks was also passed to Mr. J. T. Cochran for placing his steam yacht at the service of a number of members, and for his kindly hospitality on the afternoon of Saturday, the 6th instant, and thus affording them an opportunity of taking a few rapid shots at the shipping of the Mersey, and a number of views were passed round by Mr. H. N. Atkins, the result of his work on that occasion. The President and Mr. E. Newall also placed prints upon the table for friendly criticism.

Mr. G. E. Thompson then read a paper entitled "Photographic Reminiscences from London to Italy by Sea" (see page 396), exhibiting by way of illustration a number of beautiful enlargements and two large albums of half-plate pictures, many of which were quite unique as to subject, and all displaying the great artistic ability and resource of their author in his treatment of them.

Leeds Photographic Society.

The ordinary meeting of this Society was held on June 4th, Mr. J. W. Ramsden, Vice-President, in the chair.

After the confirmation of the minutes, Messrs. Rowley and Hargreaves were elected members.

The Chairman then called upon Professor Rücker, F.R.S., to introduce the subject of "Lecture Illustrations by the Lantern."

Professor Rucker, F.R.S., after explaining the principles upon which the lantern is constructed, said that he proposed to discuss the various uses to which that instrument is put in the exhibition of experiments to large audiences. To illustrate how greatly the lantern increased the range of illustrations at the command of a lecturer, a photograph of the interference bands produced by thick plates was exhibited on the screen. This had been taken at the Lecturer's request by Mr. A. Haddon, Demonstrator in Physics in the Royal Naval College at Greenwich. Photographs of interference bands were first taken by Professor Clifton, of Oxford; but he believed the particular bands now shown had not been taken before. It was found necessary to photograph them through a pinhole.

The lecture concluded with a comparison of the performances of two objectives—viz., a Dallmeyer lent by Mr. W. F. Fison, and a lens by Messrs. Newton Brothers.

The address was listened to with marked interest, and on its conclusion a short discussion took place.

The following questions were found in the question box:—"In platinotype printing, is there any different result according as the printing is done in a strong or weak light?" "In the same process is there any objection to using the same developing dish for the ordinary paper and the sepia tint?" In reply to the last question, the necessity of absolute cleanliness in all photographic manipulations was insisted upon; but, supposing the dish to be made of non-absorbent materials, and well washed after using, no evil results would accrue.

The Chairman remarked that he had a glass dish for a great number of years in his studio, which he had used for almost every process in connection with his business without any evil result.

It was shown by the prints exhibited that a great difference could be made by printing in strong or weak lights.

The Secretary reported that he had received £3 2s. towards the "W. B. Woodbury Fund."

Birmingham Photographic Society.

A meeting was held on Thursday last, when the chair was taken by Mr. W. J. Harrison.

Officers as following were elected:—

President—Mr. R. Hill Norris, M.D.

Vice-President—Mr. W. J. Harrison.

Treasurer—Mr. G. M. Iliffe.

Secretary—Mr. W. J. Joyner.

Committee—Messrs. B. Kowleese, Rickard, H. Lucas, J. P. Heaton, S. Hulme, J. Lewis, R. P. Taylor, and E. J. Cox.

It was arranged that Mr. W. J. Harrison should read a paper at the next meeting on "Warnerke's Sensitometer," and Mr. Jones a paper at the following meeting on "Weights and Measures and the Making of Solutions."

Sixteen new members were elected.

Talk in the Studio.

Photographic Society of Great Britain.—The next Monthly Technical Meeting of this Society will take place on Tuesday June 23rd, at 8 p.m., at 5a, Pall Mall East. The room will be open at 7 p.m. for perusal of journals.

London and Provincial Photographic Association.—The annual general meeting will take place at Mason's Hall Tavern, on Thursday, the 25th instant, when the report and balance sheet of the Association will be presented, and the election of officers for the ensuing year take place. The chair will be taken at eight o'clock. The annual dinner of the Association will take place at Mason's Hall Tavern, on Thursday, July 2nd, at half-past six o'clock. Tickets 4s. each. It is necessary that application for tickets be made before the 30th instant to Mr. J. J. Briginshaw, Hon. Secretary.

Composite Portraits of Racing Men.—Mr. R. A. Proctor, writing in *Knowledge*, says:—"While waiting for a train at Clapham Junction last week, and watching the people enter those departing for Epsom Downs, I could not help speculating whether, among his composite photographs, Mr. Francis Galton had ever combined a series of the lower order of sporting men to form a typical portrait. If he has, or should he in future do so, he cannot fail to obtain as hard, cunning, and evil a type of countenance as it would be possible to depict."

A Novelty in Printing.—In consequence of the increase of shortsightedness, and the theories current as to its cause, a new departure in book-printing has been made in Holland, the letters being printed in dark blue on a pale-green page.—*Science.*

Cutting Glass by Electricity.—Electricity has now been applied for cutting glass tubes, an operation of some difficulty when the diameter is large; and iron wire half a millimetre in diameter is wound round the tube at the place required to be cut, and the ends are connected by means of copper conductors of the same diameter, with the poles of a powerful battery or other generator of electricity. This iron becomes heated when the current flows, and it is only necessary to cool it suddenly with a few drops of cold water in order to produce a clear cut. Glass tubes four inches in diameters are now cut in this way.—*Journal of the Society of Arts.*

A Flat-Boat Gallery.—We are all tolerably familiar with photographic studios on wheels, also tents and other portable arrangements for the same purpose; but a floating gallery, we venture to think, would be somewhat of a novelty. Thirty-one years ago, however, Mr. Sam. F, Simpson, of New Albany, Indiana, fitted up such a gallery, and travelled with it nearly to New Orleans, making Daguerreotypes. He mentions, moreover, that these flat-boat galleries were "becoming quite popular in the West" at that time. His boat was fitted up with reception room at the head end, skylight in centre, and dark room, &c., at the stern. His light was large enough to enable him to make sittings in five to ten seconds in good weather. Such a floating gallery has many advantages over a tent or waggon, seeing that there is no unpacking and setting up to do as with the former, but you are ready for business as soon as tied up; and no horses are required for transportation as with the latter. Should business prove bad at one place, you can start for another at a minute's notice. On the other hand, of course, you are confined to water routes, which involve a somewhat more limited territory than can be covered by a "'cross-country" conveyance.—*The Photographic Eye.*

Photographic Club.—The subject for discussion at the next meeting, on June 24th, will be "The Chemistry of Toning." The Saturday out-door meeting will be held at Chingford; trains from Liverpool Street at 2.30.

To Correspondents.

⁂ We cannot undertake to return rejected communications.

Florence.—The very best finder is that figured on page 628 of our volume for 1883, and it could be made for you by any optician. If you merely wish to use a finder for determining the direction for aiming, it is simply necessary to take a sight along one of the upper angles of the camera.

W. D. V.—The reproduction of the letterpress is by a photographic process; but the portraits are the work of an artist—if, indeed, one may apply the term to him. The print has been returned by post.

Wm. Smith.—Your communication should be addressed to the publishers as an advertisement.

M. Morelli.—The address of Mr. Romain Talbot is 68, August-Strasse, Berlin, N.

Litho.—1. Major Waterhouse is in India, but will probably be over here during the summer. 2. Let us have exact particulars as to your failures.

Juz. Beer.—1. Those by the maker you mention, if not the best, are certainly those we should elect to use; and this notwithstanding the absence of modern "improvements." 2. No.

Alphonzo.—Solid paraffin or ozokerite is best, but we have never heard of serious mischief arising in the other case. For chromotype work, paraffin wax does not answer very well—ordinary yellow wax (unadulterated) being almost essential.

Enquirer.—1. The acetate bath is best in such a case. 2. There is no help for it; if you want the result, you must use the highly albumenized paper. 3. The weak bath and longer time; increase the strength a little in cold weather.

Leinster Grove.—It would be much more satisfactory if your suggestion were to be universally carried out, but each make acts according to his own notions.

Printer.—Make it thoroughly dry; and slightly warm, after whic varnish it with the so-called Brunswick black.

Old Subscriber.—Full directions will be found in the mor recent articles on the subject by Major Waterhouse, and in th few which will shortly appear to complete the series.

J. H. S.—Use Luckhardt's encaustic paste—Best white wax 1 ounce; oil of turpentine, 5 ounces.

⁂ Several answers must stand over till next week.

The Photographic News.

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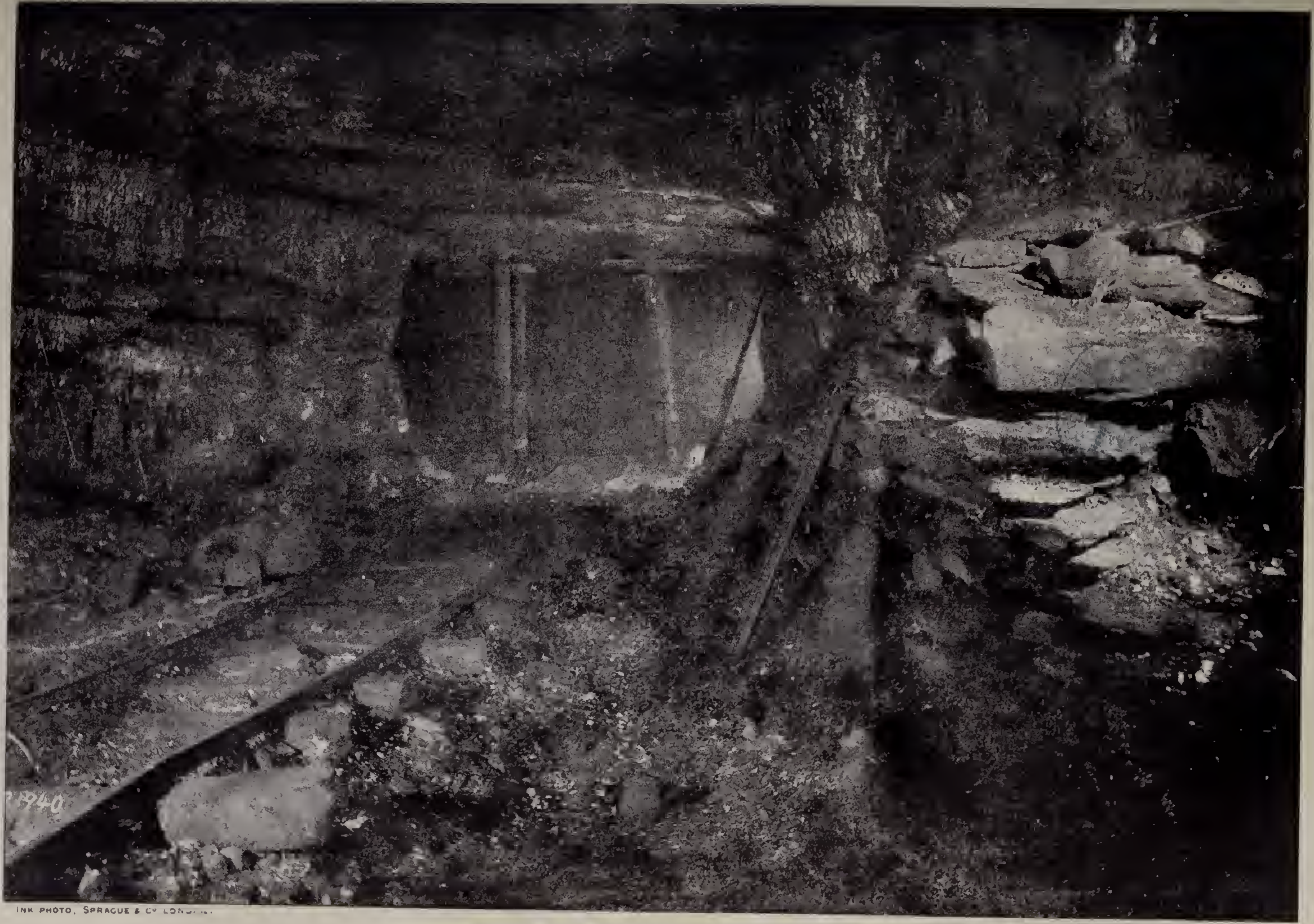

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1399.—*June* 26, 1885.

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VARIATION IN THE PRICE OF METALS DURING THE PAST TEN YEARS.

In the current number of the *Journal of the Society of Arts* there is an interesting table showing the market cost of some twenty metals in 1874, and again in 1884.

Owing to the progress made in the technical details of extraction and reduction, the general tendency has been towards a lowering of the value of metals; but in some cases the cheapening is due to increased supply, as in the case of silver. Silver, according to the table, has fallen in value no less than ten shillings per pound during the past decade; but it is certain that photographers do not enjoy a proportionate reduction in the price of the nitrate.

	Dec. 1874. per lb. £	s.	d.		Dec. 1884. per lb. £	s.	d.
Osmium	71	10	0	... ...	62	0	0
Iridium	70	0	0	... ...	45	0	0
Gold	62	15	0	... ...	63	0	0
Platinum	25	7	6	... ...	21	7	6
Thallium	23	17	6	... ...	4	15	0
Magnesium	10	5	0	... ...	1	15	0
Potassium	5	0	0	... ...	4	0	0
Silver	3	17	6	...(In Hamburg)	3	7	6
Aluminium	1	16	0	... ...	1	16	0
Cobalt	1	14	0	... ...	1	2	0
Sodium	0	14	2	... ...	0	8	8
Nickel	0	11	0	... ...	0	3	1
Bismuth	0	8	1	... ...	0	8	1
Cadmium	0	7	1	... ...	6	4	0
Quicksilver	0	2	0	... (in London)	0	1	9
Tin	0	1	1	(in Berlin)	0	0	9
Copper	0	0	10		0	0	7
Arsenic	0	0	8	... ...	0	0	$4\frac{1}{2}$
Antimony	0	0	$6\frac{1}{4}$	(in Berlin)	0	0	5
Lead	0	0	$2\frac{3}{4}$		0	0	$1\frac{3}{8}$
Zinc	0	0	$2\frac{1}{2}$		0	0	$1\frac{1}{4}$
Steel	0	0	$1\frac{3}{8}$	(in Upper Silesia	0	0	$0\frac{3}{4}$
Bar iron	0	0	$1\frac{1}{8}$		0	0	$0\frac{5}{8}$
Pig iron	0	0	$0\frac{7}{16}$		0	0	$0\frac{1}{4}$

Gold, according to the authority quoted, now ranks highest in value of all metals, the competition of osmium and iridium having been overcome. It is only by reason of improved methods of preparation that the latter have become cheaper, while their use has at the same time increased. Iridium is mixed with platinum in order to increase its strength and durability. The normal standards of the metrical system are made of platinum-iridium on account of its known immutability. In 1882, platinum stood 15 per cent. below its present value; but its increased employment for industrial purposes led to the subsequent improvement in price. Thallium has experienced a severe depreciation, on account of the economical process by which it is extracted from the residue of the lead chambers used in the manufacture of sulphuric acid. The use of this metal is mainly confined to experimental purposes. The fall in silver has arisen from increased production and diminished use for coinage.

The price of magnesium is, as will be noticed, given as being now 35s. a pound, or (say) 2s. 3d. per ounce; and mention is made of it being turned out at this low figure from a factory at Saliudres, but we have not yet heard that it can be bought in London at a rate much less than that charged ten years ago. The value of cheap magnesium to the photographer, especially in the winter months, need not be enlarged upon.

◆

RAPIDLY PRINTING STIPPLED TRACINGS FROM PHOTOGRAPHS.

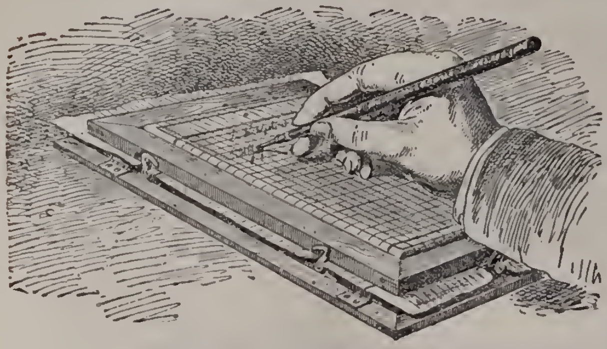
Stencil printing for writings or fine work is a thing which has only come into use during the past few years, and it was first introduced by Edison in connection with his electric pen. In the pen of Edison a fine needle point is made to move very rapidly up and down by means of a minute electric motor attached to the instrument; and if one writes with this pen on a sheet of paper the lines will be made up of numerous clear perforations packed quite closely together, and the perforated sheet of paper thus obtained may be used as a stencil for printing a very large number of copies. For this purpose the stencil is laid on a sheet of paper, and either a roller or squeezee charged with printing ink is passed over it.

If now an ordinary print upon albumenized paper is used as the basis of the stencil, the person working with the perforating pen can very readily follow the outlines of the subject, and also work in a great deal of the light and shade, in this way obtaining a stencil from which numerous copies can be rapidly printed.

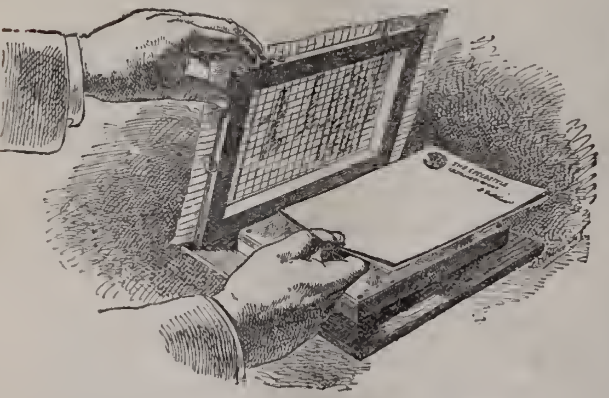
Since the introduction of the electric pen various perforating methods have been devised, some of which involve the use of far less complex and delicate appliances than the electric motor pen of Edison, and among these may be mentioned the trypograph of Zuccato, in which the paper to be perforated is laid on a fine file, and tho tracing is perforated with a blunt steel point or stylus, the teeth of the file cutting their way through the paper.

As, however, it is difficult to ensure that the file shall always be exactly underneath the part of the photograph which is being traced, there is some advantage in using a perforating pen rather than the file underneath: and a recent invention of Mr. G. Gestetner seems likely to prove of considerable value as a simple and economical substitute fo rthe electric pen. It consists of a minute spur wheel, mounted at the end of a pencil shank; and to make the printing stencil, this is rolled with some pressure on the outlines and shaded portions of the photograph, this print being by preference laid on a sheet of zinc or other soft metal. It is an excellent plan to wax the print before converting it into a printing stencil, as, under these circumstances, the perforations are cleaner and less liable to become clogged up by the expansion of the paper under the action of the printing ink.

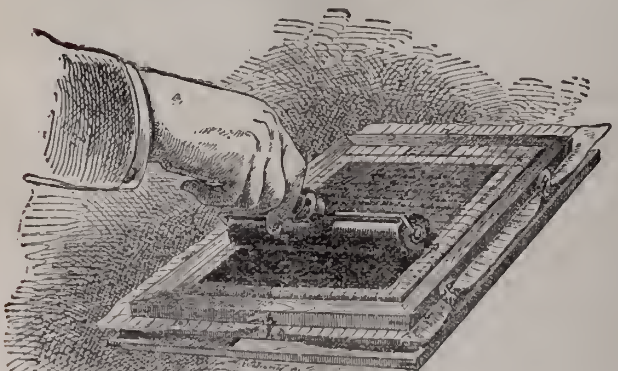
The subjoined cuts illustrate the method of using the cyclostyle for the multiplication of an original stencil writing, and when the tracing of a photograph is to be multiplied, it is merely necessary to use the photograph (waxed by preference) instead of the paper ordinarily supplied with the apparatus.



WRITING WITH THE PERFORATING PEN.



PLACING THE PAPER THAT IS TO RECEIVE THE IMPRESSION.



USE OF THE ROLLER FOR FORCING INK THROUGH THE PERFORATIONS OF THE STENCIL.

THE ANTWERP INTERNATIONAL EXHIBITION.

[FROM A SPECIAL CORRESPONDENT.]

SITUATED at the extreme east end of the Avenue de l'Industrie, and about ten minutes' stroll from the old town of Antwerp, the spacious buildings which constitute the Exposition Universelle will before long present an impressive appearance; but now, nearly two months after the official opening, the central arch with the ornamental towers on either side are little more than an iron cage and wooden boarding. On entering the building by the main doorway, however, one is at once impressed with the very brilliant effect that one sees in the Belgian and French sections, with their coloured canopies, festoons, flags, and other ornamentations. The grounds, too, although comparatively small, looked very gay, with the luxuriant plantations, kiosks, ornamental cafés, and the gorgeous eastern temple of the French colonial section.

Of the exhibition itself, we may at once say that it is a grand success, and that, considering the exhibition is universal, photography is fairly well represented; although, as is usual under these circumstances, the exhibits are chiefly contributed by professional photographers. Of the various countries represented, whether from a general or photographic point of view, the palm must certainly be given to France, although Belgium has a very fine show, and undoubtedly comes second on the list. As regards England and Germany, they are practically unrepresented; in fact, as far as English photography is concerned, the exhibits are confined to two frames, the one containing Messrs. West and Son's admirable yachting pictures, and the other from A. G. Tagliaferro, including the church of the knights of St. John at Malta, which gained two medals at Pall Mall last October. English photographers, altough so deficiently represented, can certainly find consolation in the fact that the quality of the British exhibits is all that could be desired.

Perhaps some explanation is due to our readers for allowing nearly eight weeks to pass before following up the first notice (see page 291), but when we say that until a few days ago there was scarcely a frame hanging in the photographic departments of the Belgian and French sections, it will be at once understood that we preferred to delay giving a detailed account till the afore-mentioned photographic displays were completed.

On entering the main building, the Belgian photographic department is situated just to the left. The frames are for the most part hung on three-sided screens, over the top of which are suspended light canopies which very effectually soften and diffuse the direct rays from the large skylight. MM. Geruzet Frères, of Brussels, whose work is always of great excellence, show a very striking series of large portraits with artistic backgrounds. The portraits are taken in the usual studio, but the surroundings are printed in from well chosen negatives of actual interiors or landscapes; thus a lady is represented posed in a tastefully-arranged ball-room; or again, Her Majesty, Queen of the Belgians, is represented strolling in a leafy avenue. The effects thus shown are highly satisfactory. Of Herr Ganz's large frame of portraits and groups, which are also very excellent, little need be said. The electric light portraits of M. Dupont show what can be done with artificial illumination, the pictures being delightfully soft and harmonious. The frame of instantaneous portraits of children, contributed by M. Maes, of Antwerp, contains a few charming little studies, but also several which, although taken instantaneously, present unmistakable signs that the juvenile sitters feel they are being photographed. In cases where instantaneous photography is possible in a studio, it would be a great advantage to disguise the camera and lens in some way or other. The enlargements contributed by M. Dirks, of Antwerp, and M. Meeus-Verbeke, of Louvain, are satisfactory; but we should have admired them more if they did not so unmistakably bear the marks of the retoucher's pencil. Of M. Van Crewel's gorgeous exhibits of character studies, mounted in massive metallic frames on a crimson plush background, we prefer the mounting to the photographs. M. de Neck exhibits his hat-camera, which was described in these columns a short time ago, and also several surprisingly satisfactory negatives and lantern slides of street scenes taken with the apparatus.

Of M. Storm's (amateur) large frame of various photographs, we certainly prefer the harvest groups and rustic bits. M. Bennert, amateur, of Brussels, makes a considerable show of very good carbon work; the views of the lakes in the higher Alps with natural clouds are particularly successful. Of the amateur exhibits the palm must certainly be given to M. Hector Colard, the energetic member of the Belgian Photographic Association, who is represented by three enlargements in carbon. Of the two landscapes, the one representing a shady glen with rippling water is particularly fine. The other picture is both excellent and original, and represents a drawing-room scene tastefully arranged, and showing the window directly facing the lens; yet the window frame is perfectly reproduced, without any visible solarization; at the same time, all the surroundings are delightfully softly rendered. We hope shortly to again refer to this picture, but in the meantime we congratulate M. Colard on his result. In addition to some good examples of the blue process, M. Kymeulen-Pettens shows a reproduction from a mechanical drawing, in which the lines appear white, while the groundwork is of a dark chocolate tint; no information, however, is given as to how the latter tone is obtained. Among the other exhibits of general interest in this department may be mentioned the photo-mechanical reproductions of MM. E. Aubry, L. Bogaerts et Cie., A. Cadot, Colens, Florimond et Cie., and J. Thoorens; the general studio work of MM. Ed. Launoy, A. Moraiu, G. Raynaud, and H. Zeyen. Of the apparatus exhibited, the large solar camera designed by the late Dr. Van Monckhoven attracts most attention; but the cameras and other apparatus exhibited by MM. C. E. Hofmans and A. J. Kramers are worthy of inspection. Before leaving the Belgian photographic department, we should add that in the exhibition under notice, one is struck with two features, viz., the introduction of carbon printing almost to the total exclusion of the albumen process, and a tendency to the increase of size, the cabinet being, to a large extent, replaced by pictures measuring about seven by five inches.

In the other departments of the exhibition photography is made use of to a very large extent; in fact, quite twenty-five per cent. of the exhibitors employ photography for illustrative purpose, and in one or two cases we fear it has been employed in a hardly satisfactory way. Thus, when the manufacturer is not altogether satisfied with the appearance of his works, instead of having the latter directly photographed, he calls in the aid of an artist, who carefully produces a picture showing the subject under abnormally satisfactory conditions, and then this interesting production is carefully reduced by the camera. To the public ignorant of photographic details, the deception is complete; we should remark, however, that such photographic results are only shown in one or two cases.

In the machinery and electrical departments there is little of photographic interest except a fine series of photomicrographs of diatoms produced by Dr. Henri Van Heurck, the professor and director at the Antwerp Botanical Gardens. In a *brochure* which the professor has recently published, he lays particular stress on the advantages of illuminating the object with incandescent electric lamps, and gives preference to Mr. Stearn's diminutive Swan lamps as constructed especially for microscopic purposes. When we mention that several of the photomicrographs exhibited represent an amplification of 1,200 diameters, it is hardly necessary to remark that the use of incandescent electric illumination is capable of producing highly satisfactory results.

The Belgian educational department consists for the most part of the same exhibits which attracted so much attention at the Health Exhibition last year; but the model chemical laboratory which is here fitted up is worthy of passing notice. The choice of a suitable material for the construction of a dark-room bench presents no serious difficulty, but in a chemical laboratory, where strong acids and other corrosive liquids are frequently spilt, the orthodox wooden bench soon acquires a disreputable appearance. In the model exhibited, the working table is covered with a sheet of enamelled iron, which should withstand the average wear and tear of a laboratory fitting, at the same time always presenting a cleanly appearance.

Next week we shall describe the photographic exhibits of the French and other sections.

ANOTHER BLOCK PROCESS.

BY GEORGE SUTHERLAND, M.A.

In the number of the Photographic News for March 27th last appeared, under the above heading, a print from a block photographically produced by a process devised by me, and a few words as to the objects aimed at by this process may not be uninteresting. For years past it has been evident—and the Photographic News was among the very first to recognise the fact—that a wide extension lay before photography in its application to the illustration first of books and magazines, and secondly of ordinary newspapers. It is to the last-named phase of the subject that I have confined my attention. When the general public come to look for photographic prints relating to the news of the day served up after breakfast in the columns of the newspaper, the photographer will then be master of the situation; even if at first the reproductions are of a comparatively rough nature, the habit of looking for them will grow upon people. In portraiture, the feeling that an illustration is a veritable photograph, and not a transcript of one made with more or less fidelity by an artist or copyist, will give a claim to such reproductions that nothing else could possibly give. When an election takes place every elector will expect to see portraits of the candidates in all the public prints of his neighbourhood. Whatever may be stirring in any town or village, the services of the photographer will be called in to aid the printer in enlightening and amusing the public. Every entertainment will be followed by the publication of portraits of the performers; every stylish wedding by those of the bride and bridegroom. When anyone distinguishes himself or herself, either in a good or bad way, the camera will at once be called into requisition. The locality of every incident of interest will be duly photographed, and the picture published through the medium of the press. All public celebrities will become familiar to the people as household words. In short, the news photograph will become as essential to the press as the news paragraph.

Keeping this vision of the future before me, I set to work about 1877 or 1878. It is useless to recount the different methods employed; suffice it to say that I found that for common newspaper work etching of any sort would not be satisfactory. Ordinary newspapers, as most people know, are printed by machines in which the paper is pressed on to the type by means of thick blankets. Unless the depth between the parts intended to catch the ink be very great indeed, the blanket and paper will dip, and there will be a smear.

The objection of want of depth was overcome by the device of using an impression in tinfoil from a deeply-cut wood engraving capable of printing a very light even tint all in dots. This film, having been made to take the shape of the photo-relief, is gently rubbed so that all high dots become large, and all low ones remain small, and a reproduction of the surface in type metal is the desired engraving. This is a rough outline of the process. As newspaper ink is not very fine, the dots must be placed at some distance from one another, and the engraving consequently cannot be very close in grain. The degree of fineness which is practically attainable will depend chiefly on the character of the newspaper for which it is intended.

But another requirement, apparently more difficult of attainment, was that of providing some substitute for overlapping. A flat woodcut put into a newspaper press along with type under a soft blanket prints very badly, owing to the want of force and intensity in the dark parts of the picture. In printing from a wood-cut for book-work or for a superior journal, the printer cuts out pieces of paper, and places them in position, so that at each revolution of the press they fall exactly on the parts of the block intended to print the deepest shades. "Overlaying," as this is called, forms an art in itself, and in ordinary newspaper work it is, for obvious reasons, quite impracticable. But a photo-relief is, in point of exactness, more perfect than any overlay ever prepared by the most experienced artistic printer, the degree of relief being exactly proportioned to the intensity of the shade required. Why should not this property of the photo-relief be utilised? This was a new idea entirely, and it was worked out with satisfactory results. The photo-relief was made of depth sufficiently great to protect from any pressure all the dots in the lightest parts of the picture. These dots in the type-metal block lie in hollows, and when the blanket presses the paper on them the darkness of the mark made is proportional to the height. Thus the "dip" of the blanket, instead of being a disadvantage, is utilised to a very important purpose. One fact about the specimen printed in March will therefore be understood, although it sounds like a paradox. The printing of the Photographic News is too good to give the blocks which my process produces a proper chance. The dip is not sufficiently great, and, in consequence, the dark parts of the picture print too dark, and the light parts too light, thus making the effect rather spotty. By the use of a small piece of blanket in any press, the objection is overcome; and perhaps when I am in London, as I expect to be in a few weeks, I may be able to show readers of the Photographic News portraits as they would print on an ordinary newspaper press. As I have said, it is to the problem of photography in the newspaper press that I have applied my efforts, being persuaded that before many years are over, the link between the studio and the newspaper office will soon be fully supplied, and photographs will be seen in almost every public print.

◆

HOW TO SUCCEED IN TAKING GOOD PICTURES ON GELATINE PLATES No. 1.

BY S. R. BOTTONE.

I can imagine that many of my readers will exclaim, "What is the use of writing about this? Those who do not know, can buy a sixpenny book at any photographic dealer's, which will teach them all they want to know." Perfectly true; I have no wish to decry the many excellent pamphlets, varying in price from one penny upwards, by means of which the man most ignorant in photography can be taught to take a picture. But I write for a great many amateurs who, having spent a few pounds in an outfit, taken a few lessons from a photographic friend, and succeeded in taking a few good pictures, gradually find themselves getting into a hopeless muddle. Sometimes the picture is beautifully sharp but,—oh, so thin! At another time it comes out veiled, and pretty black all over, and yet prints without any contrast. At another time the picture seems all out of focus; and again at another, great transparent spaces appear after fixing. Now, I propose to teach the amateur how to find out the cause of these and other defects; and by so doing, put him in the way to become a successful photographer.

I do not propose (at present) to give any receipt for the preparation of the gelatine plates themselves, since those that are to be found at the dealers' are so uniformly good, that it is not worth while for the amateur to make his own plates, unless he has some special object in view. But I must strongly advise the student to choose a well-known plate, and then stick to it, until he has overcome eve obstacle.

The chief difficulties in the way of success are:—

1st. Improper light in the dark-room.
2nd. Stray light in the camera or dark-slides.
3rd. The sitter or object badly lighted.
4th. Improper exposure.
5th. Improper development.

We will now proceed to attack these difficulties one by one, so that we can afterwards single out the point at which our failures (if any) occur.

1*st. Improper Light in the Dark-Room.*—Given sufficient time, I believe any coloured light will affect the sensitive bromo-iodized gelatine film; but practically, dark shades of orange and red are sufficiently inactive to afford protection from injury to the film, if the manipulations do not extend over an unreasonable time; and if the window, or other source of light, be not unduly large, or exposed to direct rays of the sun, I have found that the glazed linings made at the Foot's Cray, known as "Golden Fabric" and "Cherry Fabric," are excellent.

Suppose we have to fit up a dark-room with either of these materials, we must carefully block up every window, every chink through which light can pass, except that window we intend to cover with the yellow or red lining. Stout brown paper and good stiff paste can be used to block out any chinks in boards, bad fitting doors, &c., &c. Remember, absolutely no light must enter the room except through the window chosen.

Now as to the choice of the window. The window for a medium-sized room should not exceed four square feet in size; but if the room is very large, say eighteen or twenty feet long, so that the operating table is twelve or sixteen feet from the window, it may be larger. The window must face the north or west. If it faces the south or east, it will be better to block up the window altogether, and work by a ruby lantern; the reason for this is, that if the sun shines on the window it must be so much covered with fabric to enable you to work without fog as to be almost dark when the sun goes off; and if, on the other hand, you use only sufficient fabric to enable you to see and work when the sun is not on, then, on the advent of the sun, your pictures will surely fog. Having covered your window (and two folds of golden fabric or one of golden and one of cherry will afford ample protection for ordinary sized windows), you may proceed to test practically whether your room is light-tight. To do this effectually, you must begin by making up a little standard developer thus. Take—

A.—Neutral oxalate of potash	...	4 ounces
Water	...	8 „

Place in a bottle capable of holding 12 ounces. Agitate until the water will dissolve no more of the oxalate.

B.—Ferrous sulphate	...	1 ounce
Water	...	2 ounces

Place in a four-ounce bottle, agitate, and keep corked.

Both these bottles should be labelled. If required, these solutions may be made up in quantities of pounds instead of ounces. A little fixing solution should also be made up by dissolving one pound of hyposulphite of soda in one pint of hot water, allowing to cool and bottling off. Label this bottle also, and make it a part of your creed never to allow any hyposulphite solution to get near any other solutions (Abney forgive me!) If you do, you will have stains of all kinds, fogs, reversals, and other pretty effects. (Always wash your hands after having touched the fixing solution.) Having made up these two solutions and placed them in your dark-room, take your sample of plates (as yet unopened) to some successful photographic friend, and ask him to try one so as to see whether they fog. This is hardly likely, still it will afford you convincing proof as to which side the fault lies. If he reports that they are all right, go into your dark-room, close the door, open the packet of plates, lay one of them on your operating table, put the others out of the light (all ruby though it be), and leave the plate untouched for, say, five minutes.

Now place it in a small developing tray, and flood it with a mixture of three parts by measure of A, to one part by measure of B. Do not shake up these solutions before measuring off, use only the clear portion. Leave the plate in the developer for a quarter of an hour; do not open doors or let any kind of light in except that through the fabric-covered window. At the expiration of the quarter wash the plate thoroughly in clean water, fix in the hyposulphite solution, wash again, and bring to the light for examination. It should show no traces of fog, but appear like a sheet of clear glass—a little opalescent, perhaps, because of the gelatine, but absolutely no deposit or fog.

If otherwise, light enters somewhere, or your window is insufficiently covered. In the latter case, put on another thickness of lining, and try again until you get your plates quite clear.

"POOR PUSSY."

The Tale of a Manx Cat.

BY PERCY DE VERE.

> "There are cats that are large, there are cats that are small;
> There are cats with nine tails, and with no tails at all."
>
> —*Old Song.*

From quite a child I was always attached to the "harmless necessary cat." My earliest pleasant remembrances (in the way of stories) recall at once "Dick Whittington" and "Puss in Boots"; and even now—despite the disagreeable habit many cats have of prowling about and making the night hideous with their possibly well-meant, but nevertheless undesirable, vocal performances—I must confess to a great fondness for the animal.

When I arrived at years of discretion (some of my friends doubt whether I ever did so—but no matter), and had a home of my own, I looked about for some friend whose household had lately been enriched with a litter of kittens—I soon found him—chose a pretty specimen of a dark tabby, and prepared to "train it up in the way it should go." Some one else evidently thought they could train it better than I could, and I saw it no more. It was stolen. Misfortune number one.

My next venture was with a sandy kitten. This promised well, and grew into a fine cat; but its habits became so irregular, and its love of society so great, that I gave this treasure to a friend. Loss number two.

My third attempt was with a tortoiseshell, which certainly bade fair to be a most useful animal; but alas! before one short year had flown, it developed a taste for my neighbour's chickens. Two days after, it died somewhat suddenly. It seems that someone took to leaving arsenic about, and this useful chemical does not agree with all cats. Loss number three.

Now comes the object of this little narrative. I had almost said I would not try my luck (?) again, when an old friend offered me a very pretty tabby kitten, with white chest and feet, and *without a tail.* I hesitated, and as the man who hesitates is lost, I consented to accept the little oddity, and notwithstanding the trouble of which that animal was the innocent cause, I can hardly regret my decision.

Turning over a box of old negatives a few weeks since, I came across one which caused me involuntarily to sigh, "Poor Pussy." Yes, there was my Manx cat. How proud I felt when I had taken that negative, "Poor Pussy." "Was it patient?" Very. "Did it scratch?" No. "Was it a good mouser?" Unquestionably. But the two first mentioned were its most valuable qualities to me; as a studio accessory it was invaluable.

I am speaking of course of the old collodion days—say, ten years ago—when the preparation of plates took time, and children in the studio were not quite so easily managed as at present. How many of my successful pictures of babies were due to the assistance of "poor pussy!" How often, when all other attractions failed to keep a child amused, "poor pussy" would come to the rescue, and allow the little darling to pull its ears, or clutch a handful of its fur until the tearless infant's temper had modified, and it had ceased to remember what it was screaming about. Peace was restored, and at last you were able to emerge from what we then called a dark-room, smiling, and without having uttered any of the undesirable expressions that were so plentiful a few minutes before.

But, "to our tale," as Burns says. Happening one day to find the animal sitting comfortably on a cushion that had lately been occupied by a little sitter, I took the negative to which I have alluded. In due course it appeared in my show case, and the number of applications for copies was surprising; and the success of what would now be considered a very ordinary production induced me to enlarge it to life size, finish it in black-and-white, and place it in my window.

The delight of the children in the locality knew no bounds. My cat was a "landmark." Young people of opposite sexes used to arrange to meet "at the cat in the lane," &c. Copies of "poor pussy" continued to sell, and this went on for about eighteen months.

Meantime, of course, several "accidents" had happened to the object of this narrative; among other things, she had had her throat cut. I don't mean fatally or murderously, but it occurred in this way. One morning, on arriving at the studio, she was found in a state of complete exhaustion, and examination showed a piece of thread hanging from her mouth, leading to the conclusion that somehow or other she had swallowed a needle. I took her to a good veterinary surgeon, and held her while an aperture was made in her neck, through which was extracted the needle. Of course the "shirt front" of "poor pussy" was covered with blood, and she had to be carefully fed; but in about a fortnight, all was right again.

A few months after this, however, in her endeavour to add to the feline population, "poor pussy" died. I did not have it stuffed, for which I have been sorry since, but I had her skin sent to a furrier, and possess it now.

To continue. About six weeks after the decease of my favourite, a woman called and purchased one of her cartes. Next day she came again, and had two. Two days afterwards the same individual "went in" for three. Again she appeared; this time the order was for two only, but it was coupled with the request for an interview with myself.

I was naturally prepared for her making a proposition to be supplied wholesale, when she coolly demanded the enlargement. I offered to part with it for a certain sum. This, however, was not her idea of the matter—she demanded the picture without any consideration. "Why," said I, "should I give it you?" "Because," said she, "it is a picture of my cat which you enticed here, and kept for several days, almost starved, in fact, in order that you might take its picture and make your fortune by it."

At first I felt inclined to laugh, but the serious aspect of the speaker convinced me that she was in earnest, and would not allow of my doing anything of the kind. At last, having recovered somewhat from my surprise, I enquired how long it was since her cat had been away. "Three weeks," said she; "I only got it back on Tuesday." "But, my good woman," said I, "that picture has been in my window more than twelve months." "I know better," said she; "you can't deceive me."

"Well," said I, rather annoyed, "where is your cat now?" "Here it is," said she, and forthwith from her black bag she draw a thin dark tabby cat unusually long in the body, and without a tail.

"And do you mean, for one moment, to say that the picture in the window is like that brute," said I. "Yes," said she, "the very image."

"But, bless the woman," said I, "the cats are only alike in the fact of having no tail; the marks on them and the shape are totally different."

"Ah, that's the artfulness of you likeness takers," said she; "you were afraid to make it quite the same, but, *if you hadn't altered it in the taking* it would have been like my Tom to a hair. You can't deceive me."

"Nonsense," said I. "In the first place, my cat was not a Tom, and secondly, it has been dead nearly two months." "*Your cat*," said she; "*you never had a cat.*" This was said in such a forcible and decisive manner that it reminded me of the memorable quarrel in "Martin Chuzzlewit," where Betsy Prig says (alluding to the mythical Mrs. Harris), "I don't believe there's no such a person."

The line must be drawn somewhere, and the limit having been reached, I desired my visitor to "clear out," and not bother me any longer.

Next day, on returning from business in the city, I was somewhat astonished to find my house surrounded by a crowd of people, and my visitor of the day before demanding the picture of the cat from my assistant. This had been going on for about half an hour, I was told, but being nearly opposite a police station, of course no constable appeared on the scene. Just at the moment of my arrival, however, came by the purveyor who daily, during her lifetime, had provided "poor pussy" with "*ros bif on a leetle stick*," as the Frenchman termed it, and calling to him for corroboration, I endeavoured to convince the woman of her mistake.

'Twas all of no use, and the matter ended by an intelligent officer, who had accidentally noticed about fifty people too many in front of my house, clearing the mob and the cause of it away.

The house I occupied at that time was only one door from a side street, and my studio could easily be seen "over the garden wall" of the house between it and the roadway. That night thirteen large squares of glass were broken by stones, which also damaged several articles of value that happened to be in the building.

Now, I had been here several years, and, except by an occasional stone from some over-mischievous boy, had been tolerably free from such annoyance; I naturally therefore betook myself to the inspector opposite.

The next day bills appeared in the locality to the effect that "Whereas, &c., &c.,—two pounds reward would be paid to anyone giving such information as would lead to the conviction, &c., &c.—" An extra officer was told off to watch the premises, but notwithstanding the information he had received, the despoiler of my 21-ounce sheet could not be discovered.

The glass was replaced, and a few days afterwards came another visit from my tormentor. The same old story, the same refusal; this time I actually showed her the *skin* of "poor pussy" (which had been returned from the furrier in the meantime), but without avail. Another crowd—another (or perhaps the same) intelligent officer, who "moved on" the obstructions, and the same night seven or eight more windows were broken. There could be no doubt that the damage was somehow connected with my visitor; but the extra policeman (who had of course been withdrawn the night before) failed to catch the delinquent, and the glazier—who was very intelligent, by-the-bye, for a British workman—had another job.

It had all along been settled that the "cat woman," as we had christened her, must have done the damage, but it was none the less annoying on that account. It was all very well for my friends to say, "The woman must be mad"; I thought the same, but that didn't mend the windows. The intelligent glazier thought so too, but seemed to be of opinion that if anyone must go mad, breaking windows was about as sensible a pastime as they could possibly indulge in.

There seemed no alternative but to take the picture out of the show case, and this was done; but a few nights afterwards it was broken open, and (disappointed, I suppose, at not finding the cat there) the intruder smashed the specimens and frames, and threw them about the forecourt. After this, however, the persecution ceased; a prominent place was found for "poor pussy" in my reception room, and there it is still.

The last I heard of the "cat woman" was this: she was seen by my assistant arguing with a "cat's-meat-man" in the Highbury New Park; whether it was my *purveyor* or not I don't know, but he was described as wearing a drab hat with a black band round it; and this was one of the peculiarities of the individual who used to call on "poor pussy." Poor man!

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PHOTOGRAPHIC REMINISCENCES OF A JOURNEY FROM LONDON TO ROME.

BY GEORGE E. THOMPSON.*

We made a delightful excursion to Puteoli, distant about seven miles from Naples. The ruined amphitheatre is beautiful, and the vaults are a mass of maiden-hair. I took a view of Vesuvius and Puteoli as seen from the top of Monte Nuovo, an extinct volcano only formed three hundred years ago. Another photograph shows part of the symmetrically-shaped crater of the same. The upper part of this small mountain was covered with a lovely white heath, which scented the air, and grew to the height of five feet.

The great excursion from Naples is to the crater of Vesuvius, and this we did in the orthodox manner. Leaving Naples by carriage and pair, we arrive at the railway station at the foot of the great cone in four hours; eleven minutes of fearfully steep railway lands us near the top. Guides conduct the party along a good path, past the old crater, with its wriggling forms of hard lava, to the foot of the small cone. A few minutes of struggling with loose cinders and dust, and we are on the top. Earth and air are quite hot and sulphury; the parts round the active crater are of brilliant yellow sulphur. I set up my camera, and just as one of the eruptions occurred, a photograph was taken, in which can be seen the stones being ejected. We had a good suffocating look down into the crater; it contained five red-hot furnaces. Every half minute a thud sounded, and vapours and stones ascended to a great height from one or other of these furnaces. There being no wind, we had a good, safe view. A little below the summit the red-hot lava pours out in constant flow. A representation of this I also attempted. The various lava streams can be seen well from the mountain, as they lie like huge black glaciers among the vineyards and farms. Pompeii, the great city, and Bay of Naples form a grand panorama, but one that is too vast for the camera. We obtained the necessary permit to photograph at Pompeii, and at Paestum, and left by train for Pompeii. The day being close and dull, photography was neither enjoyable nor a brilliant success. The "bakehouse" and the

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* Continued from page 398.

"house of Cornelius Rufus" are the best specimens. I took an excellent one of the Amphitheatre, but I also photographed the "bakehouse" on the same plate; the combination was not happy, and having at once found out my mistake, I took another of the "bakehouse." The Amphitheatre was too far away, and the day too hot, to allow of another walk there.

That night we lodged at La Cava; the hotel is most comfortable, and it is the starting place for Paestum and its fine old temples. This journey of fifty miles in all, there and back, takes the train six hours to perform. The time allowed at Paestum is only two hours, and we were twenty minutes late. The weather was still dull, and for once, through being chivied off to the train forty minutes too soon, I had forgotten my tripod. The following substitute succeeded, but is not recommendable, both from its unsteady nature, and from the loss of time it incurs. Take of loose stones enough to make a pile two feet high; on the top of this hill place a three-legged camp-stool; on the stool put the leather box of your camera; balance the camera on the top, hold your breath, and trust to luck to pull you through. I must say that on developing the four plates I exposed on those grand old temples I was agreeably surprised, and sheep and the small figures on the steps serve to show the size of the buildings, and impart to it an air of poetry, and Italian life, which would have been more marked had the sheep been bisons (of which we saw a large herd), or even the friendly goat. We had not time to visit the third temple, much less to build a hill and take a photograph.

The next morning we experienced a welcome change from the close dull weather, to a fresh west wind and glorious sunshine. The sirocco, which blows direct from the hot deserts of Africa, had lasted for three days, and unfortunately Paestum was a dream of the past, and had not been seen to advantage.

A drive of two hours along the most glorious coast road in Italy landed us in picturesque, artistic Amalfi. We passed many coast towns on the steep mountain sides, and through orange groves where the scent of the blossom loaded the air. The ancient town of Amalfi, which had once a Doge of its own, and was a powerful republic, is perhaps the most beautifully situated of these coast towns. We were conducted from the market place along narrow passages, under and through houses, up flights of steps, more narrow lanes, more steps; when, having climbed 290 steps, we reached the Convent Hotel, the most delightful retreat possible. The building has been an old Capuchin Convent; the cells are now comfortable bed rooms, with clean sheets instead of hair shirts, and bell ropes instead of scourges. The view is superb. I took two photos. from my window—one at sunrise, one later in the day; also a view of the town and convent from below. The chief employments of Amalfi in these degenerate days are the manufactures of macaroni and of paper. There are sixteen paper mills on the stream that descends at the back of the town. Two of them I photographed in one picture; women are descending with loads of paper on their backs. The little port is always lively and picturesque, and one or two views were taken, showing something of the sailor life, unloading of boats, &c.

The landlord of the Convent Hotel, Signor Vozzi, is an excellent man; he has a fine tenor voice, and favoured us two evenings in the drawing room, accompanying himself on the guitar, in one well-known Neapolitan song. I have depicted him sitting under his own vine at the Convent overlooking the town and sea.

We left Amalfi with much regret. The day was warm and still, and the sea lay in such tempting opalescent calm, that we concluded the right thing was a boat to Capri. The Italian boatmen are up to their business. Four men manned our ship, and never ceased rowing for the five and a-half hours of our sail to Capri. Now and then a man would sit on his oar for a moment, while he took a long draught of wine from his gallon jar; but, when lunch time came, half a yard of bread and much cheese disappeared, being helped down by one hand, while the other hand still plied the oar. Verily, the captain and his crew deserved the good square meal of macaroni of which they told us they were about to partake at Capri. Then they would row back to reach Amalfi at 1 a.m. For four and a-half hours our way lay along the grand Italian coast, to which we kept so close as sometimes to touch with the oar. One hour more, with Vesuvius and the Bay of Naples in sight, and we passed under the grand precipices of Capri, and we were soon landed, and making the best of our short stay. Four photographs show the results of our morning's walk, and in the afternoon a boat, with her lateen sail filled by a spanking breeze, conveyed us to Sorrento. On arriving at Naples next morning, I had a week left for the journey home. Having run out of plates, I bought two dozen of native make (from Mr. Sommers, landscape photographer) wherewith to sack Rome. They proved to be excellent.

I left Naples at 7·30 a.m., and arrived in Rome at 2·30 p.m. I had spent a week there last year, so knew the city well, and went to work alone, taking three views that afternoon. Towards evening I walked into the Coliseum and boldly set up my camera. A custodian soon pounced upon me, and gave vent to much Italian, evidently about permission, and the office of the secretary for the preservation of monuments, &c.: did I understand? No, not quite. So skulking off quietly behind the arch of Constantine, I nervously took a view showing that fine old arch and part of the Coliseum. The next morning opened fine, and I determined on a heavy day's work. My first photograph was taken from the Pincian Hill, at 8·30, and my twenty-first at 5·30 p.m., at St. Paul's Church, outside the walls. The day was perfect, but in the morning I lost much valuable time by having to apply at the Office of the Department for the Preservation of Monuments for permission to photograph the ruins. On showing the head of the office my passport he sent me to the English Consul for a letter, and then, after a number of entries in books, I was allowed to have my fling at the "monuments." In the middle of the day I had to find a retreat in a dark dust-hole at the hotel to change my plates. This was nervous work, as the door would not fasten, and the servants and I did not understand each other's language. One old man evidently took me, with my red lantern, for a Guy Fawkes, but the little word "photographia" at last satisfied him that the hotel was safe, and he passed by on the other side.

Thus ended my siege of Rome, and it only now remained to convey my nine packages home. I expected the most trouble from the Customs at Dover; but a little pleasant conversation settled affairs, and I was allowed to proceed.

ROYAL CORNWALL POLYTECHNIC SOCIETY, FALMOUTH.

The fifty-third annual exhibition of this Society will open on Tuesday, 22nd September, 1885. Medals and prizes are offered in photography. Photographs by professionals and amateurs; photographic appliances, &c.

Professional Photographers.

Medals are offered by the Society for meritorious productions in the following subjects:—Landscapes, portraits, composition pictures, instantaneous pictures, interiors, transparencies for lantern or window decoration, pictures by improved processes, enlargements. All enlargements for competition must be the work of the exhibitor.

Amateurs.

Medals are offered for meritorious productions in this department.

Photographic Appliances.

Medals are offered for improved apparatus and appliances, including magic lantern apparatus, &c.

All exhibits in this department must be accompanied by a written explanation of their specialities.

Note—Regulation 7 does not apply to the photographic department for this year.

This Exhibition has been established over half a century, and affords an opportunity for making known the merits of invention, &c., through the West of England.

The Exhibition will be held in a spacious hall and other buildings, and will continue open for five days. *No charge will be made for space.*

Lists of prizes, and all further information, may be obtained from the Secretary.

Regulations.

All exhibits must be forwarded so as to reach the Polytechnic Hall, Falmouth, not later than Tuesday, September 15th, after which no article will be eligible for competition, and no space can be guaranteed.

All pictures and photographs must be framed; and if left at one of the following places of the Society's authorised agents, on or before Tuesday, September 8th, will be conveyed from these depôts to and from the Exhibition free of charge, namely, Messrs. Worth and Co., Cathedral Yard, Exeter; Messrs. Harris and Sons, 197, Union Street, Plymouth; Mr. J. Mitchell, 37, Fore Street, Devonport; Messrs. Thomas Solomon and Co., King Street, Truro. The above agents will not receive any article unless delivered to them free of conveyance and other charges.

All cases and packages sent to the Exhibition must be addressed "The Royal Cornwall Polytechnic Society, Falmouth," and must bear the name and address of the owner; the covers to be fastened with screws. The exhibitor must write on the back of each picture his name and address, its title, whether it is an original or a copy, the name of the artist, and whether he is a professional or an amateur.

Exhibitors must enter all articles intended for exhibition on forms provided for the purpose by the Society, which may be obtained from the Secretary, or any of the above-named authorised agents.

Forms can be obtained from the Secretary, and must be returned on or before September 5th.

The Society will not be answerable for loss of or damage to any article sent to the Exhibiiion, but every care will be used to prevent injury while in the Society's possession.

After admission no article may be removed until after the close of the Exhibition.

Discretionary power is vested in the officers of the Society as to exhibiting any article sent.

The judging in all departments of the Exhibition will take place on Monday, September 21st.

The Art Union of Cornwall (under the sanction of the Board of Trade) selects its prizes from the works exhibited by professional artists. The drawing for prizes will take place at the Polytechnic Hall during the Exhibition. Information respecting the Art Union may be obtained from the Honorary Secretary, Wallace W. J. Sharpe, Falmouth. Any further information may be obtained personally, or by letter, on application to the Secretary, Edward Kitto, F.R.Met. Soc., Polytechnic Hall, Falmouth.

Notes.

Like many others, Dr. Neuhaus, of Berlin, finds that by allowing freshly-developed gelatino-bromide plates to remain for about five minutes in a saturated solution of alum, the chance of frilling taking place in the fixing bath is reduced to a minimum; but Dr. Neuhaus worked under exceptionally trying conditions: in the Sandwich Islands, where the water used was at a temperature of nearly ninety degrees Fahrenheit.

Vanity Fair says of a fancy dress ball at Lancaster Gate: "A noticeable feature was introduced by taking photographs of the guests by limelight." There is no particular novelty in this. Had *Vanity Fair* also stated that the photographs were taken by amateurs, there would have been something worth notice. But now that the Princess of Wales has begun to practise photography, perhaps we shall not have to wait long before it is the fashion for guests at balls to seek a change from the mazy dance in photographing one another. A wag might describe it as a new version of "*sitting* to partners."

A scientific revolution of the first importance is foreshadowed by a new method of preparing light-sensitive selenium plates, just discovered by Mr. Charles E. Fritts, of New York. A paper on the subject was read recently before the Berlin Academy of Sciences by Dr. Werner Siemens, who described Mr. Fritts' plates as consisting of a thin homogeneous sheet of selenium spread upon a metal plate, and covered over with a fine gold leaf. The illumination of the gold leaf by direct sunlight, it appears, increases the conductivity of the selenium plate to an enormous extent. Some of the plates sent by Mr. Fritts to Dr. Siemens showed very curious properties, for instead of showing sensitiveness to light, they generated electromotive force. Writing later, Mr. Fritts says he has discovered the conditions upon which the electro-motive light-action depends, and with more perfect means for constructing the plates he believes he can accomplish the conversion of the greater portion of the energy of light into electrical energy, and, if so, we may, ere long, see the photo electric plate competing with the dynamo-electric machine itself!

Excellent portraits of the members of the new cabinet were issued by the *Pall Mall Gazette* some twenty-four hours before its formation; all these portraits being tracings from photographs etched into relief by the zinc process, originals being by Elliott and Fry, The Stereoscopic Company, Maull and Fox, and Bassano. A regularly illustrated daily paper should now be a thing of the near future.

King Oko Jumbo has developed a curious partiality for photography, and amongst the resources of civilization he takes back to the native land over which he asserts a regal right, a complete photographic apparatus will have a prominent place. Possibly his Majesty thinks that by dint of assiduous practice he will then be in a position to "take" his old and indefatigable rival, Ja-ja, at a disadvantage.

According to the *Figaro*, the publication of the fact that an album is kept at the Paris Morgue, in which photographs of all corpses found in the Seine or elsewhere are placed, has led to several applications being made to the Morgue authorities for the right to publish selections from their ghastly *post mortem* photographs. As considerable sums were offered for the privilege, it would seem that the enterprising publishers have full confidence in the ghastly and morbid taste of a large section of the public.

Amateur photography might well form an important function of antiquarian, architectural, and historical societies. The summer outings of such bodies are very pleasant, doubtless, but they too frequently degenerate into mere picnics. A few members are, perhaps, thoroughly up in the subject, but the rank and file are apt to get a little bored. The gentlemen, too, who undertake to explain the various points of interest, are not always heaven-born orators, and when they are closely hemmed in by a crowd of listeners, the voice is hemmed in as well, and only a few get the benefit of the special knowledge which is displayed on such occasions. Now, if cameras were busy at work, how much more interesting these gatherings would be, to say nothing of the valuable store of archæological memoranda which would be accumulated.

It is now stated that Messrs. Braun have undertaken to photograph the Blenheim Raffaelle. It may be presumed that the picture will be copied with the cracks in all their integrity. Certainly if it be true that it is cracked, and it be equally true that Messrs. Braun do use the retouching pencil, here is a capital opportunity for showing their skill. But what about Mr. Morelli's copy of the Raffaelle?

A miniature reproduction of a recent number of *Moonshine*, in which photozincography has been utilised to reduce the page to something like the size of the palm of one's hand, strikingly illustrates the circumstance that type matter reduced by photography is remarkably easy to read. As a contrast with this small reproduction, one may refer to the circumstance that the front page of a recent issue of *Illustrated Bits* has been enlarged to nearly seven feet high, and copies do duty as posters on the London hoardings.

The example set by the *Journal of the Photographic Society* in giving illustrations is about to be followed by the *Journal of the Royal Microscopical Society*, in which it is proposed to publish portraits of the past presidents. There will be two whole page plates, one of Professor Owen, the first president of the Microscopical Society of London, and another of Mr. Glaisher, the first president of the Royal Microscopical Society after the charter; the remaining portraits will be printed in two groups.

Not only to photography, but also to several other branches of technology, does Mr. W. B. Woodbury give his attention. His latest invention—as recorded in the archives of the Patent Office—is a system of railway signalling by musical notes or sequences, as in the case of bugle calls, the pipes or reeds being worked by steam or compressed air. The comfort of those living near to railways would hardly be increased if every train and every signal box were to become a gigantic steam organ, and every driver or signalman a performer thereon. To be really useful, the new steam music must be loud enough to rise clearly and distinctly above the raging of the elements or the rush of the trains.

Intensely absurd pictures are occasionally perpetrated by third-rate photographers; whether consciously or unconsciously, we would rather not say. Passing the other day along a well-known thoroughfare in the suburbs, a ten-eight photograph occupying the place of honour in a show-case caught our eye, and at once fascinated us. It was the picture of a wedding party, the whole arranged in a military line, "eyes right," and noses also. There could not have been the variation of half an inch in the pose of the head of any one of them. The bride and bridegroom (not altogether youthful) stood in the centre, the bride with her veil down, and looking with her out-of-focus features very like a spectre. A more solemn, plain-faced group could not have been put together. But what made the picture so ridiculous was the background. The party had been placed with their backs to a brick wall, on the top of which was stuck, by some unseen means, a sheet, bearing in large letters, this inscription, "God's Blessing on the Wedded Pair," and at the corners certain initials, presumably those of the bride and bridegroom. At each side of the sheet was a trophy of flags, also very ghostly, for they had evidently fluttered in the breeze while the exposure was being made. The whole thing was immensely funny; and if the photographer were guiltless of the arrangement, he need not have exhibited the picture. On second thoughts, though, we forgive him—it furnished occasion for a hearty laugh.

Mr. W. Downey's autograph book should be a very valuable one. All the persons of note who sit to him sign their names in a volume kept for the purpose, and as Mr. Downey's clientèle includes a whole host of celebrities, from Royalty downwards, the collection must be singularly unique.

It would be interesting to know Mr. Matthews' opinion of the latest portraits of the Claimant. Mr. Matthews, it will be recollected, is the inventor of a little instrument called the identiscope, by means of which he asserts he can prove the identity of the portrait of the claimant with that of young Roger Tichborne. New portraits of the Claimant are now being exhibited in the shop windows, and it is no exaggeration to say that, cursorily examined, there is not the slightest suggestion of the burly "Sir Roger," with whose features some dozen years ago the public were so familiar. Instead of the moon face, with the wrinkleless cheeks fringed with whisker, and the smooth elaborately-arranged hair, we have a countenance seamed and lined, almost square in its contour, a beard and moustache somewhat towzled, and a head of hair the very reverse of smooth. We do not know whether Mr. Matthews based his claim on the recent portraits, or on those taken at or before the trial. It would seem almost impossible that both could coincide with the portrait of young Sir Roger, so unlike are they.

Patent Intelligence.

Applications for Letters Patent.

7,411. James Henry Steward, 406, Strand, London, for "Stops or diaphragms for photographic lenses, and projection apparatus, and instantaneous shutters."—18th June, 1885.

7,422. Charles Wells, 22, Southampton Buildings, W.C., for "A method of recording by photography the degree of accuracy in aiming ordnance."—Complete Specification.—18th June, 1885.

7,488. Alfred Julius Boult, 323, High Holborn, Middlesex, for "Improvements in the manufacture of sensitive films, plates, or tissues for photographic purposes."—(*George Eastman and William Hall Walker*, United States).—19th June, 1885.

Patents Sealed.

3,184. Henry Harris Lake, 45, Southampton Buildings, London, for "An improved heliotypic or photo-lithographic process and apparatus to be used therein."—(*C. Angerer and —— Göschl*, Austria.)—10th March, 1885.

3,185. Alfred Julius Boult, 323, High Holborn, Middlesex, for "Improvements in apparatus for applying photographic emulsion to photographic plates."—(*Eli John Palmer*, Canada) 11th March, 1885.

Patent on which the Seventh Year's Renewal Fee of £10 has been Paid.

1878—No. 2,800. W. Willis, "Process of photo-chemical printing." (Platinotype.)

Specifications Published during the Week.

10,033. William Henry Richards, 27b, Great Hampton Street, Birmingham, and William Dyke Wilkinson, 27b, Great Hampton Street, Birmingham, Brass Founders, for "An improved portrait holder."—Dated 11th July, 1884.

The patentees say:—

This invention consists of a new method in the manufacture of portrait holders, by which we claim to make the frame part or holder in one piece of sheet metal. We first take a piece of metal the required length and width, and, placing it in tools in a press, at one blow produce the frame part or holder; we next place it in tools to give it the required shape. The slide part of the frame we cut out and bend up in tools as before; the one end of the slide part we bend up in tools, so as to form a loop; and in the frame part at the bottom we press out a piece of metal or loop to correspond with the bent up or loop portion of the slide. We then connect the frame part with the sliding part by means of a spiral or other spring, which may be secured in any convenient way; or, in place of a metal spring, india-rubber or elastic may be used, by simply putting it under the loop in the frame part, and over the bent-up portion of the slide.

11,156. George Percival Smith, Beechholme, Tunbridge Wells, Gentleman, for "Improvements in photographic apparatus."—Dated 25th October, 1884.

This patent refers to improvements in dark slides for holding sensitive plates, and relates also to the manner of unveiling the plates within the camera for exposure when light is admitted through the lens, and relates also to the construction of the camera.

The plate cases have, instead of the ordinary slides, shutters attached by hinges, which are made to open for unveiling the plate.

Patents Granted in America.

319,503. John M. Ordway, Boston, assignor of one-half to Edward Emerson Waters, Sandwich, Mass. "Obtaining a substitute for albumen from fish-roe."—Filed June 6th, 1884. (No Specimen.)

Claim.—1. The process of treating roe or eggs of fishes for obtaining a substitute for albumen, consisting, first, in dissolving the roe by means of ammonia, then precipitating by treatment with an acid.

2. The process of treating roe or eggs of fishes for obtaining a substitute for albumen, which consists in digesting the roe in a solution of ammonia, or its specified equivalent, then precipitating by the acids named, and washing, pressing, and drying.

319,663. Albert S. Barker, Clifton, Pa. "Apparatus for instantaneous photography."—Filed September 6th, 1884. (No model.)

Claim.—An apparatus for instantaneous photography, consisting of a frame-work adjustable to the back of a camera, containing a compartment for a sensitized plate, and immediately in front of the plate a shutter with a slot, the shutter being so arranged that the exposure is effected by the passage of a slot from end to end of the plate, and the plate is protected by the solid parts of the shutter before and after the passage of the slot.

319,669. John K. Beach, New Haven, Conn. "Photographic apparatus."—Filed May 5, 1884. (No model.)

Claim.—1. In a photographic apparatus, the combination of a flanged rotating pivot-mechanism, substantially such as described, to impart rotation to said pivot, latching-disk of less diameter than the shutter, a shutter constructed with an orifice for exposing the plate, and attached to said pivot so as to partake of its rotation, and whereby the aperture in the said shutter is caused to cross the lens-aperture, substantially as and for the purpose specified.

2. The combination of the latching-disk, trigger, and a spring connecting said disk and trigger, substantially as described.

3. In a photographic apparatus, the combination of a stationary plate, rotating shutter, arranged upon one side of the plate, and provided with a pivot extending through the said plate, and so as to rotate with the shutter, and a shutter latching and rotating device upon the reverse side of the plate, substantially as described.

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A SCAMPER ACROSS A CONTINENT WITH A CAMERA.

Being a continuation of "With the British Association."

BY R. G. BROOK.

Our next stopping place was Gretna, which is the boundary line between Canada and the United States. Here, at the station, were waiting the Mayor of Gretna, and several members of the Council, who, I suppose, taking my friend and me to be a couple of learned *savants* of the Association, gave us a most cordial and hearty welcome. We next proceeded to Fargo, and after spending the evening there, we proceeded on our journey west, at 3.30 a.m., arriving at Senuabar on Sept. 19th, at 6 p.m. On presenting the checks for my baggage, my Gladstone bag was not to be found, which was exceedingly annoying, as I had put into the bag my lamp, instantaneous plates, &c., to photograph the Geysers, and to serve me through the park; but the only satisfaction I could get was, the officials "guessed" it had gone on to Portland or San Francisco. Luckily I had brought some other plates, but no instantaneous ones.

We drove to Mammoth Hot Springs Hotel, arriving at 8.30 p.m. on the 19th. The loss of my bag occasioned the wasting of one day, and as there was no prospect of getting it, I proceeded to make the best of the situation by getting some other plates from the package, but was again at a loss, puzzled how to change the plates without my lamp; but in the morning I fortunately met with Mr. Watkins, the renowned photographer of San Francisco, who kindly gave me two sheets of red paper (already mentioned) which he informed me would answer, when wrapped around the flame of a candle, quite as well as a lamp, and I found them answer quite satisfactorily. My next difficulty was about a dark room, but, for a dollar (which I found goes only about as far there as a shilling does with us in England) one of the attendants at the hotel allowed me the use of a store-room, where, making up the window with carpet, the place answered my purpose. Whilst here, I took six views, including the Pulpit Terrace and Orange Geyser, which pictures are satisfactory.

From this place we proceeded on a drive of thirty-eight miles to Marshall Station, in the neighbourhood of the Geysers, through most romantic scenery, refreshing ourselves on the way by drinking at the pure natural springs of Soda and Apollouaris waters. As he emerges from a gloomy and monotonous forest of pine trees, a curious and romantic scene presents itself before the traveller as he enters into the "region of wonder, terror, and delight."

This is Norris Basins Geysers, an extensive valley composed of hot sulphur springs and geysers, some of them constantly spirting, steaming, boiling, hissing, roaring, and groaning, others entirely quiet until just before eruption. I requested Mr. Marshall, the proprietor of the station, who was driving, to stop here, promising that I would not detain him longer than ten or twelve minutes; and after fixing my camera, taking the view (which I particularly wanted), and re-packing, which occupied exactly twelve minutes, I had the satisfaction of finding that the plate came out all right.

Further on the journey, at Carron Creek, I again requested him to stop, as here are views of the Lower Geysers, Hell's Half-Acre, and the Maddison River, where, as far as the eye can see, are forest, dale, and river—a vast scene of great magnificence.

We then journeyed on to the station, where we slept in canvas tents for the night, but Marshall has built a log-house here, and wintered in it last winter. I changed my plates in the larder, a place lying a short distance from the log-house, a cavity dug in the ground, and covered on top with logs.

In the course of last winter a large black bear was seen scratching off the top, endeavouring to get into the larder when the master of the house was from home, when Mrs. Marshall got a gun and shot the great brute dead—rather a plucky feat for a woman to achieve; and a few months ago Mr. Marshall caught one of the bear's cubs, which is here now, chained to a tree near the tents.

Next day we had another rough drive of from thirty to forty miles, to see all the large geysers, but I only photographed the principal ones, viz. Hell's Half-Acre, Old Faithful, the Grotto, The Giant, and the Lions and Cubs. The Old Faithful plates are not good. This is the geyser that sends forth a volume of boiling sulphur water four feet in diameter, and from 100 to 150 feet high, every hour, which eruption lasts about five minutes. I exposed a plate when the stream of water was at its highest, but this view should be taken instantaneously, and as my instantaneous plates had gone with my bag, my opportunity was not favourable.

I here met Mr. Watkins again. He also was getting views of the geysers, by both wet and dry process, on plates 22 by 20, the negatives of which he permitted me to see, and they looked splendid. He has a waggon and a tent, and every other facility. He gave me a pressing invitation to call upon him at San Francisco, and also expressed a wish to make an exchange with me in photographs, which, of course, I shall be extremely glad to do. I had now only a few plates left; so reserved them for my return journey. Next day, at 7 a.m., a very frosty morning, I commenced my journey of a hundred miles' ride to Beaver Canon, over rough country, in a four-wheel buggy, with four horses; and at the close of the first day we arrived at what is called the Hunting Station, where the hour being rather late, and the light darkened down to dusk, the tents also being in the midst of the forests, I thought it would prove useless to expose my plates here, but, feeling very desirous to get a picture here as a memento of this journey, I exposed one plate on the sleeping-tent and log buildings, and one on the meat hut. By the door of the other sleeping tent—*i.e.*, that of the hunters—there was a large black bear chained to a tree, but the tent was so enclosed by trees, that I could not get a clear view of it, and, besides, it was nearly dark. This view would have been interesting.

The next day's journey was partly across some prairie land, and the driver expressed a wish to have a photo of his team, for he took pride in his horses, and properly so, for they had brought us safely through some very difficult and dangerous places, so I gratified his wish, and the plate has come out well, the horses especially being clear.

The next time I used my camera to take a photo was at Chicago, where I received my long-lost bag, after it had been lost to me for twenty days; then I took a picture in the garden of the friends with whom I was staying, which photo was for their friends and relatives in St. Helens.

In the Chicago Exposition I witnessed the working of, and got some information relating to an instrument called "The Air Brush," so styled because the effect of this brush is caused by air from an air-pump. It consists of three parts—a hand-piece, a compressed air-chamber, and an air-pump—and it is controlled entirely by means of a thumb-screw, whilst, by its means, you can produce the finest line or the broadest shadow required. This I did with it, thoroughly testing the instrument, which gives a beautiful finish, and can be used with any liquid pigment, on any surface, nearly, and is much used here for enlarging portraits from cabinet to life-size, which, with the aid of the metroscope, can be done with perfect ease and rapidity. I left Chicago for Niagara, for, of course, a visit to America would be incomplete without seeing Niagara Falls, which truly wonderful and world-famed cataract has surely been photographed oftener than any other sight. It is indeed a stupendous wonder, in awe-inspiring power and majesty truly sublime; but a photograph gives only an exceedingly faint idea of the glorious reality, which a travelled "Masher" is said to have pronounced, "Neat, very neat!"

Near to the hotel where I stayed was a photographer's studio, that of Mr. Frank Norris, and on my asking permission to use his dark-room, it was readily granted. This gentleman informed me that Mr. Henderson, of London, had called upon him a few weeks before for the same purpose. I was rather doubtful about the light in this room for my instantaneous plates, and from some cause my views of Niagara are rather fogged. If Mr. Henderson changed his plates here, I should like to know the result of his exposures.

I had some difficulty in getting permission to take a photograph of the place where Captain Webb was last seen to throw his arms up in the Niagara River; but there is a photographer here who takes portraits of visitors, with this portion of the river for a background, for which his charge is four dollars. I struck a bargain with this gentleman to have my likeness taken, provided he would allow me to take two views. I got one view of this portion of the river, and one of the whirlpool, from the same spot. Then, after having gone under the Falls on the Canadian side, on arriving at the top, I thought I would patronise the profession again by having my photo taken in the oil-skin clothes that had been put on me before going under the Falls, in which suit I cut a sorry figure, and for this piece of very innocent amusement they had the conscience to charge me for the photo, five dollars, and for going under the Falls a dollar and a half; after which Mr. Artist requested me to forward to him, on my return to England, lists of Ross's and Dallmeyer's lenses, as he thought they were much superior to those he was using.

I took one view of the Falls on the American side, from the Canadian side, and one of the Falls on the Canadian side from Prospect Park, one of Goal Island, and one of the Rapids above the Falls.

I may mention here that I saw at the Philadelphia Electrical Exposition some splendid photographs of extraordinary size, about six feet long and two feet in depth, and I could not perceive any indications of piecing up. There were also exhibited there some very good specimens of views of the interior of the Exhibition Building, taken by the electric light, the illuminating power being enormous, no less than five thousand incandescent lamps and three hundred and fifty arc lights blazing away at once.

My next exercise with the camera was at Boston, U.S., where I exposed half-a-dozen plates on the Public Gardens. I met here two friends from Rye Beach who had relations in St. Helens, so I got them to stand at the foot of National Monument whilst I took a view of it, for the benefit of their friends.

Having a camera with one on a tour abroad is pleasant and interesting, enabling one to bring back portraits and views of scenes that deeply interest friends at home.

I had now to hasten to Quebec in order to catch the ship *Polynesian*, which was to sail on Saturday, the 18th of October, and arrived at Quebec on Friday morning, where, hearing of the dynamite explosion at the Government Buildings, I spent the rest of the day in taking a view of the building where the explosion took place, and also one or two other views that I had omitted getting on my first visit to the city, viz., one of the Citadel, and one of the River St. Lawrence from the Dufferin Terrace, with the ship *Oregon* lying in the river below.

I had reserved half-a-dozen instantaneous plates for my passage home, but it was such a stormy voyage that what I did attempt to take was indeed photographing under difficulties. In one attempt to take a troubled sea, I hung my camera on a rope that ran along the deck, and holding on with a firm grip, I took a drop-shutter exposure, and only just escaped being soused by a large wave that broke over the deck.

My next attempt was more unfortunate still, for, when holding the camera under my arm, and placing my foot against the foot of a passenger, who held on by one of the boats, before I could drop the shutter, the ship suddenly gave an extraordinary lurch, upsetting my friend and throwing me violently against the rail of the ship, smashing the focussing glass, and cracking the body of the camera; I need not say that this attempt was a failure. On leaving Loch Foyle, being then in smooth water, I took a drop-shutter view of Green Castle as we passed, and in coming down the Irish Channel the saloon passengers were just beginning to revive from the effects of the severe tossing we had all experienced throughout the passage; and a few of them expressed a wish that I would try to take a group, to which request I gladly acceded, and without focussing-glass, took the group, which picture has come out in the most satisfactory manner, considering the dilapidated condition of myself and my poor camera.

This completed my three months' tour with a camera through Canada and America, a journey nearly sixteen thousand miles.

In conclusion, I may mention that on landing at Liverpool, my baggage had to be examined, which was the first time during my tour, my British Association ticket being sufficient pass everywhere up to this time. One gentleman informed me that the astute dynamite hunters had even gone so far, with a friend of his, as to have his photographing kit examined in a dark room; but they did not go so far as that with me. I had met with brusque treatment, indifference, inattention from independent spirited Yankees, during my journeyings; but never with insult, until I once again placed my foot on British soil; and I regret that, being unable to take their "heads off" (by photography), I cannot display to view those wise, courteous, considerate, respectful, discriminating, sweet-spoken, good-looking individuals, the searchers on the great landing stage at Liverpool.

PHOTO-LITHOGRAPHY AND PHOTO-ZINCOGRAPHY.

BY MAJOR J. WATERHOUSE, B.S.C.,
Assistant Surveyor-General of India.

Chapter XVIII.—Photo-Lithography in Half-Tones.*

Major Volkmer has given in the *Correspondenz* for January last the following methods of employing the grained original mother-plate, obtained as before described, followed in the Military Geographical Institute at Vienna.

A photographic copy is made from it on wet collodion, and the film is stripped by means of gelatine or transfer collodion. This film is then laid between the negative to be copied and the sensitive bichromated gelatine or albumenized paper. The exposure should continue until the grain in the deepest parts is entirely lost, while it is visible in the covered lights. Soft, delicate negatives, not too intense in the lights and full of detail in the shadows, are the most suitable for the process. Hard negatives, which show great contrast and bare shadows, can be improved by coating the back of the plate with bichromated gelatine, and allowing the light to fall directly on this film through the negative. The exposures should not be carried too far, so that after washing there may remain only a light tint over the transparent parts. After exposure under the grained negative the print is inked and washed as usual, but a better effect is obtained by rolling in with a velvet roller, as described in Chap. VIII. After the transfer to stone or zinc, lights that are too full may be taken out with a scraper, and shadows that are too open may be filled in with a brush.

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* Continued from page 302.

Instead of laying the grained film between the negative and the sensitive paper, the operation may be performed as follows:—The varnished negative is coated with a solution of gelatine in glacial acetic acid and a little alcohol, and allowed to dry; the collodion copy of the grain original is lifted from the glass plate with paper, which should be rather smaller than the grained negative, so that the edges of the latter may be turned over upon it, and, without anything further, is transferred upon the gelatinised negative. If required, the grain may, with a little care, be washed away again after use.

Another way of using the grain original is to copy the grain on a glass plate and varnish it. This plate is used once for all until it is spoilt. The two negatives carrying the grain and the subject are put together, and a transparency is taken in the camera. With a prolonged exposure and a supplementary intensifying, it is changed into a suitable grain picture. If this transparency be taken on a bromide of silver emulsion plate, it can easily be changed into a negative by the process described in Chap. IV., or by constant copying in the usual way.

The grained negative may also be obtained by taking a good silver print of the subject, and printing on it an impression of the required grain taken from stone, type, collotype, or copperplate, the impression of the grain being as strong as possible, and its opacity increased, if desired, by dusting with bronze powder. A copy is made in the usual way from this grained silver print. Sufficient exposure and a supplementary intensification give the corresponding negative, which gives a very good result in skilled hands.

We may remark that the specimens of photo-lithography in half-tone by Mariot's process, published in the *Correspondenz*, are very perfect—*i.e.*, they have all the qualities of a good lithograph, without the delicacy of the photographic detail being too much impaired. As Major Volkmer says, they will bear comparison with collotype, and the printing press stone has many advantages over the collotype plate, which is easily damaged, and often difficult to work.

In his treatise on *Heliographic*, Prof. Husnik has described various methods of producing grained negatives, among them one which he recommends as particularly suitable for photo-lithographic or photo-typographic purposes, and which is very similar to Mariot's.

For these purposes Prof. Husnik insists on the necessity of having a clear and well-defined grain, with its intervening spaces perfectly clear and transparent on the negative. The only way of obtaining such plates is by dusting collotype plates with black lead.

The collotype plates are prepared by taking 6 parts of the finest gelatine, and soaking it in 72 parts of water. When soft, it is dissolved with heat in a water bath, and then 1 part of bichromate of potash and 1 part of chloride of calcium are added, and the mixture is filtered.

Glass plates that have been previously coated with the usual substratum, as for collotype printing, are coated with this mixture, the coating being double as thick as for collotype printing, so that the grain may be coarser. The plates are dried in a level position in a box, at a temperature of 104° F.

When the film is dry, it is exposed to light under the negative rather longer than is usual for collotype, and may be exposed in sunshine. The thicker the coating, the longer the exposure should be. Only in the very deepest shadows of the image should the plate be glassy and free from grain.

The plate is then washed free from all bichromate, and covered, in a horizontal position, with a mixture of equal parts of glycerine and water. After a quarter of an hour, this is poured off, and the plate well wiped until all traces of glycerine are removed from the surface. It is then laid in a drying-box and warmed up to about 155° F. After half an hour the plate is dry, and all water removed from the glycerine absorbed within the film. The plate is then taken out and dusted with blacklead until it has the proper strength. In this way a grained negative is obtained, in which the strength of the grain is dependent upon the thickness of the coating.

After the dusting, the plate is laid face downwards in a mixture of 2 parts spirit and 1 part water, and left for half an hour or so to remove all glycerine. The plate is then taken out, dried, and varnished.

Another method is to make a collotype plate, exactly in the same way as described above, but replacing the chloride of calcium by 1 part of sugar. The film must also be thick, but not so thick as to dry in waves, which cannot be got rid of afterwards.

The exposure should be rather longer than with collotype plates with thinner films, and is continued until the highest lights appear as shining points. After this the plate is washed, treated with glycerine, and inked. Such an inked plate may be used in two ways—either a transfer print may be made from it on paper coated with starch for transfer to zinc or stone; or a negative of the grained plate may be taken in the camera, which will show a very strong grain. If the inked plate is properly dried, and slightly dusted with plumbago to take off the stickiness of the printing ink, a grained positive is obtained, from which a negative may be made by contact printing on a dry plate.

Dr. Schnauss has described another method, also invented by Prof. Husnik, as follows:—

A fine ground-glass plate is rubbed in with copper-plate printing ink, which is then cleaned off so that the ink remains only in the depressions. The plate is then levelled and covered with a solution of gelatine (1 : 10) with the addition of 3 parts alcohol and $\frac{1}{6}$th glycerine. When this is dry, it is stripped, and will be found to have a very fine grain. It must be kept flat between the leaves of a book. The film is laid between the negative and the bichromated gelatine paper, and an exposure is given four times as long as in the ordinary process. Great care must be taken, in washing the ink off the print with a very fine sponge, not to injure the graining. The print should be allowed to soak rather longer than usually necessary, so that the ink may come away easily. The shadows may require a little extra pressure with a sponge cut to a point, but the lights should not be touched.

Several methods of producing grained negatives have been patented within the last year or two, chiefly in connection with the production of photo-blocks in half tones for letter-press printing. Most of them are modifications of previously known methods, and their object is, as a rule, to produce a lined or network grain, which is more suitable for type work than for printing from stone. We may therefore refer those interested in the matter to the specifications of the patents.

Many other ways of obtaining grained negatives suggest themselves; for instance, there are many fabrics woven in black and white, in patterns quite suitable for giving a good mixed or regular grain. These can be copied and used as film negatives, or the grain image can be printed from them on to the original negative by the dusting process, or by transfer from a photo-transfer print on bichromated gelatine paper. The process, introduced by the writer, of dusting a gelatine surface with waxed sand, or other granular powder, may be also availed for the production of grained negatives, or of electrotyped plates, from which grain films on collodion or gelatine can be made, or transfers in copper plate can be taken. To produce such films, a glass plate is coated with a solution of gelatine containing a little chrome alum, or tannin, to render it insoluble on drying. When set, it is sprinkled evenly all over with sand which has previously had a little wax, stearine, or paraffin stirred into it while hot, so as to coat each grain with a thin film of greasy matter, which prevents its adhesion to the gelatine. When the plate is dry, the loose sand is removed by brushing it off, and the remainder by immersing the plate in water and gently rubbing the sand away. When again dry, the surface of the gelatine will be found to be very evenly grained. A finely grained film of this kind would make an excellent substitute for ground glass for focussing screens.

(*To be continued*).

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Correspondence.

WASHING TROUGH.

Dear Sir,—May I, for the sake of amateurs who are as much bothered over washing negatives as I have been, describe a very simple and inexpensive washing trough? It consists merely of a tin dish wide enough to just take a plate lengthways, and long enough to take any required number of plates breadthways, and about two inches deep. Along each side, not less than an inch from the bottom, solder a shoulder (wire will do if the dish is made accurately) with so much distance between them that they will just support a plate. If preferred, the sides might be made sloping, so that the plates would be arrested half way down, but the other plan is the best. When you wish to wash any plates, put them on the supports, *film side down*, cover them with water, and leave them.

If they wash thus for two hours with one change of water, and with a sluicing at the change and finish, I believe they will be quite free from hypo. Of course the addition of putting the dish on a stand, and having a tap underneath to run the water off, is a great convenience, but it would about double the price. The only objection that I can see in the dish is that it takes up a lot of room; but it is so very cheap, and saves such a lot of time and water, that it is quite worth adopting.—I am, yours, &c.,

Washer.

ROYAL CORNWALL POLYTECHNIC SOCIETY.

Sir,—I beg to call the attention of your readers to an alteration that has been made in one of the rules for this year's exhibition (which will be held at the Polytechnic Hall, Falmouth, on Tuesday, September 22nd)—viz., that rule 7 will *not* apply to the photographic department, wherein it says, "No holder of a medal or prize may receive an award of the same or lower value for similar subjects in the same department at the next two subsequent exhibitions." The above restriction being removed, the awards will be made in accordance.

I also beg to call attention that there is an Art Union in connection with the exhibition, wherein professional photographers' exhibits which are for sale are open to be selected by the winners as prizes, as well as oil paintings and water-colour drawings. And it is to be hoped that photographers will not overlook this department. Tickets, one shilling each, can be had of any member of committee, as soon as published, or from myself.

Prospectuses and prize lists are now ready, which I shall be most happy to forward on application, and any further particulars required.—Yours very truly,

Wm. Brooks.

Laurel Villa, Wray Park, Reigate, June 22nd.

SUSPENDING THE ACCOMMODATION OF THE EYE.

Sir,—After reading Mr. Jackman's paper in this week's News, it occurred to me that he might be interested in the optical matter referred to in the paper enclosed. I shall be glad to see an explanation. Also I should like to know the meaning of "A lens of 3″ focal length." I suppose 3 inches to be intended, but surely it is a mistake to use the sign ″ (seconds) for inches.—Yours truly,

A. Brothers, F.R.A.S.

[Mr. Brothers encloses the following extract from a contribution of his to the *Journal of the Manchester Literary and Philosophical Institute.* If he will look at an ordinary engineer's drawing, he will find that the same sign which astronomers use for seconds is used as Mr. Jackman uses it.]

"The effect on the retina when the eyes have been fixed intently for a few seconds on a brightly illuminated coloured object is well known; the colour complementary to the one looked at always appears when the gaze is removed to a colourless surface. It is also a matter of common observation that when the eyes have been directed to a bright light for a short time, the image left on the retina, as seen when the eyes are averted, is dark; but if the eyes are rapidly opened and closed, the image is still seen bright. I am not aware, however, that it has ever been noticed that this image varies in size according to the distance of the background to which the eyes are directed. A circle of gas jets, perhaps, affords the simplest test. It will be seen, after looking at the circle of light for a few seconds—in some cases a more or less lengthened gaze at the light is necessary, owing to the varying sensitiveness of the retina—that, if the vision be turned to a distant background, the size of the image is instantly enlarged, and then, if the eyes be directed to a near background, the image is reduced in size. If any difficulty should be found in seeing the reversed image of the gas jets, it may readily be seen as a bright object by rapidly closing and opening the eyelids. The effect is the same as if the image were seen through a cone—the apex of the cone being held close to the eyes. In other words, the effect is the reverse of the ordinary rules of perspective."

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Proceedings of Societies.

Photographic Society of Great Britain.

A monthly technical meeting was held at the Gallery, 5a, Pall Mall East, on Tuesday last, the 23rd inst., Mr. **John Spiller**, F.C.S., in the chair.

Mr. **Addenbrooke** again brought forward the shutter which he exhibited at the last meeting. The apparatus is a more portable form of one shown a year or two ago, and now weighs only ten ounces. In the shutter now shown, the exposure is capable of variation from two seconds to one-twenty-fourth of a second, and the exhibitor asked the opinion of the members as to the desirability of increasing or decreasing this range.

Mr. **Cowan** was of opinion that for exposures exceeding two seconds, the ordinary lens cap would suffice.

Mr. W. **England** said that with commercial plates it was certainly rarely possible to obtain a negative sufficiently exposed in less than one-twenty-fourth of a second.

Mr. W. **Bedford** exhibited his latest improved apparatus for cutting up gelatine emulsion for the washing process. For this purpose the ordinary plated metal cylinder is replaced by one of ebonite, which, in the one shown, measures three inches in diameter, and about one foot long. At one end is fitted a removable silver-plated copper-wire gauze, of about eight meshes to the inch. The opposite end is capped with a perforated plate, which is connected with an ordinary water tap. To use the apparatus, the emulsion, cooled down to about 120° F., is poured in the cylinder; when the gelatine has sufficiently set, a disc of ebonite, which acts as a piston, is inserted inside the cylinder. On connecting the apparatus with the water supply, the pressure, which in the North of London is about seventy pounds on the inch, forces the emulsion through the wire gauze in long shreds.

Mr. **Shew** showed a small portable camera specially designed for taking street views. The apparatus is easily set up, and the quarter-plate size, with slide, weighs only twelve ounces. The shutter works on the principle of a revolving stop, actuated by a watch spring. Several very interesting instantaneous views taken with the apparatus were passed round.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 18th inst., Mr. W. E. **Debenham** in the chair.

Mr. A. **Cowan** spoke of the advantages to be derived from the employment of very slow bromide plates for some out-door subjects, and he showed a series of chloride transparencies made from negatives which had received exposures ranging up to ten minutes.

The **Chairman** preferred a slow emulsion for copying purposes, and employed one that was not washed.

Mr. **Cowan** used a special emulsion for copying; it was made by the ammonia process and washed; the rapidity depended upon the proportion of silver converted into ammonia nitrate; an eighth part would give a slow plate, and a fourth a plate quicker. This characteristic of ammonia he considered to be valuable to the emulsionist. In reply to a member, he said that a large excess of ammonia would yield a slow plate with very clear shadows.

Mr. A. **Mackie** stated that sulphite of soda destroyed the pink stain on albumen paper; it was attributed by some to sulphurous acid.

Mr. F. **York**, who had just returned from a tour in the States, then favoured the meeting with a description of Carbutt's dry plate factory. The following is an abstract of his remarks:—"All the water used is obtained from a deep well, the temperature being 50° F. A steam engine is used for forcing air—filtered through Canton flannel—into the building, the temperature of which stands at 60° F. winter or summer. Plates were coated by hand, and passed through a refrigerating chamber by means of endless bands; thence into drying racks, where in four hours they were ready for packing. This house was also making a film of gelatine and albumen which gave a result more like a wet plate. They recommended the carbonate of potash developer used with a restrainer, as they could get a better coloured negative than by any other means, and the exposure could be shortened to one half that necessary for ammonia. Very few English plates were sold in America, and these were not so rapid as those of American manufacture."

Mr. J. **Stuart** had some American plates sent him; he gave an exposure of $\frac{1}{10}$ drop shutter, and they were at least three times over-exposed.

Mr. W. K. **Burton** remarked that some plates made by one of the gentlemen present had required a diaphragm No. 32 of the Photographic Society of Great Britain's standard.

Mr. W. H. **Prestwich** mentioned that Mr. Pollard Graham had found a means of increasing rapidity six times by an addition to the developer.

Mr. **Haddon** spoke of the difficulty of obtaining dry air in summer when it was cooled by artificial means.

Mr. **Burton** referred to the danger of opening Winchesters of ammonia in summer, and mentioned a recent case of expansion wherein the liquid had boiled over. Several gentlemen had met with a similar experience.

Mr. **Cobb** inquired if anyone had suffered from deafness which could be attributed to the use of ammonia; but no direct evidence was forthcoming.

Mr. A. L. **Henderson** attributed the difficulty of toning the opal plates he had shown on a previous occasion to the presence of citrates; by substituting acetate, toning would be easier. He then passed round some glass plates coated with the formulæ given last week, and printed until they assumed a deep ruby tint; he thought they would prove an excellent substitute for ruby glass, and, tested spectroscopically, they were safer for dark-room purposes, as they only showed the slightest fringe of green. He also recommended a thin gelatinous coating of barium sulphate on glass as a substitute for opal glass, or as a backing for transparencies.

A discussion then took place on some of the characteristics of citrates mixed with chlorides in a gelatino-citro-chloride emulsion for direct printing, in which the Chairman and several of the members took part.

Mr. **Stuart** showed some excellent negatives to illustrate the quality conferred by the use of potash as a developer. He dissolved one ounce of pure anhydrous potassium carbonate in an equal weight of water, which gave a solution of syrupy consistency. Three drops of this were added to enough pyro and sulphite of soda—both in solution—to cover the plate; eight grains of sodium sulphite, and one of pyrogallol, was contained in each ounce of developer.

Messrs. W. K. **Burton** and A. **Cowan** thought equal results might have been obtained with ammonia carbonate.

Mr. **Henderson** was sure that the best all-round developer was the ordinary liquid ammonia, potassium-bromide, and pyro formula.

Mr. A. F. Longdon was elected a member of the Association.

It was announced that the annual dinner will take place on Thursday, July 2nd, commencing at 6.30 p.m.

Edinburgh Photographic Society.

The eighth ordinary meeting of the current session was held in 5, St. Andrew Square, on Wednesday evening, 3rd June, Mr. Wm. **Forgan**, Vice-President, in the chair.

The minutes of the last meeting having been read and approved, Dr. James Foulis was elected an ordinary member of the Society.

A letter from Mr. Norman Macbeth, R.S.A., was read, resigning his position as President of the Society.

Mr. Wm. **Neilson** moved that the Society request Mr. Macbeth to withdraw his resignation as President of the Society, and that the Secretary be directed to enclose this motion to Mr. Macbeth. This was agreed to by the meeting *nem. con.*

It was also agreed that Mr. Stewart should withdraw his resignation as a member of Council.

The **Chairman** stated that a prize competition among members of the Society would take place in October next, with the view of a picture being selected from these for a presentation print to the Society. These pictures were not to be restricted merely to those for competition, but it was desirable that members should also send in other pictures, that there might be an exhibition of the whole in October next, at a conversazione to then take place. The matter had been put in the billet now to impress upon members the necessity of preparing pictures either for competition or exhibition. It was very desirable that as many as possible should be sent in, that the conversazione might be a success.

Mr. **Andrew Pringle** read a paper on lantern slides, which will be found on page 374. The paper was illustrated by a number of slides projected on the screen.

At its conclusion Mr. Pringle received a hearty vote of thanks.

The **Chairman** directed the attention of members to an International Exhibition to be held in Dundee in February next.

After this, a vote of thanks to the chair terminated the proceedings.

The next ordinary meeting of the Society will be held on the 7th October.

Hyde Amateur Photographic Society.

The usual meeting of this Society was held on Wednesday, the 17th inst., the **President** (Mr. F. W. Cheetham) in the chair.

After reading and confirming the minutes of the preceding meeting, a discussion arose as to the best means of getting the railway companies to grant tickets to amateur photographic societies at reduced fares.

The **Chairman** said he thought the best plan would be for each society to lay before the various railway companies a list of the rambles intended to take place during the summer season, and ask them to grant tickets at reduced fares.

Mr. **Cartwright** thought that would scarcely do; what he wanted was, to be able to go at any time at reduced rates.

Mr. **Crowther** said the railway companies granted to fishers, and so the same privilege ought to be granted to photographers.

Several other members having given their opinion, it was ultimately decided to assist the Liverpool Amateur Photographic Society in their endeavour to get reduced fares.

Several other matters having been disposed of, those members who had attended the last two rambles exhibited their work. The first ramble had been to Haddon Hall, when about fifty views were taken, and out of that number about forty were very good. In this trip Mr. Pennington came off best with one of his views, having a very good landscape with Haddon Hall in the distant background. The second trip was to Marple Hall (Dr. G. W. Sidebotham being captain), some thirty views being taken. Nearly all of these proved good, the groups taken being excellent; whilst Mr. Crowther was congratulated on one of his views.

Postal Photographic Society.

A committee meeting of this Society was held at the Hon. Sec.'s address, 4, Middle Temple Lane, on the 17th inst., and the following business was transacted:—

1. Each member to have two votes in future albums; one for the first prize and one for the second.

2. The voting in Competition 7 was examined, and the result was:—Class I—G. Bankart (1st prize), with 76 votes; R. Leventhorpe (2nd prize), with 12 votes. Class II—F. G. Ticehurst (1st prize), with 55 votes; G. Bankart (2nd), with 16. Class III—G. Bankart (1st prize), with 73 votes; R. Tindall (2nd), with 18.

3. The voting in albums 17, 18, and 19 was found to result in the prize in each being taken respectively by Mr. Gaddum, with print 1002, G. Bankart with prints 1023 and 1028 (both these prints having equal votes), and H. E. Lees with print No. 1120.

4. The following gentlemen, who had been provisionally admitted, were duly elected, viz.:—Mr. H. Lunn, Rev. H. Aldwin Soames, Messrs. W. T. Tucker, and Alfred Dewey. The following candidate was also elected, viz.:—Miss Kitchen.

The meeting then adjourned for the

Annual General Meeting.

Dr. Day (the president) having been elected to the chair, the minutes of the previous meeting were read and confirmed, and the Hon. Secretary reported shortly as to the position and progress of the Society, which now consisted of ninety-seven members, and had issued 13 albums containing 700 prints during the past year. The balance sheet was produced and approved.

It was then proposed by the Rev. Miles Barnes, seconded by Mr. G. Percival Smith, and carried, that the present members of the Committee be re-elected, and that Mr. H. Noel Malan be also elected to fill a vacant seat.

The subjects for the Special Albums were, with one or two exceptions, fixed to be the same as last year, viz.:—September 1st, 1885—instantaneous views; November 1st, 1885—members' own portraits; January 1st, 1886—interiors, architecture, old buildings, &c.; March 1st, 1886—animals; May 1st, 1886—½-plate and smaller sizes only, larger sizes cut down not eligible; July 1st, 1886—portraits, groups, and figures.

Mr. Miles Barnes called the attention of the meeting to a discussion relative to cheap lenses which had taken place in one of the note-books, and showed an enlargement 11 by 14 from a ¼-plate negative, taken by a well-known cheap lens, the definition of which was as perfect as if it had been the product of one of the highest price lenses.

Mr. Percival Smith produced his improved and patent camera, which was examined with much interest, and admitted to be far simpler and lighter than the majority of those in the market; he also explained a most ingenious arrangement of lenses, which he had patented, and by which the angle of the lens could be instantaneously increased or diminished by shortening or lengthening the focus as required, and this without materially increasing the weight of an ordinary lens.

After a vote of thanks to these gentlemen, the meeting adjourned.

The Bury Photographic and Arts Club.

The first out-door meeting of the above Club was held on Wednesday, June 10th. The members and their friends mustered in great force. Leaving Bury for Accrington by an early train, where a waggonette was provided to take them to Whalley, a stay was here made; several of the members securing negatives of the Abbey, Old Church, &c. The party then proceeded to Milton and Hodder Bridge. The light being good, several views were taken. The next place visited was Stoneyhurst College, where, by the kindness of the authorities, the members were permitted to inspect the splendid chapel, gardens, walks, &c. Hurst Green, Stid Church, and Ribchester were then visited; many negatives being taken of these and other interesting objects.

The party then partook of tea, after which Messrs. Mellar and Holdin took groups of the party present.

Coventry and Midland Photographic Society.

The first out-door meeting of this Society was held on Wednesday, the 17th inst., by the kind permission of L. V. Loyd, Esq., in Combe Park. The morning, which was dull and cloudy, gave no promise of successful photography, but at 1 p.m. matters improved, causing the spirits of those members with heavily charged slides to rise considerably. A pleasant drive of about half-an-hour through charming scenery brought the party to its destination. Cameras ranging from ¼-plate to 12 by 10 were at once brought into requisition, and the members, fully armed, at once proceeded in quest of the picturesque. The light proved fickle, but those members who waited till the clouds rolled by were rewarded by short gleams of sunshine which enabled the exposures to be satisfactorily made. The drive home in the cool of the evening brought a pleasant outing to a close.

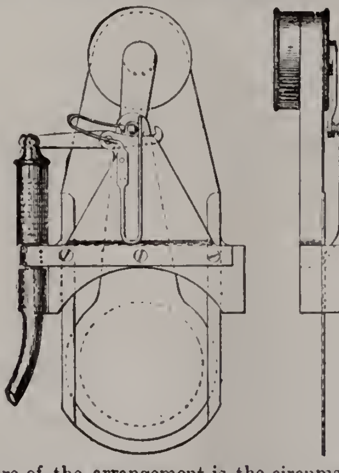
Manchester Photographic Society.

The excursion for the 20th instant was fixed for Gawsworth, but the weather in the early part of the day was so unfavourable that it was thought it must be put off. Within an hour of starting, however, the sun began to make an occasional appearance, and when the gathering took place at the station a sufficient number of members and friends was found to be present to warrant the excursion being proceeded with. Gawsworth is situated in the extreme eastern part of Cheshire, about three miles from Macclesfield, and only about six from Buxton, in Derbyshire, and the same distance from Leek, in Staffordshire. The party proceeded by rail to Macclesfield, whence they drove in open carriages to Gawsworth, stopping on their way, just before arriving at their destination, to visit the grave of "Maggotty" Johnson. Only a hundred yards or so past the eccentric Johnson's grave the road takes a sudden turn, and the visitor at once stands in the midst of the most attractive features of the parish. Before him is the placid and old-fashioned-looking fishpond, with a sluice at the far end; the surface is broken up here and there by lilies and other water plants, and the church, which grows even more picturesque as you become better acquainted with it, is reflected as in a mirror on the face of the water. The frame to the mirror, adding to its marvellous power of reflection, is composed of spreading beech and towering elm, through the breaks in which peep out the "magpie," structures of the Old Hall on the one hand, and the still more picturesque rectory on the other. The whole scene is one of such quiet old-world beauty as to astonish the visitor who sees it for the first, time and to ensure a return to it time after time. The place seems dedicated to what Goldsmith terms "sweet repose;" and to see it as the Manchester Society saw it, with boughs tossed about by violent winds, with the mirror broken into ten thousand reflecting surfaces, and to feel withal a chilling dampness pervading the atmosphere, is to have Gawsworth at a distinct disadvantage, as much from an æsthetic as from a photographic point of view. But the attractions of Gawsworth are not all out of doors, and the rector of the parish, Rev. John J. Penrose, B.A., having, in answer to the application of the leader for the day, very kindly given permission to the Society to photograph the interior of the ancient church, with its very remarkable monumental effigies; and not only this, but also thrown open his own rectory for interior photography, the visitors were quickly at work inside both interesting buildings. As no exposure under half an hour was deemed sufficient, a good deal of time was consumed in this work, and when the time for tea arrived the cameras were not all satisfied, and some two or three had to be left at work while the meal was consumed. "A good man and a west wind go to bed at night," and on this occasion the wind proved true to the adage, dying down as the evening advanced, so that at seven o'clock, when it was time to return home, the best part of the day had come, and every camera seemed anxious to take another view, though it could not be from one of the scores of places of vantage which the delightful village offers. The total number of plates exposed was much less than is commonly the case, but the long exposures given would leave little room for failure, and probably the members will have no cause to regret that the weather drove them within, instead of inviting them without.

After tea Mr. Abel Heywood, jun., read a short communication which he had compiled for the occasion on the history of Gawsworth.

Talk in the Studio.

Another Go-and-Return Shutter. — An arrangement devised by Mr. Grimston has been shown to us. The go-and-return movement is provided for by a crank arm attached to a spring barrel, and shown at the top of the woodcut; and one useful feature of the arrangement is the circumstance that the lower part of the apparatus is so thin that it can be fitted into the ordinary diaphragm slot.



Photography and Book-Binding.—A collection of Portraits of Dickens, numbering nearly 200, has been bound in one volume, demy quarto size, by Mr. Zaehnsdorf; the cover is dark red Levant morocco, inlaid with a green band encircling four portraits, let in under the leather and covered with talc. The portraits represent the four ages of Dickens, and are reproduced in platinotype from four of the engravings inside the book, and are surrounded by very minute gold tooling, giving great effect to the pictures. The collection belongs to Mr. C. P. Johnson, who has one of the finest Dickens' collection in existence. We believe this is the first time photography has played an important part as a decoration in connection with bookbinding; and to Mr. Zaehnsdorf, who is not only well known as an art book-binder, but also as an energetic amateur photographer, much credit is due for the idea and the execution.

A Costume for Women Photographers.—*Funny Folks* makes the Vice-Presidentess of the "Raising of Women in the Social Scale by Providing them with Remunerative Employment Association," say:—"We have come to the conclusion that lady photographers ought to make *large* fortunes. Of course, the first thing to be done is to devise an appropriate dress, and every spare minute I have I am devoting to this. But with my painting on china, Indian club and trapeze exercise, banjo practice (you know that this is the fashionable drawing-room instrument), *repoussé* work, scientific dress cutting, ancient history lectures, Schopenheuer studies, Blavatschy, and Buddhism, in addition to cookery in its highest cult, I haven't a great deal of time to spare; so if you have any ideas on the subject of a photographic *atelier* dress for ladies, pray write me. I was thinking that a collar and cuffs of this shape would be nice. Perhaps you could suggest something else to go with them."

Photographic Club.—The subject for discussion on July 1 will be "The Chemistry of Toning." The Saturday out-door meeting will be at Loughton; trains from Liverpool Street at 2.28.

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To Correspondents.

_ We cannot undertake to return rejected communications.

Samuel C. Riley.—The specimens are very interesting, and we are much obliged to you for sending them.

E. Jackson.—Your most likely way of obtaining what you want—if, indeed, it exists—is by advertising in the Photographic News. Anyone taking such a photograph would be almost certain to secure the copyright.

W. Barry.—1. Your photograph of the interior of the tunnel is extremely interesting, and we shall be very glad to have a description of your method of working. An unfolded print will serve our purpose for reproduction quite as well as the negative. 2. We have not seen any results, and, like yourself, should be glad to see them. A letter addressed to Captain Eugene Himly, Berlin, will probably reach him.

Non-Chemist.—Soften some good glue in water, add about its own weight of glycerine, and melt in a water bath. The extent to which the softening action must be carried on depends on the quality of roller you require. The rollers can be cast in smooth brass tubes well oiled. 2. There is no satisfactory method. 3. Soak it in a weak solution of potassium bichromate acidified with hydrochloric acid.

T. Jones.—The Autotype Company, Oxford Street, or Sprague and Co., Martin's Lane, Cannon Street.

J. E. Hoggard.—There is not even one.

R. Milliken.—If possible, we will obtain it for you.

G. H. C.—Obtain the *Camera Oscura*, published at Florence.

Pin.—1. You must make it, as such articles are not sold in commerce at present. 2. By planing out grooves on a slab of type metal, and using this as a mould for the rubber during vulcanization. 3. From Hughes and Kimber, West Harding Street, Fetter Lane, E.C. 4. At the same place. 5. Try another sample of gelatine. 6. Perhaps you keep the paper too long after sensitizing. 7. No. 8. See answer to question 3. 9. You had better go to one of the best makers. 10. On the whole, we are inclined to think that a portrait lens will be the best.

Country Bird.—Thin paper, sold under the name of *Papier Mineral*, is stretched over the back of the negative, and gummed down at the edges. You can shade this by means of black lead powder applied with a paper stump. A matt varnish which answers a similar purpose can be made as follows:—

Sandarac	18 parts
Mastic	4 ,,
Ether	200 ,,
Benzole	80 ,,

S.—1. It is to hand, and we are much obliged. Had it not been for a press of matter, it would have appeared before this. 2. Send them to Stevens' Auction Rooms, King Street, Covent Garden, W.C.

E. A. P.—There are regulations affecting the matter, but they differ at each of the places you refer to. Make enquiry from the gate-keeper in each case.

Canada.—1. From what you say, we cannot gather that you would have any better chance than at home. 2. There is not one.

W. B. F.—Both pose and expression are exceptionally natural and pleasing.

J. D.—Use a landscape lens by preference.

J. W. B. M.—Ordinary blotting-paper is very liable to contain hypo, but the special kind you refer to is manufactured by Messrs. Chas. Morgan and Co., of Cannon Street.

Oxon.—You can patent it; but unless there are definite points of novelty, the patent will be as worthless as nine out of ten of the existing photographic patents.

Photographs Registered.

Mr. G. Mole (Banbury)—Photo. of Broken Cart, &c.; Interior of St. Mary's Church, Banbury; Reindeer Inn, Banbury.

Mr. George Taylor (Bishop Auckland)—Photo. of Archbishop of Canterbury.

Mr. Thomas Erwin (Ballymena)—Photo. of Rev. Thos. Watters.

Mr. J. E. Newton (Norbiton, Surrey)—Photo. entitled "Returning from the Derby.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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PATENT OFFICE

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RECENT IMPROVEMENT IN THE ASPHALT PROCESS.

Prof. J. Husnik has recently worked out an improvement which forms a genuine advance in the asphalt process as applied to photo-zincography. This he describes in the *Photographische Mittheilungen*, from which we abstract the following particulars of the process.

In working the asphalt process it is desirable to separate from the bitumen the portion which is soluble in ether, that portion being insensitive to light. To bring this about, it has been customary to powder the bitumen, to pass it through a fine sieve, and to pour ether over it.

This process has been only partially successful, a considerable quantity of the insensitive bitumen remaining undissolved after any reasonable time of the action of the ether.

Herr Husnik gets over the difficulty in the following ingenious manner. The bitumen is reduced to a coarse powder, and is dissolved in rectified turpentine. By allowing sufficient time, a very large proportion of the bitumen may be thus dissolved. Herr Husnik states that with occasional stirring during three days the turpentine can be caused to take up one-third of its weight of bitumen. When a saturated solution of bitumen in turpentine has been made, the liquid is diluted with ether. This process now precisely corresponds with the precipitation of a gelatine emulsion by the use of alcohol, except that in the latter case it is usual to pour the emulsion into the alcohol—that is to say, into the precipitating fluid; whilst in the case of the bitumen process the solution, corresponding to the emulsion, has the precipitating fluid—the ether—poured into it. The reason for adopting this course will soon be made evident.

As ether is poured into the solution of bitumen in turpentine, the first effect is merely to cause the fluid to become less viscous; but after the solution has been about three times diluted, a doughy precipitate is thrown down.

To discover now whether the ether has thrown down all the insoluble asphalt, a portion of the upper stratum of the liquid is placed in a small vessel. If an addition of ether to this small portion of the liquid causes the precipitation of any bitumen, it shows that sufficient ether has not been added to the turpentine solution. Further additions are made, a test being performed after each, as just indicated, till no further precipitate takes place.

It will now be evident why the ether is poured into the bitumen solution, and not *vice versa*. It enables the quantity of ether necessary to be accurately guaged, so that there is no waste.

The solution is allowed to stand for twenty-four hours, when the supernatent fluid is poured away. The precipitate which remains behind amounts to about half the original bitumen. Fresh ether is poured over the precipitate, which is occasionally stirred up during two or three days. This causes it to become considerably firmer, on account of the removal of almost the last trace of the turpentine, and also of the last of the bitumen soluble in ether.

The last portion of ether is retained to be used again. The precipitate is removed with a bent strip of zinc from the vessel in which it was thrown down; it is placed in a porcelain dish, and is allowed to remain in a warm place for several days, with occasional stirring to secure the complete removal of the ether, when there remains a "hard, extremely brittle, glittering black mass, which is readily reduced to powder by hand." After the bitumen has been thoroughly freed from ether as described, it is dissolved in benzol (not benzine) free from water. Then is added to each 100 parts of the bitumen 1½ parts of Venice turpentine. This renders the film more pliable, and less liable to scale off than it would be without the addition.

If, as is common with commercial benzol, there is a trace of water, the solution of bitumen cannot be caused to flow evenly over the zinc plate, but runs into lines and drops. This defect can be overcome by a free addition of chloroform.

With films made from bitumen prepared as described, the exposure necessary with a clear negative is only ten minutes in bright sunshine, or one to two hours in diffused light, and development is complete in four minutes.

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BLANCHARD'S INSTANTANEOUS VIEWS MADE ON WET COLLODION PLATES.

Our supplement of this week consists of some examples of the extensive series of instantaneous pictures made by Mr. Blanchard nearly a quarter of a century ago, and which pictures are now in the historical collection of the Photographic Society, at the Inventions Exhibition. With respect to these pictures Mr. Blanchard says:—

Nearly all the river and street scenes were made between the years 1861 and 1867, and the lower Thames view—one of the four illustrations—was taken exactly twenty years ago this spring. In an art so comparatively new as photography, this is a period sufficiently long ago to have earned for it the mellow expression, "the good old days." It cannot be other than interesting, therefore, to a new generation of photographers to know how rapid pictures were made by the antique methods.

In this age of prodigious mechanical appliances and chemical wonders—when, with snap shutters and pneumatic triggers, not only can a picture be produced in the 100th part of a second, but it can almost be made in five minutes less than no time—in such an age, then, as this, it is something to remember that just a quarter of a century ago the veteran Wilson, of Aberdeen, produced rapid pictures that have never been surpassed—the only mechanical appliance for making the exposure being his old Scotch cap, which he most certainly used with marvellous dexterity.

The advent of gelatine plates has made the out-door photography of to-day so extremely easy that I am sure the amateur of the present can have no possible idea of the difficulties incurred and the bodily fatigue endured by the photographic worker in the past. But many an old photographer, when he recals his bye-gone experiences, will say with me, that in spite of much worry and botheration—of the many disappointments to put against the comparatively few successes—that the intense pleasure of obtaining a real success on the field made up for much trouble and vexation of spirit. The out-door worker of the past carried the brand of his craft, for not only were his hands Hall-marked "pure silver" unadulterated, but his linen was honoured with the same distinction. Alas! in these degenerate days it is only on Hampstead Heath, or on the sands at Ramsgate or Margate, that the photographic professor carries his (I was going to say blushing) honours on his person.

When the beautiful sea studies of Wilson, and the then marvellous street views of Paris by England, made their appearance, the opinion was erroneously held that the successes in instantaneous photography were due to some carefully-guarded secret. On the contrary, however, secret dodges had very little to do with it, for then, as now, those fortunate possessors of important and valuable wrinkles profited so little by them that their work might generally be held up as examples of what to avoid. Success in "instantaneous" photography was not due to hidden secrets, and the work of the veterans I have named was not produced by the aid of carefully-concealed methods, but to untiring patience and care in perfecting the *modus operandi* then in use.

I find, on reference to an article on "Instantaneous Photography," written by me in 1864, that I cannot do better than extract a few of the most salient portions, for, with all my after-experience, I am compelled to say that, for the wet collodion process, I know of no better method.

"The bath should contain forty grains of nitrate of silver to the ounce of water, and is prepared by dissolving the amount of silver necessary in a small quantity of water. Now add a few grains of iodide of potassium, well stir, and afterwards add the remainder of the water. In most cases filtering would complete the operation, and we should have a bath in perfect order. But as the payment of a good price may not always insure a good sample, and as, in instantaneous photography, success is due to attention to trifles, I always assume that the silver may be acid, or that some organic impurity may have sullied some unfortunate crystals, and therefore to be sure, I add a small quantity of carbonate of soda, stir well, and let the solution stand for some hours in sunlight; I then filter, and try a plate. The bath will generally be found in splendid condition, giving negatives with iron development that require no intensification, and will rarely need the addition of any acid. This bath is, however, in such a nicely balanced state, that with some collodions it might be necessary to add two or three drops of very dilute nitric acid. A better plan, however, especially if the collodion be colourless, will be to add two or three drops of tincture of iodine to the collodion until it assumes a deep straw colour. A bath prepared as above will not retain its sensitiveness very long; a fortnight will be about the longest period that it will act graciously, and then will follow fits of fickleness and waywardness, perplexing enough to the operator. Bromo-iodized collodion is absolutely necessary. It is true that under certain circumstances, by no means under control, very rapid pictures can be obtained by the use of iodized collodion and pyrogallic developer, but when due account is taken of the uncertainty, and more than all, the difficulty of producing perfectly clean pictures free from 'comets' and other blemishes, it will not be wise to waste any time in experiment in this direction.

"For instantaneous pictures it is best to employ a strong developing solution. The strength I recommend is:—

Protosulphite of iron	30 grains
Glacial acetic acid	15 minims
Water	1 ounce
Alcohol when necessary	

In out-door operations, especially in a tent or through the sleeves of a dark-box, much difficulty will be found in applying strong developing solutions to the plate, but patience and much practice will overcome it.

"The slightest pause or indecision in pouring on the developer will cause a fatal stain, and in these instantaneous slides, unlike other pictures, no doctoring will avail, for in a picture where very fleecy cloud is rendered, any stain is at once apparent. . . . Pephaps one reason why there are so few really good instantaneous pictures is, that very few indeed are able to develop a plate perfectly in a dark-tent, with all its accompanying evils of heat, dust, and general botherations. . . . The best remedy against dust—the photographer's deadliest though tiniest enemy—is the liberal use of a wet sponge everywhere in the camera and slide, and particularly in the dark-box or tent. Never dream of commencing the operations of the day without employing this most necessary precaution."

This last extract may with advantage be marked by the workers of to-day.

The impedimenta absolutely necessary, even for small pictures, was always a very serious matter in the days of wet collodion, and, in consequence, a long journey, especially when accompanied by several unavoidable changes, was never looked upon with much affection by the photographer of twenty years ago.

Most of the street views were exposed by means of a shutter in the camera, immediately behind the lens; but later on I employed the ingenious drop-shutter invented by Mr. W. England, and employed by him for his Paris views. It formed part of a movable back, attached to the camera when necessary, and the shutter dropped immediately in front of the sensitive plate. The advantage of this arrangement over the shutter in front of the lens will be apparent on a little reflection. By England's method the whole of the light from the lens is operating on the picture during the very short space of time that the shutter is open; whereas by the method in front of the lens, the moment the shutter covers a portion of the lens, the light is at once diminished over the whole of the picture, and this takes place before even the image is cut off by the action of the drop-shutter.

For an instantaneous street view, of course the exposure cannot very well be too quick; but for marine studies, and, indeed, for almost all subjects where water plays an important part in the making up of the picture, I cannot help thinking that some of the phenomenal methods go beyond the mark I have seen some studies of water done since the introduction of gelatine, that much more resemble pictures of ploughed fields, than the subjects they were intended to depict; and I feel sure that all artists would agree with me in saying that for pictorial effect, a picture taken with an exposure of the tenth part of a second would at all times be more artistic than one taken in the 100th part of a second.

It requires a lengthened experience to distinguish between those subjects beautiful in light and shade, and those that owe their charm to colour rather than form. I have at this moment a vivid remembrance of one of my studies done from Ryde Pier. The sky was leaden in hue; a thunder-storm was evidently near at hand, for the clouds were knotted and fantastic. A gun-boat was coming up the Solent, and not far off; the wind and tide were dead against her, and drove at her in great fury, trying, but in vain, to stop her career. The whole picture was grey in the extreme, but there was so much go and movement in it that it was one of the most successful of the series.

THE ANTWERP INTERNATIONAL EXHIBITION.

[FROM A SPECIAL CORRESPONDENT.]

It will be scarcely possible to refer to all the numerous photographic exhibits that are scattered about in the various sections; but we propose to take note of those subjects that impressed us most as we sauntered round the exhibition.

From the very close relationship between the French and the Belgians, it is perhaps not surprising that the former have taken so much interest in the grand display which is now gathered together at Antwerp. As a proof of the great sympathy shown, we may remark that the French Government voted no less than £40,000 for the expenses of their own section.

In the photographic department, M. Nadar makes perhaps the most interesting, if not the most extended, exhibit. In the frame of portraits of celebrities may be mentioned those of Gounod, Sarah Bernhardt, M. de Brazza, and the illustrious Victor Hugo.

Of the series, the portrait of M. de Brazza, representing the African explorer just returned from the Desert, is the most successful. M. Nadar also shows some attempts at subterranean and ærostatic photography. The former were taken in the well-known catacombs of Paris, by the aid of the electric light. The large balloon photograph is an enlargement from a negative exposed in 1866, and in which the Avenue du Bois de Boulogne, and the Arc de Triomphe, are distinctly discernible. This picture is particularly interesting, for it was the first successful balloon photograph, and was obtained before the days of gelatine plates and instantaneous shutters. M. Levy, of Paris, has fitted up a small cabin glazed with a large series of window and lantern transparencies of both an artistic and educational nature; in this exhibit we noticed several stereoscopic slides produced by the well-known firm of Ferrier and Soulier.

In the extensive exhibit of MM. Braun and Co. are included several of their well-known large photographs, taken direct, of Swiss scenery, also a numerous collection of the now much talked of reproductions from the galleries of Windsor Castle, Dresden, St. Petersburg, Louvre, and of our own National Gallery. M. Van Bosch, of Paris, whose work has frequently been noticed in these columns, in addition to a frame of excellent portraits, exhibits an original screen suitable for the drawing-room or spacy boudoir. The screen consists of about a dozen transparencies of family or other portraits mounted on a crimson plush framework; and each picture is embellished with a wreath of pressed ferns and variegated grass, tastefully arranged on the glass itself, and thus completing a very effective and original ornament. In M. Gallot's series of portraits of the officers of the French Academy we notice the features of the illustrious de Lesseps, and also those of the now departed Victor Hugo. M. Chalot exhibits some good general work, but the ballet scenes, taken at the Eden Theatre, Paris—like other attempts at stage photography—suffer very much from want of definition, in consequence of the large aperture of the lens necessary for the purpose. Landscape photography is well represented by M. H. Krafft, who shows a number of pictures taken in his native country, Greece, Japan, and China. Some very graceful photographs of acrobats and gymnasts in the act of performing are contributed by M. de Saint-Senoch. Of the enlargement shown by M. F. Vandenbosch, of Bordeaux, perhaps the less said the better; we have seen worse work. M. Leon Vidal, the chief of the *Moniteur de la Photographie*, is represented by a little case containing copies of his journal and several of his well-known photographic manuals. We note specially a copy of Poitevin's last treatise, which is edited by our excellent French Correspondent, and is embellished with a very satisfactory portrait of the author.

MM. Attout-Tailfer and J. Clayton exhibit a coloured screen composed of ribbons of pale yellow and indigo blue, with a star of salmon tint; also two photographs of the same; one was produced on an ordinary gelatino-bromide plate, and the other is from a negative on an isochromatic film. In the former result all the colours are reproduced in almost exactly one uniform tone; but with the isochromatic negative the colours are translated according to their visual intensity.

Space will not permit our noticing all the numerous examples of photo-gravure and mechanical printing here exhibited; but excellent work is shown by MM. Déroulède and Terpereau, Jules Hautecœur, S. Krakow, J. E. Lecadre, A. Quinsac, and Victor Rose.

An extensive display of apparatus is made by the French dealers. M. Fleury-Hermagis exhibits a series of lenses to which are attached an original form of mounting for the stops. The latter, which are of the Waterhouse type, are rivetted together, and hinged to the metallic mounts, so that with such a fitting no fear need be entertained of losing or mislaying the diaphragm when out on tour; on the other hand, as each stop is differently situated in the mounting, out of the set of six, only one could be properly centred; and thus, looking at the apparatus from a theoretical point of view, we should be of opinion that flare spots and want of definition would frequently result. The same exhibitor shows a neat and very practical drop-shutter working next to the diaphragm, and also several instantaneous pictures taken by M. Grassin, who exhibited such excellent work at Pall Mall some months back.

The case of optical and electrical apparatus displayed by M. Ducretet contains a polariscope with camera attached; also several photographs of salt, nitre, sugar, &c., taken with the apparatus. It will be remembered that Mr. W. Crookes, F.R.S., first succeeded in obtaining micro-photographs with polarized light about twenty years ago, but, as he pointed out at the time, such results would never prove satisfactory, from the absence of colour.

Apparatus well worthy of examination is also shown by MM. J. Andouin, George Balagny, Balagué, Gilles frères, F. P. Jonte, Mackenstein, H. Martin, Schaeffner, Schrambach, and C. Vavasseur.

In the Italian section, Ganzini and Gabriel, of Milan, show an enlargement of a portrait of an old priest, in which the features of the veteran are exquisitely preserved. Signor Naya, of Venice, exhibits a gigantic frame of reproductions from oil paintings, which would perhaps have been more satisfactory had the isochromatic process been employed. The phototypic reproductions by Danesi, from chalk sketches, are very effective, and should prove valuable for educational purposes. In the exhibit contributed by the Principality of Monaco are shown several excellent photographs by M. Messey, of the luxuriant grounds and gorgeous buildings belonging to the famous gambling hell at Monte Carlo.

In the Haiti collection we noticed an interesting frame exhibited by M. Weik, and containing photographs of the transit of Venus, the instruments in the temporary observatory, and a group of the expeditionary party sent out on the occasion of the 1882 transit by the Portuguese Government.

In the Canadian section, which—by-the-bye, attracts many visitors—Mr. Tapley, of Ottawa, shows some very effective photographs of Canadian river scenery. Among the most successful is a picture showing the mouth of the Saguenay.

Among other good work now on view at Antwerp may be mentioned the landscapes by Herr Bernhoft, of Luxembourg, the portraiture of M. Uniao, of Oporto, and the instantaneous pictures of performing elephants by Mirsch, of Temesvar.

Before concluding this notice, we should mention that those of our readers who contemplate visiting Antwerp during the present summer will have an excellent opportunity presented to them for experimenting in aeronautic photography. The balloon *l'Etoile*, with its spacious ca capable of accommodating some twenty occupants, makes periodical ascents from a small enclosure near the Exhibition, under the direction of M. Toulet. On the occasion upon which we had the pleasure of accompanying the able æronaut, the day, though somewhat sultry, was delightfully clear, and eminently suited for an aerial excursion. As we slowly rose, the Exhibition grounds gradually became beautifully less, and long ere we arrived at the maximum height of 350 metres, the whole scene appeared like one gigantic map. The view was bounded on the north by the town of Malines, on the south by the winding and placid river Scheldt, while on our west the town of Antwerp, with its charming boulevards and the lofty towers of Notre Dame, completed, perhaps, the most magnificent bird's-eye view it has been our good fortune to witness. After a period of twenty minutes we slowly descended, and a large crowd of anxious friends and inquisitive loungers gathered to meet us, and cheered lustily as we again reached n other earth. Whilst the balloon was made taut, M. Raynaud, a local photographer, secured a picture of the car and its occupants.

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* Continued from page 402.

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ACTION OF COLOURED SUBSTANCES UPON THE COLOUR SENSITIVENESS OF BROMIDE OF SILVER IN GELATINE.

BY DR. J. M. EDER.*

When an ordinary gelatino-bromide of silver plate is immersed in a very weak—and best, in a somewhat acid alcoholic—solution of nitrate of silver,† and dried, its sensitiveness to white light is increased from twice to three times. In the sun's spectrum this effect is first noticed in a general increase of sensitiveness. Upon more exact observation, it is found that the relative sensitiveness to the less refrangible rays is somewhat increased. An ammoniacal solution of nitrate of silver acts similarly, and the picture is somewhat stronger. Plates thus prepared, however, do not keep good for more than a day, and do not approach dyed plates in sensitiveness to coloured rays.

If a gelatino-bromide of silver plate that has been dyed with eosine be treated with a dilute (best an alcoholic) solution of nitrate of silver, eosine silver‡ is formed by the excess of silver nitrate. Plates of this kind are then more sensitive to light generally, and, at the same time, relatively more sensitive to the yellow-green. Other dyestuffs behave similarly.

When gelatino-bromide of silver plates are immersed for some minutes in dilute ammonia (10 per cent. of liquid ammonia in water), and dried, they appear about twice as sensitive to white light as before, and yield very intense pictures.

Towards the sun's spectrum such plates display increased sensitiveness in the same proportion throughout, without any special increase to the less refrangible rays being observable. The blackening, however, becomes very intense in the whole of the spectrum image. If a sensitizing dyestuff be added to the dilute ammonia, the sensitized band also becomes stronger.

The action of the ammonia, which is entirely driven off by drying, can only be attributed to a molecular change in the bromide of silver, which influences powerfully the sensitiveness of the compound, as I have already shown in a former treatise.

A solution of bromide of silver in ammonia deposits by evaporation microscopic crystals, as has been shown by Elsden.§ These are also formed by precipitation of bromide of silver in the presence of much ammonia. They take, according to the concentration of the solution, forms seen in fig. 11*a*,* or fig. 11*b*†, and range from a diameter of 0·02 to 0·2 m.m., and have a thickness of about 0·001 m.m.. Such large crystals as these are not formed by immersing gelatino-bromide of silver in dilute ammonia, but by the evaporation of the ammonia from the wet plate; the bromide of silver doubtless becomes crystalline, and this may cause the increase of sensitiveness. Caustic and carbonated alkalies also increase sensitiveness by acting as absorbents of bromine.

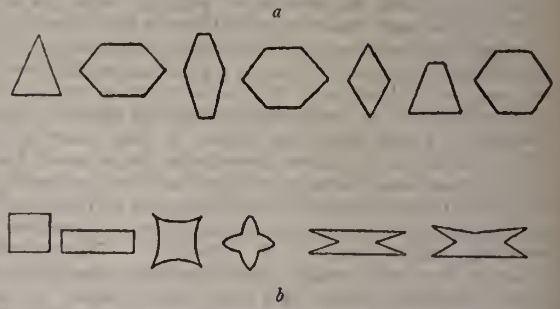

Fig. 11.—CRYSTALLIZATION OF SILVER BROMIDE WITH AMMONIA IN THE MICROSCOPE.

Researches into the Chemical Condition of Bromide of Silver Mixed with Dye-stuff and Gelatine.

For the estimation of the phenomena exhibited by dyed and undyed bromide of silver in the solar spectrum, as well as of the part played in this connection by gelatine, the decision of the following question is of importance: "Does bromide of silver combine with these substances, or not?" Here the same conditions must be observed as in the preparation of a sensitive bromide of silver emulsion. When bromide of silver gelatine emulsion, prepared in the usual manner, is washed, and then, whilst in a liquid state, submitted to the action of a centrifugal machine, the bromide of silver can be separated from the gelatine.

Mr. J. Plener has constructed a machine for the purification for photographic purposes of bromide of silver, and kindly placed it at my disposal for the purpose of these investigations. Fig. 12 shows a vessel of gun-metal well gilt upon the inner surface. Liquid emulsion being placed in this vessel, it is closed at C, and fixed upon a vertical axis, which is then caused to revolve with a speed of from 4,000 to 6,000 revolutions per minute. All the silver bromide is, by the action of centrifugal force, driven to the side of the vessel, and there forms a compact mass from which the gelatine solution can be poured off clear, and the bromide of silver washed free from gelatine.‡

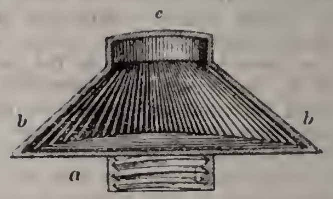

Fig. 12.—CENTRIFUGAL APPARATUS FOR THE SEPARATION OF BROMIDE OF SILVER FROM EMULSION.

Bromide of silver that has been, by repeated separations in the centrifugal machine, and washings with hot water, completely freed from all soluble substances, contains, according to my analysis, after drying at 150° C., whereby much hygroscopic water is driven off, some organic matter. This is estimated by heating to redness, and re-converting the resulting silver into bromide with bromine. 100 parts

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[*] Continued from page 357.

[†] 100 cub. cents. of alcohol, and from 0·1 to 0·5 cub. cents. of a ten per cent. solution of nitrate of silver in water.

[‡] Eosine silver is itself, according to F. W. Vogel, sensitive to yellow (from D towards the green). This was first published by Robert Amory, in the American *Academy*, in January, 1878.

[§] Photographic News, 1881, p. 174.

[*] By evaporation of a concentrated ammoniacal solution of bromide of silver after dilution with five parts of water.

[†] Like the foregoing, after dilution with an equal quantity of water.

[‡] By treatment with a fresh solution of gelatine it becomes immediately divided into a fine emulsion of excellent photographic properties.

of silver bromide contained in one case 0·45, and in another, 0·52 parts of gelatine.

It is seen from this that bromide of silver which has been precipitated in presence of gelatine takes up some of the latter, and retains it so obstinately that it cannot be removed by washing with hot water and the use of the centrifugal machine. When to a gelatine emulsion eosine or cyanine is added, and the same is then washed, the dye cannot be so completely driven off that the sensitiveness to yellow does not appear in the spectrograph. When, however, the silver bromide is, by repeated treatment (three times) in the centrifugal machine, and washing, separated from an emulsion to which eosine had been added, at first the gelatine comes away stained red, afterwards the washing water comes off colourless. Nevertheless, whether the silver bromide, after separation from a strongly dyed emulsion, remain of a faint reddish colour, or, after the use of less eosine, can scarcely be seen to be tinted by it, *in every case the characteristic maximum of sensitiveness in the neighbourhood of* D *shows itself.* This proves that the dye holds fast to the particles of bromide of silver, whether to bromide of silver as such, or to the gelatine retained in these particles. This fact appears to be of importance in researches on "Optical Sensitizing."

CONNECTION BETWEEN THE ABSORPTION OF DYESTUFFS AND THEIR SENSITISING ACTION UPON BROMIDE OF SILVER.

For the examination of the connection of the absorption of a dyestuff, with its sensitising action—which has been already referred to by H. W. Vogel—dried sheets of dyed gelatine are used, and their absorption compared with the spectrum photograph upon similarly dyed gelatino-bromide of silver plates.[*] In every case that I have observed, the position of the absorption spectrum of the dried stained sheets of gelatine corresponds with that of the sensitising maximum upon the dyed bromide of silver; there is, however, a shifting towards the red in the latter case as compared with the former. This shifting is not always very important; with eosine the maximum of absorption of the dyed gelatine differs from that of the sensitising of bromide of silver in the yellow given by 16 to 20 $\mu\mu$.[†]

In fig. 12 the results of some of my experiments are exhibited. Spectrum 1 is the *facsimile* of the spectrum picture upon gelatino-bromide of silver which had been dyed with bluish eosine, obtained in direct sunshine. Similar spectra upon yellowish eosine, as well as upon Bengal rose, have been shown in the curves previously given. In 2, the absorption spectrum of a sheet of gelatine dyed with the same eosine is given (obtained by photographic reproduction of the same upon a cyanine bromide of silver plate). *The maximum of sensitising action of eosine upon gelatino-bromide of silver lies more towards the red than that of the maximum of absorption in the dyed gelatine.*

The same occurs with aniline red, as is shown in 3 and 4, fig. 13), as well as with other dye-stuffs.

The dyed gelatine also permits many rays to pass at the less refrangible end of the spectrum, which rays act very strongly upon a bromide of silver plate dyed with the same substance. When the solar spectrum is passed through a sheet of gelatine dyed with eosine, there should be no picture in the yellow green upon an eosine dyed bromide of silver plate, if the rays absorbed by the former are those which excite the sensitiveness of the latter. I obtained, however, under these conditions, besides the customary spectrum picture in the blue, an intense image in the yellow near D, which corresponds with the maximum of optical sensitising upon eosine of silver, and near to it a minimum (a perfectly clear space), which corresponds with the maximum of absorption of eosine gelatine (curve 5, fig. 13).

It is thus proved that the maximum of sensitiveness of dyed gelatino-bromide of silver is not identical with the maximum of absorption of dyed gelatine, but that the colour of bromide of silver itself must be taken into account.

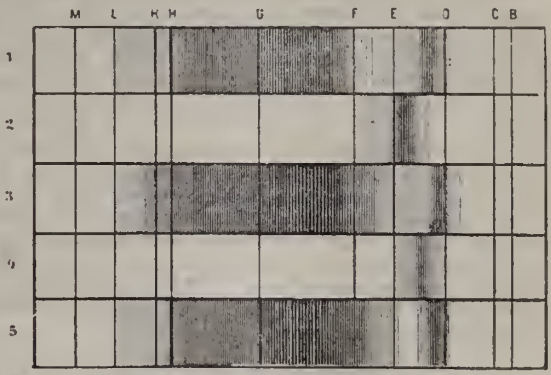

Fig. 13.—1. Spectrum picture upon bromide of silver in gelatine eosine. 2. Absorption spectrum of sheet gelatine stained with eosine. 3 Spectrum picture upon bromide of silver in gelatine aniline red. 4. Absorption spectrum of sheet gelatine stained with aniline red. 5. Absorption spectrum of sheet gelatine stained with eosine, photographed upon a bromide of silver plate stained with eosine.

That the molecule of bromide of silver itself is, in fact, coloured, I have experimentally shown. To the interpretation of the great lighting of the maximum, the law of Kundt may be applied, according to which, in most cases, with an increase of refracting power of the medium, the absorption band of the dye therein contained is moved towards the red end. In an analogous case, Dr. E. Albert has made observations upon dyed collodion emulsion.

From this consideration I also think that the behaviour of gelatino-bromide of silver which is exposed wet under a solution of a dye can be explained. The solution of dye acts then as a coloured medium. For instance, the spectrum picture upon a gelatino-bromide of silver plate covered with an aqueous solution of eosine resembles more the image 5 in fig. 13, than that of 1 in the same figure. The absorption band of the aqueous solution of eosine near E keeps back the light from the sensitive silver bromide, and narrows the action to the maximum of sensitiveness lying nearer D, which last lies nearly in the same place, for stained silver bromide, whether dry or wet.

When gelatino-bromide of silver is stained with a mixture of dye-stuffs, the action of one is often hindered by that of the other, and not seldom one is apparently suppressed. This appears to happen particularly when the absorption band of one of the compounds of the dyed gelatine falls upon the maximum of sensitising action of the other.

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[*] Solutions of dyestuffs give quite different absorption spectra from those of the dry dye. It would be best to employ thin films of well dyed bromide of silver in gelatine, but as these are difficult to apply, I contented myself with dyed sheets of gelatine.

[†] Following the suggestion of Kayser (*Lehrbuch der Spectralanalyse*, 1883, p. ii), I have shown the wave-lengths in millionths of mm = $\mu\mu$.

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ON THE WORK OF A LOCAL PHOTOGRAPHIC SOCIETY.

BY W. JEROME HARRISON, F.G.S.[*]

During the last few days I have more than once had the enquiry made. "What are the objects of your Society?" "What do you propose to do?" and "How will it benefit me to become a member?" I shall now attempt to briefly answer these questions.

Within the last four or five years photography has made a new departure. The introduction of gelatine dry plates has made the process so clean, and, by comparison, so easy, that photographers have multiplied twenty-fold. O! that we could bring Daguerre, with his costly silver plates which required such tremendous polishing; Fox Talbot, with his collotypes; and Scott Archer, with his silver bath and travelling tent, which made the landscape photographer's life a burden to him; and show them our light and complete equipment, with which man may travel round the world, and leave—if he choose—his negatives to be developed by his grandchildren, with every probability that, if preserved with reasonable care, they will turn out all right.

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[*] Read before the Birmingham Photographic Society.

But one consequence of this great change has been, that while the multitude of "new hands" have naturally had everything to earn, the oldsters have not been much better off; for there is a world of difference between the management of a collodion plate which required an exposure of, say, twenty seconds, and a gelatine plate—25 on Warnerke—which I have known to be "much over-exposed" with an exposure of one-twentieth of a second.

Then I say boldly that we all have much to learn; and I believe that we can learn more rapidly, more effectively, and, I trust, more pleasantly from one another than we can from books. By our fortnightly meetings, with the papers which will be read at them, the specimens which will be shown, and the discussions which will take place, we hope that a benefit will be conferred on each individual who attends. In the question-box which will be provided, members may drop questions on knotty points, or even without fear of being thought ignoramuses, whose why and wherefore are sometimes sufficiently perplexing.

During the coming winter we may anticipate that the "lantern-nights," when slides prepared by members, together with those made by experts in the art, will be exhibited, will prove a great attraction. From first-class lantern slides of good subjects shown in the best possible way, it is perhaps possible to secure the greatest happiness of a greater number than by any other photographic exhibit, and I look forward to large audiences on our lantern nights.

An exhibition of pictures and apparatus—annual, biennial, or triennial, as may be determined—seems to me one of the important objects of such a society as this. Every photographer, I am sure, whether amateur or professional, is desirous to see and to study the works of the leading men in our art-science of this and other countries. By an exhibition, with liberal offers in the way of prizes, we may hope to attract the choicest works of the photographers of the British Isles, and even those of France, Germany, Russia, and the United States. Such a collection would not simply be an instructive one for the photographers of our district, but I am persuaded that it would be a revelation and a source of great pleasure to the people of this town, and would show the marvellous progress made by photography during the last decade, and the services it has been able to render, and is now rendering, to science and to art.

Not the least benefit which a photographic society is able to confer upon its members is a series of well-organised excursions during the summer months. For the complete success of these outings it is necessary to have a leader who knows the ground well, so that the various points of interest may be visited at a time when the light is suitable for each. It would be a good plan, too, to appoint a recorder for each excursion—or the offices of leader and recorder might be conjoined—whose duty it would be to write a brief account of the trip, which should be read at the next meeting of the Society, and preserved in a book for future reference.

Another service which a photographic society can do for its members is the issuing of presentation prints, consisting of copies of the choice works of celebrated men in our art-science. For such a purpose and in such numbers these can be secured under favourable conditions, and they will serve as a standard of comparison, and as an incitement and a guide.

The formation of as complete a library of books on photography as can be collected, I consider a duty of this Society. Not only should all modern periodicals and books be bought or begged, but everything which bears upon the past history of photography must be secured. More than this, it is very desirable that the leading works in such cognate sciences as chemistry, optics, &c., should be on our shelves, and, under proper regulations, at the service of all our members.

An album has already been provided to receive the portraits of members, which they are required by one of our rules to contribute, and I trust that other albums will receive a goodly collection of work done, accompanied by all those particulars with reference to lenses, plates, stops, &c., which photographers alone know how to value.

Much useful local work may be done by a photographic society in a large town like Birmingham. By securing accurate representations of old buildings, we can furnish a record for posterity whose accuracy cannot be disputed, and whose interest in the future will be great. But I would not only photograph the old buildings, I would secure, or try to secure, on rapid plates, impressions of the appearance of our streets, of the principal lines of thoroughfare, and of the busy crowds by which they are traversed. Even in the short half century which has past since the discovery of photography, if such pictures could have been secured of Birmingham at intervals of every five or ten years, what an interest they would have for us to-day. We exclaim at the pleasure it would give us if we could see photographs of Stratford as it was when Shakespeare lived there, but there will come a time when a similar desire will be expressed to see England as it was in 1885, and, fortunately, by the aid of photography, it will be possible for such a desire to be gratified.

Then we can do something in the direction of beautifying the bare walls of our Board Schools, and of similar institutions. Frames of good photographs—and more especially, perhaps, enlargements—would bring forcibly before the minds of children some of those beauties of nature which, alas! many of them never behold.

From members of the Natural History Societies numerous specimens of shells, rocks, plants, &c., have been received, and these have been placed in suitable cases upon the walls of our Board Schools; but I feel sure that the Kyrle Society—which is doing an excellent work in adding an element of beauty to the interior of our schools—would welcome the gift of good local photographs, more especially if they were produced by some permanent process, as platinotype or carbon printing.

In conclusion, I need hardly say that the successful achievement of even the least of the objects I have named, requires the hearty co-operation of every member. By regular attendance at the meetings members can do good, not only to the Society, but to themselves. Such meetings as these revive the flagging interest, and give a new interest to work. We include all within our ranks—amateurs and professionals—all who are desirous to learn, and all who are willing to teach.

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MAKING LANTERN SLIDES.

BY A. B. BENJAMIN.*

I FIND in reducing a 5 by 8 negative to $3\frac{1}{4}$ by 4, having the copying camera containing the negative placed within six inches of the window, and the latter protected by a piece of ground-glass or white tissue paper, the sun's rays shining direct, or nearly so, upon it, an exposure of from five to seven seconds is sufficient for negatives of ordinary density. For a very thin negative I have reduced the time to cap on and off.

I prefer this latter exposure for negatives of such subjects as rocks, white stone buildings, steamboats, sailing vessels, and rough water and marine views. In such cases I use the developer at its full strength, as I notice it yields what are called "black and white" tones, but which are actually more black and blue or black and very dark purple, such as is often seen in an ordinary silver print. For such objects as landscapes containing considerable foliage and grass, brown stone buildings, or those composed of the yellowish brick much used at the present time, I prefer a dilute developer, as I think it yields tones more in accordance with the subject. The exposure should be trebled, and the strength of the developer reduced one-half, putting in one grain of bromide to two ounces of solution, and picking out the plate when the development has proceeded far enough.

By commencing the development with a weak solution, there is little need of ever losing a plate. My plan of proceeding is as follows:—Suppose we have two ounces of developer just half the normal strength in the tray, and in a graduate near by an ounce of the same full strength; now this latter solution can be added, a little at a time if necessary, to bring out the picture without danger of causing any immediate chemical change in the developer. I do not advocate using a developer that has been mixed over thirty minutes, as beyond that time the yellow precipitate begins to form, and though the developer appears to remain clear, there is a sprinkling of golden sand deposited on the surface of the plate, which, while it can be easily removed by a constant and rather violent agitation of the tray, is a movement which is really needless so long as the plate is well covered.

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* A communication to the Society of Amateur Photographers June 9th, 1885.

When a negative to be reduced is thick on one end and thin on the other, the thin portion can often be shaded with success. I have even thrown a handkerchief over the thin end, and thereby obtained a more even illumination.

Until some better light is provided, it will be necessary to make a double set of slides for home exhibitions, one suited for oil, and the other for the lime light. I have some subjects that I cannot develop thin enough for oil, and retain any pluck; yet if the development is continued, the transparency becomes practically worthless.

I employ two cameras facing each other; in one the negative to be reduced is placed in a kit in the space occupied by the plate-holder, and the lens front is removed. The lens of the copying is inserted in this operture, and the space between the two cameras is covered by a black cloth; this plan I find works very successfully, and avoids the necesity of using a copying camera. In focussing I employ a magnifying glass. The making of lantern slides is to me extremely fascinating, and if I have imparted any information which can be utilised by others, I shall feel that my experience has not been in vain.

ISOCHROMATIC PHOTOGRAPHY.

BY FRED. E. IVES.*

For the purpose of better illustrating the capabilities of my process of isochromatic photography, I have recently made a large number of photographs of a colour-scale, which is made up of pieces of woollen cloth dyed red, scarlet, yellow, green, blue, violet, magenta, &c. The exposures were made through colour-screens, which were carefully selected by the aid of the spectroscope, in order that it might be known in each case what kind of light was transmitted.

I have not had time to make a set of lantern positives, but will show some of the negatives on the screen, and also one positive, made from prints which have been arranged for comparison.

The first negative is an ordinary photograph of the colour-scale, in which blue, violet, and magenta are the only colours which photograph with considerable intensity.

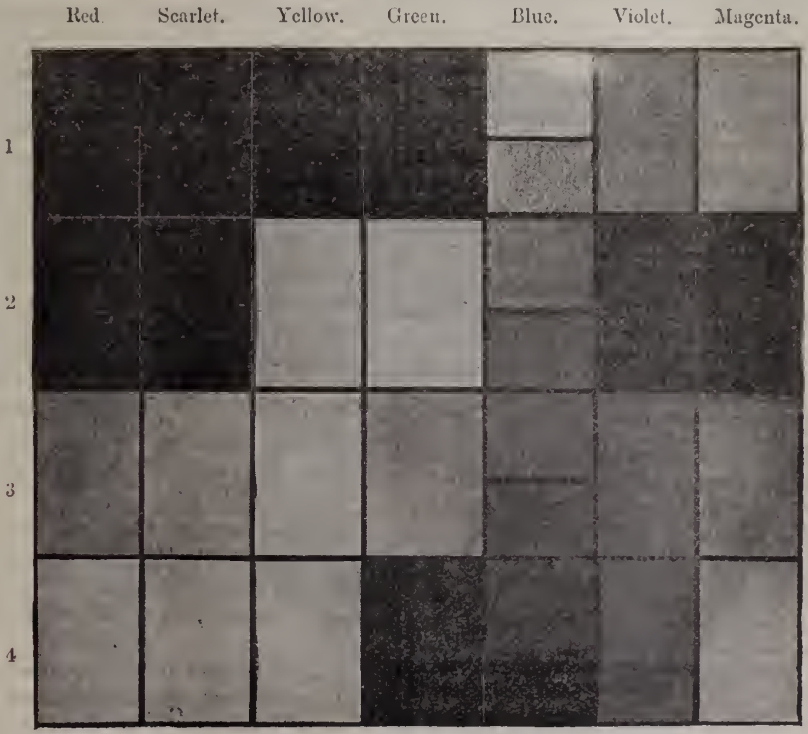
The second photograph was made with an eosine-stained plate, exposed through a yellow screen. Light blue, green, yellow, and light yellow-brown are the only colours which photograph well.

The third photograph is by my isochromatic process, and all of the colours come up in approximately the true proportions of their brightness.

The fourth is one of my chlorophyll plates exposed through a scarlet screen, and brings out with remarkable intensity all those colours which have usually been regarded as most non-actinic; but green and blue come out like black.

In the lantern positive, seven squares are shown from each negative, arranged for comparison. The first row is from the ordinary photograph, the second is from the eosine plate exposed through a yellow screen, the third is from the isochromatic photograph, and the fourth from the chlorophyll plate exposed through the scarlet screen. These photographs tell their own story so far as regards the capacity of the processes; but my investigations have revealed some remarkable facts, which I will now state briefly, without entering further into the details of my experiments:—

1. Although collodio-bromide emulsion plates, stained with blue-myrtle chlorophyll alone, are capable of photographing all coloured objects in the true proportions of their brightness, they are far more sensitive to the extreme dark red of the spectrum, below the absorption band of chlorophyll, than to either the orange, yellow, or green.



2. All red, orange, and yellow objects reflect the dark red light to which chlorophyll plates are so sensitive, and bright yellow objects reflect as much of this light as red ones. Yellow objects photograph lighter than red ones by this process, because they reflect two kinds of light to which the plates are sensitive, while red objects reflect only the one kind.

3. The sensitiveness of the chlorophyll plates to spectrum yellow and green may be greatly increased by treating them with the tea organifier, which also nearly doubles the general sensitiveness, but without appearing to alter the effect in photographs made through a yellow screen. If a green screen is used, of a shade which does not transmit the dark red of the spectrum, the resulting photograph is better when the tea organifier has been used, and does not then differ in any respect from one made by exposing an eosine-stained plate through the same screen.

4. The dark red of the spectrum passes freely through a solution of chlorophyll, and through ruby and orange glass, but is absorbed by common green glass, or by solutions of sulphate of copper or prussian blue.

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* From advance proof sheets of the Journal of the Franklin Institute. Read at the meeting of the Institute, Wednesday, May 19, 1885.

These facts show that plates prepared with both sensitizers, according to my original instructions, are, strictly speaking, more nearly isochromatic than those prepared with chlorophyll alone; but that in the production of photographs of coloured objects they seldom offer any practical advantage, except that of reducing the exposure about one-half, at the expense of some extra labour and care in their preparation and development.

It is also evident that the safest light in which to prepare and develop chlorophyll plates is neither ruby nor orange. The light which I find most suitable for this purpose is that transmitted by a combination of two thicknesses of deep orange glass with one of green.

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Notes.

One may well look back now and then, and looking back becomes a pleasure in the case of such instantaneous street views as Mr. Blanchard made on wet collodion a quarter of a century ago. The originals of our supplement are in the Historical case of the Photographic Society at the Inventions Exhibition; and the supplements themselves were printed by Messrs. Sprague and Co. in the Exhibition building.

Making artificial lithographic stones of Portland cement is the subject of a recent patent to P. Walker (1885, No. 5538). He also makes baths, sinks, and washing tubs of Portland cement. The patentee says:—"The mould which is used in making lithographic stones has for its bottom a piece of plate glass of the size of which it is intended to make the stone, and the cement employed is passed through a very fine sieve in order to separate the objectionable matters, and is then made up into a plastic condition and filled into the mould. In making baths, washing tubs, sinks, and similar articles, the sides of the mould are formed by means of two frames of the desired shape, open at top and bottom, one being placed inside the other, and the inside frame having fixed on its outer surfaces pieces of plate glass. A piece of glass is also placed across the top of the inner frame, which piece of glass is shaped to form the bottom of the article, which is moulded upside down. The space between the glass surfaces on the inside frame and the inside of the outer frame corresponds to the thickness of the article to be moulded, and the cement is filled into this space at the top and the open surface slecked over or smoothed level with the tops of the outer frame.

Mdlle. Jeanne Blin owes to her close association with the notorious criminal Marchandon quite a number of assorted chances of making money. Offers of lucrative employment as a *dame du comptoir* have been sent to her from cities as distant as St. Petersburg. Several music-hall managers are trying to induce her to appear on their stages; and at least one enterprising showman is anxious to "run" her through the country as the main attraction of a "side show" devoted to a realistic representation of the Madame Cornet murder. Nor are these all Mdlle. Bliu's opportunities, for it is asserted that she has received in all applications from over 200 photographers, all of whom are —or were—eager to have the copyright of her features, which have been described as harsh, and by no means prepossessing.

Seeing, then, to what monetary advantage even indirect association with a sensational crime may be turned, there is a danger, it seems to us, that ere long we may find criminals of an exceptionally cold-blooded and calculating character deliberately availing themselves of the existing demand for the photographs of notorieties. It will be found, possibly, that these criminals, before committing their crimes, will be photographed in various attitudes, and will take all the necessary steps to ensure the negatives being in the custody of relatives or friends who can turn them to good account. A sentimental villain may, perhaps, in the not distant future, comfort his wife with the observation that he has only committed his sensational crime for the sake of her and the children; that though he is necessarily lost to her for ever, he leaves her with the assurance that she will be able to secure competent support by the sale of the negatives which will be found in the left-hand drawer of his dressing table. And a callous brute will even go farther, and endeavour, maybe, to negotiate the copyright of his carte before committing the crime for which he will have to fly the country.

Talking of brutes reminds us that the *Pall Mall Gazette*, the other evening, initiated a kind of "Press Pillory" by printing in capital letters, enclosed in a frame of thick black lines, the name of a so-called gentleman convicted of insulting a young lady in the public streets. This kind of publicity will doubtless be distasteful to "gentlemen" of the "street-prowler" genus; but, if we recollect aright, a contemporary threatened to deal them a much more serious blow, not long since, by announcing its intention of publishing in its columns the photographs of all the better-known of the ruffians in question. Whenever this proposed portrait gallery is exhibited, its originals will probably soon have good reason to complain, especially if the portraits published are good. A "striking" likeness of a "street-brawler," in fact, would probably result in a "striking, not to say kicking, recognition of him at the hands—and feet—of an indignant public."

Another book illustrated by platinotype is announced by R. Keene, of Derby, "An account of Winfield Manor." The book will also contain some wood-cuts from drawings by W. C. Keene, son of the publisher.

The composite photographs of members of the American Academy of Sciences, recently made under the direction of Professor Pumpelly, and referred to by us some weeks ago, are reproduced as block prints in the last number of *Nature*.

Among the remarkable actions of light may be cited its effect in enabling compressed carbonic acid to etch glass. Herr Pfaundler found that if the upper part of a sealed glass tube containing liquefied carbonic anhydride is exposed to light for some minutes, the surface of the glass is etched. May not this observation possibly lead to a process of photographing in which the sensitive surface is nothing more than a glass plate?

That Dr. Bernardo had turned photography to account by issuing parallel portraits of inmates of his Orphanage, taken in their original condition as street waifs, and after a short residence in the Institution, was known some years ago. The public were invited, in fact, to "look first upon this picture, and then on that," as an incentive to subscriptions, and it is probable, with some such object, that an enterprising officer of the Salvation Army is said to be circulating portraits of some of his recruits before and after their conversion. It is, of course, a somewhat delicate subject to write about; but a cynical critic, especially if he had had any experience as a practical photographer, would not without reason have suspicions as to the smiles supposed to be expressive of the sitter's peace of mind. They have a very conventional please-assume-a pleasant-expression-of-countenance kind of look about them, and cannot, therefore, be considered more reliable evidence of mental serenity than the stereotyped grins assumed by the victims of the cheap artist when in the very climax of the torture of "being taken."

The above reminds one of the numerous uses to which photography may be applied by those who, like George Bernard Shaw's hero (see page 431), may wish to press in the aid of photography in putting a case before the public. May we not before long have a series of cartes by John Hampden to prove that the world is flat, or cabinets by Mrs. Weldon to prove to the public how much she has been ill-used? Again, it may be that Mrs. Besant will issue a series of photographs to show the extent to which our London slums are overcrowded with children; while George Smith, of Coalville, will certainly fail in his duty unless he either becomes a photographer himself, or employs one. Unless our memory is at fault, it is not long since that Adolphe Smith and J. Thompson issued a remarkable series illustrative of life in St. Giles and other squalid quarters of the metropolis.

One thing must not be forgotten, and this is, that when the camera does tell lies, it does so with such an air of truthfulness, that even the very elect may be deceived.

In the list of the newly-elected Fellows of the Royal Society may be noticed the name of A. A. Common, whose excellent astronomical photographs, including that of the nebula of Orion, are so well known.

Lead is employed in the preparation of eosine reds, and, owing to its presence, those who use these colours—notably artificial flower-makers—are apt to suffer from colic, while painful spots on the skin are frequently produced. We do not suppose that any photographer who is tempted to add eosine to gelatine emulsion in the copying of pictures will be deterred from its use on this account. Nor is it likely that the infinitesimal quantity of lead present has any appreciable effect on the negatives, photographically speaking.

A somewhat notable album—or, rather, series of albums—is being prepared by the French Geographical Society. These albums are to contain the photographs of all persons who have made remarkable voyages, and who are in any way distinguished in geographical science. At the back of each photograph will be the autograph and a brief statement of any interesting particulars in the life of the original. If this example were followed by our learned societies, a most valuable collection of the portraits of notabilities would result.

A facsimile reproduction of the last journal received from General Gordon is to be published. The pages have already been photographed, and the copies will be in the hands of the subscribers very shortly. The price of the volume will be three guineas.

At the meeting of the Photographic Society, when the medals were presented, the President lamented the poverty of the portrait exhibits. He, however, referred more to the quantity than the quality. Perhaps photographers showed their good sense in abstaining from showing portraits which they felt were not first-rate. The artists who figure in the Royal Academy are not so wise. In our notice of the portraiture at Burlington House we pointed out what we considered to be glaring faults, and in confirmation of our opinion the *Athenæum* last week declared that, judging by the Academy, "portraiture is declining in merit, learning, and beauty of execution. Our artists, spoiled by flattery and big prices, have, it seems, forgotten that for two thousand francs a sitter can get in Paris a better head than all but the very best of the pictures we have criticised, the prices of which may range from £400 to £800." This is severe, but, unfortunately, true.

The general election in November next is sure to excite much more than ordinary interest, and no doubt strenuous efforts will be made by both sides to secure every possible vote. The only electors who will stand aloof will be those householders or lodgers who have shifted their residence within the twelvemonth, and whose names, consequently, are not on the register. It certainly does seem absurd, that because you move (say) from the south to the north of London, you shall thereby lose your electoral rights. While awaiting manhood suffrage, perhaps a system of registering photographs might allay the fears of those timid legislators who apprehend personation of voters, double voting, and other evils which the vote-book is supposed to prevent. The system could be worked something after this fashion. The point to be established is, that the John Smith who lived at Brixton is the same John Smith who has moved to Islington. When John Smith thinks of moving, he goes to the Parliamentary photographer of Brixton, and is photographed. A copy is forwarded to the office at Islington, where in due time John Smith presents himself, is identified with the photograph, and his name forthwith placed on the Parliamentary register of Islington.

A correspondent, alluding to the recent discussion on "How to Judge Photographs," suggests that the only satisfactory course open is to freely admit "negative" evidence at the trial.

Patent Intelligence.

Applications for Letters Patent.

7682. George Bernard Seibert, Suffolk House, Lawrence Pountney Hill, Cannon Street, London, for "A new or improved frame for photographic sensitive plates."—24th June, 1885.

7720. Thomas Arthur Moryson, 115, St. Vincent Street, Glasgow, for "Improvements in photographic printing."—25th June, 1885.

7764. Frederic James Egerton Hine, 4 and 5, Arcade Chambers, Corporation Street, Birmingham, for "Improvements in picture frames."—26th June, 1885.

7828. William Joseph Butler Humphreys, 186, Fleet Street, London, E.C., for "Improvements in photographic shutters."—27th June, 1885.

Patent which has become Void through Non-payment of the Fourth Year's Renewal Fee.

1881—No. 1214. R. Sherwin, &c., "Holding photographs, &c."

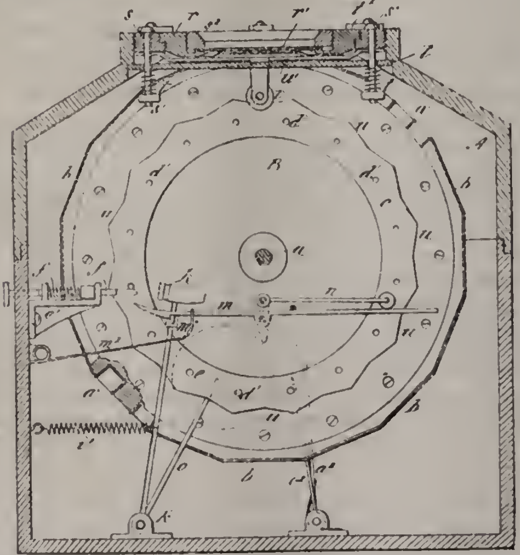
Patents Sealed.

9461. Alexander Melville Clark, of the firm of A. M. and Wm. Clark, 53, Chancery Lane, Middlesex, Fellow of the Institute of Patent Agents, for "An improved panoramic photograph camera."—A communication to him from abroad by Paul Moessard, 11, Boulevard Magenta, Paris, France, Captain of Engineers.—Dated 26th June, 1884.

10,334. James Sturrock, Bank Street, Dundee, Forfarshire, N.B., for "Improvements in washing-baths for photographic purposes."—Dated 19th July, 1884.

Patent Granted in America.

319,975. William Hill and Thomas R. Wilson, Salt Lake City, Utah, "Photographic printing apparatus." — Filed July 15, 1884. (No model.)



Claim.—1. In a photographic printing apparatus, the combination of a multifaced cylinder, a holder placed to retain a negative upon one face of the cylinder, a motor connected for rotating the cylinder, and mechanism operated by clock-work for releasing and stopping the cylinder, substantially as described.

2. In a photographic printing apparatus, the combination, with a cylinder carrying the sensitive paper, and fitted for rotation by a motor, of a trigger for arresting the movement of the cylinder, and a regulator rotated by clockwork and acting to release the trigger at intervals, substantially as described.

3. In a photographic printing apparatus, the combination of the cylinder B, formed with faces *b*, the frame *s* carrying the negative, the cam-ring *e*, and the grooved rollers *v*, attached to the frame carrying the negative, substantially as described.

4. In a photographic printing apparatus, the frame *s*, pins *s'*, springs *t*, and rollers *v*, combined with the rotating cylinder B and cam-rings *e*, substantially as described, for operation as specified.

5. In a photographic printing apparatus, the combination of the rotating cylinder B, trigger *f*, hammer *k*, latch *m*, and the tripping-arm *n*, substantially as described.

6. In a photographic printing apparatus, the combination of arms *n n'*, carried by one arbor, and the rotating disk *h*, provided with fingers for engaging the arm *n'* with the rotating cylinder B, and a trigger released by movement of the arms *n n'*, substantially as described.

7. In a photographic printing apparatus, the combination of rotating cylinder B, disk *h*, rotated by clockwork and provided with fingers *i*, and the trip-arm *n'*, operating by its movement to release the cylinder, substantially as described.

8. In a photographic printing apparatus, the time-regulator *h*, provided with spring-fingers *i*, combined with a clockwork arranged to rotate the regulator, substantially as described.

9. In a photographic printing apparatus, the combination of a rotating cylinder and a time-regulator rotated at varying speeds, for releasing and stopping the cylinder at intervals, substantially as described.

10. In a photographic printing apparatus, the combination of the eccentric wheel *p*, pinion *p'*, and gearing *q*, with the clockwork C, arbor *g*, and disk *h*, substantially as and for the purposes specified.

11. In a photographic printing apparatus, the combination, with the rotating cylinder B, of the bell b^2, hammer a^2, and arm c^2, substantially as described.

12. The combination, in a photographic printing apparatus, of a cylinder geared to a motor, a time-regulator having a constant rotation by a separate motor, and mechanism actuated by the regulator to release and then stop the cylinder, substantially as described.

POSITIVES ON GELATINO-CHLORIDE OF SILVER.

BY W. M. ASHMAN AND R. OFFORD.

Fifth Article.

Before proceeding to detail the methods of coating paper, we desire to draw attention to an error which occurred in our last article upon this subject. In the remarks regarding the formation of silver tartrate emulsion, page 294, 2nd column, 45th line, we represent the quantity of gelatine required as 14 grammes instead of 1·4 grammes; doubtless to the experienced experimentalist, and to those who have carefully followed the series, the mistake would be understood, but those who have had no experience with emulsions of this kind, and who might be induced to commence at any stage of the series, are entitled to our utmost consideration. Had a novice, for instance, taken those printed proportions, he would necessarily have met with failure, owing to the absurdly large quantity of gelatine named. Again, on page 295, 2nd column, 16th line, the sodium acetate and calcium chloride toning method does not appear to be clearly distinguished from Maxwell Lyte's borax bath, owing to the insertion of the former in brackets. The toning bath in question will be dealt with in detail in a future article.

When choosing a sample of paper upon which to spread a coating of sensitive emulsion, it is well to bear in mind the liability to rough usage that prints may incur in their transit through the different operations of toning, fixing, washing, &c. Experience with silver printing on albumen has shown the necessity of having a well-sized paper support, in order effectually to check the production of cracks, tears, and defects of a like nature, which would be certain to ensue under the severe strain to which the papers have to be subjected.

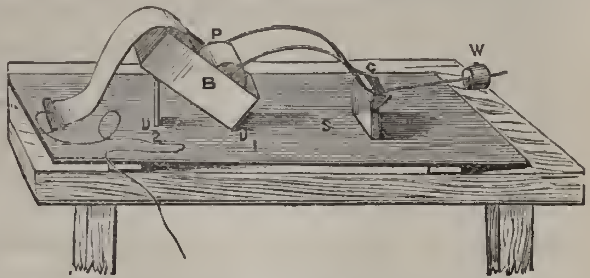
The chief objects to have in view are—first, a good basis for the emulsion, one not liable to absorb too much, and so spoil the brightness of the picture, the image being kept as much as possible on the surface; and secondly, as pure a white ground as can be obtained. In the manufacture of carbon tissue, this is not such a necessity, partly owing to the elasticity of the pigmented gelatine, and partly because the original support is not required to do duty beyond the point at which the development commences. Neither of these conditions exist in the present case. Gelatine bromide papers used for developing purposes cannot be taken as a guide, since they are not so heavily charged with a gelatine emulsion as those intended for direct prints to equal, if not rival, the best productions on albumen.

With regard to texture, it is not necessary to say much here, as opinions are diverse on this subject; but we prefer to employ a fine one, for small work at all events, so as to keep the resemblance to ordinary silver printing, and for that reason take plain photographic papers, Saxe, Rive, or Renât Rive, either being well suited to the purpose.

Certain English papers may be used; those having a close texture, and well-sized, should be selected; but they are apt to develop black spots freely after the paper has been kept a few days, especially in a damp atmosphere. This effect is very noticeable when rolls of plain wall paper have been used; showing that, however well it may answer for developed images, or the carbon process, it is certainly not expedient to employ it in the present instance. The degraded quality of the white, together with the probable trace of the hypo therein, renders the suitability of English papers very doubtful.

Several methods of coating paper have been described in the pages of the News and Year-Books. Among them we may mention the plan described in a series of articles relating to paper positives by the gelatino-bromide process, pages 738-9, vol. xxvii., wherein the paper to be coated received a somewhat brief soaking in a vessel of cold water, after which it was transferred to a levelled glass slab edged with a light frame, and a measured quantity of the sensitive mixture poured thereon. We have found this plan to answer. Again, on page 77 of the same volume, in the second of a series of articles on "Silver Printing," there is a detailed description of coating paper with albumen. This plan answers equally well for covering paper surfaces with liquefied emulsion, but it is advisable to lower the temperature of the coating room beyond that required for albumen, and some provision is necessary for keeping the sensitive mixture in a liquid state. Perhaps the simplest method on a large scale is that which is used in the manufacture of carbon tissue, illustrated on page 453 in the last volume of the News, and which does not necessitate damping the paper first. Such an arrangement is not available for the coating of small pieces, since it will only work in long continuous bands. For experiments it is merely necessary to mount a roll of paper with its smooth side outermost in contact with the surface of the liquid, be it either pigmented gelatine or an emulsion, the free end of the roll being then steadily and deliberately drawn upwards until the whole length has thereby become covered. Obviously an operation of this kind can be performed more satisfactorily by those skilled in the manufacture of the commercial article, and when emulsion papers for printing out become generally used, the facility for obtaining a perfectly-coated surface will doubtless be as great as it now is in the case of albumen, carbon tissue, transfer paper, bromide paper, &c.; and as such papers can be made to keep almost as well as ready-sensitized albumen paper, the probabilities point to their manufacture on a large scale.

A plan which may commend itself to the experimentalist may be here mentioned. The rough sketch represents the model of a simple contrivance (designed by ourselves for the purpose) consisting of a board or stand S, with an upright upon which rocks a forked lever, C. One end of lever carries a small sliding weight of lead, W, provided with a screw to secure it at the proper distance from fulcrum at C. The points of the fork are drilled to take a wire which passes through the centre of a wooden roller, P, upon which the paper is coiled; one end of paper is gummed to the roller, the other fastened in practice between two slips of wood, by means of two or three brass screws or nuts, or by springs at each end, the inner surfaces of wood being roughed. To these slips of wood is attached a cord long enough to go to the ceiling of room, to pass through an eye or staple fixed there, and to hang just within reach of the upraised hand. Two little uprights on stand U1 and U2 form a place in which to rest an ordinary deep white earthenware photographic bath, as a suitable angle to form a V trough which can receive the emulsion. In practice, the fork of the lever is better made of wood, shaped like the wire of the model. To coat strips, say, one-third the narrowest width of a sheet of Rive or Saxe, the paper is cut, and the ends joined with stout gum; the number of strips depend on height of room or position of stand, on floor or table. Care is taken that the roller is the same width as paper, and the laps in the latter are so made that each strip, beginning at the inner one, is under the next outer one, thereby presenting no edge of paper to cut against the surface of the emulsion, and so form waves; the right side of paper must of course be outside. The bath, having been warmed, is put into its place, the emulsion poured in, and the lever, with paper-covered roller tilted on to the surface, being previously so balanced as to rest lightly thereon. One hand takes hold of the string, while the other touches the fork and keeps it from rising by the tension of the cord; the cord is then slowly pulled until the whole of the paper has passed over the emulsion, when the roller is allowed to rise out of trough, and the bath is removed.



The difficulty suggests itself of not being able to reach far enough up and down to pull the whole of the paper out of the trough when the strip is very long; this is got over either by having a nail or roller in the edge of the table, round which the cord is passed as it reaches it, to be then pulled up instead of down; or better still, by providing a little bobbin about two inches in diameter and three long, mounted in a stand, or secured to the edge of the table, and capable of being turned by a little wire handle at one end. The cord is fastened to this, and by winding, it is gradually, and very evenly, pulled through the staple above, and so the coating is steadily continuous. It is difficult, without an outer bath of hot water, to keep the emulsion liquid long enough for several rollers to be attached; but if this is provided, there is no reason why, with two or three bobbins and rollers with cords ready attached, all could not be quickly and perfectly coated, the stand being slipped along the table to suit the position of the next staple and bobbin. The staples should be a foot or two to the left of a perpendicular, drawn from roller to ceiling, and so slanted to avoid dust.

It is all-important that an even temperature should be maintained in the coating trough when there is much used; and it is a matter of some consequence that the maximum should not exceed 36° C. at any time. A lower temperature would be even better so far as preserving the whiteness of the emulsion is concerned. Hot gelatine solutions, too, are difficult to spread uniformly on paper, owing to the tendency of the liquid surfaces overlapping the more exposed ones that have become partially set, and so producing a series of ridges, streaks, and inequalities. These reasons alone are sufficient to indicate why an emulsion should not be heated many degrees above the temperature at which it sets.

On the other hand, it is also difficult to coat paper with any gelatinous substance when it is too near the setting point, as might have been observed in any attempt to coat glass plates with a bromide emulsion when the liquid has become nearly cold.

The speed with which a roll or band is made to traverse the surface of the emulsion has also much to do with success. Both the temperature and density of the gelatine help to determine the speed; but beyond these facts, practice alone can guide in formulating rules for accurate work.

(To be Continued.)

THE PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

The proposed exhibition will be held during the Fall or Winter of 1885-86.

Amateur and professional photographers are invited to send specimens of their best work for competition.

The recent rapid progress in artistic photography, and the growing interest in the subject, lead the Society to hope that a collection of photographic pictures may be brought together which will be worthy the critical attention of friends and the public. A diploma will be awarded, by a Board of Judges, for the best picture in each class. Every precaution will be taken that the conditions of classification are complied with. The place of holding the Exhibition, and the date, will be announced in a future circular. It is proposed that the Exhibition shall remain open to the public about one week. To facilitate the hanging of pictures by classes, it is requested that, as far as possible, pictures of different classes be not included in one frame. Intending exhibitors are requested to advise the Secretary as early as possible, so that entry blanks, labels, &c., may be sent them in good time. Early notice in regard to transparencies and lantern slides is particularly desired, in order that proper arrangements for showing them may be made. For all further information, entry blanks, labels, &c., applications should be made to the Secretary, Mr. Robert S. Redfield, 1601, Callowhill Street, Philadelphia, Penn'a, U. S. America.

Rules.—1. Both amateur and professional photographers may compete in all classes, unless otherwise specified. 2. No photographs will be received on single mounts less than 5 by 8 inches (except stereoscopic). All smaller than this size must be grouped on a larger mount for convenience in hanging. No unmounted prints will be received except from foreign exhibitors. 3. The same picture may be entered in more than one class, but can only be awarded one diploma. No diploma will be awarded in any class in which the pictures are of insufficient merit, as decided by the judges. The committee reserve the right to reject all or portions of any exhibit offered. 4. All entries must be made on blanks, which will be furnished on application, and which must be filed with the Committee at least five days in advance of the Exhibition, giving (when possible) the following information:—Number of pictures—Size of frame or mount—Classification—Subject—Lens—Plate—If for sale, Price—Exhibitor—Address—Society. Ten per cent. commission will be retained by the Society for any pictures sold during the Exhibition. 5. Each print must have a label attached by the exhibitor, so as to be read from the front, stating class, subject, lens, plate, exhibitor. Blank labels will be furnished on application. 6. All expenses for transportation to the Exhibition must be prepaid by the exhibitors. Return charges will be collected by carriers. 7. No pictures will be received later than five days prior to the opening of the Exhibition. 8. No pictures shall be withdrawn before the close of the Exhibition. 9. The Society will not be responsible for any loss or damage that may occur to any exhibit, but will use all reasonable care to prevent such occurrence. 10. Advertising in any form, in connection with any exhibit, is strictly prohibited.

Classification.—(1) Landscapes, any size—*by professionals only*; (2) ditto, over 5 by 8 inches, (3) 4¼ by 6½ to 5 by 8 inches inclusive, (4) ditto, under 4¼ by 6½ inches—*by amateurs only*; (5) marine views, surf, (6) ditto, sail—*by professionals only*; (7) marine views, surf, (8) ditto, sail—*by amateurs only*; (9) figure compositions, over 5 by 8 inches, (10) ditto, 4¼ by 6½, to 5 by 8 inches inclusive, (11) ditto, under 4¼ by 6½ inches—*by amateurs only*; "Figure Compositions" are to include groups, and all pictures in which one or more figures make the principal interest of the picture, and which are not included in the "Special Composition," Classes No 15, 16, 17, and 18. (12) landscapes, (13) marine views, (14) figure compositions—*by ladies only*; (15) cottage door, (16) wayside fountain, (17) village smithy, (18) ploughing—*special compositions*; (19) animals, (20) still life, (21) flowers, fruit, &c., (22) trees, (23) snow and ice, (24) architecture, (25) interiors, (26) sculpture, (27) machinery and other manufactured objects, (28) microphotographs, (29) enlargements, (30) instantantaneous effects, not otherwise classified, (31) platinum prints, (32) gelatino-bromide or chloride prints, (33) porcelain pictures, (34) transparencies, (35) sets of six lantern slides—negatives and slides to be made by exhibitor, (36) sets of six to twelve pictures, taken in a foreign country, or by a foreign exhibitor, (37) pictures by any new process not before publicly exhibited.

Foreign exhibitors will please send their pictures by mail, unmounted, directed to:—The Photographic Society of Philadelphia, care Robert S. Redfield, Secretary, 1601, Callowhill Street, Philadelphia, Pa., U.S.A. Suitable arrangements for properly exhibiting them will be made by the Society. They should be accompanied by a statement of value (for custom-house purposes). As the time for holding the exhibition cannot yet be fixed, it is requested that pictures from abroad be sent to arrive during October, in order that they may be received in ample time for any date that may be decided upon. Immediate notice is desired from those proposing to send pictures.

Correspondence.

SUSPENDING THE ACCOMMODATION OF THE EYE.

Sir,—In answer to Mr. A. Brothers' letter in your issue of June 26th, I have pleasure in suggesting the following explanation of the fact referred to by him.

When the gas jet is looked at steadily for a few seconds, it excites a certain definite area of the retina, and is seen under a certain definite angle of vision. This part of the retina becomes exhausted, and therefore, when the eye is directed to a dark screen placed exactly at the same distance from the eye as the gas flame was, a black space occurs in the field of vision of exactly the same size and shape as the flame.

The impression formed on the retina by the light of the gas flame is of a certain size and shape in direct proportion to the size and shape of the flame, and the parts of the retina corresponding to this certain shape becomes exhausted; hence a certain definite part of the field of vision is in darkness. The shape of this blind space is exactly correspondent to the shape of the light space in the visual field when the flame was being looked at; but its size varies, becoming smaller and smaller as it approaches the eye.

When the eye looks at the gas flame, the rays of light pass from the flame to the eye in converging straight lines, forming a cone of light rays, the base of which is the flame of the gas, and the apex at the nodal point of the eye, which is just posterior to the lens of the eye; the outer lines of this cone measure what is called the visual angle, under which the flame is being viewed. The cone is a cone of light rays, and it is in the exact position of this light cone that the dark cone or dark space referred to above occurs. In other words, the light cone is the part of the field of vision corresponding to the part of the retina which is excited by the light from the flame, and which, when the eye is turned away from the source of light, becomes the dark cone.

The shape of the base of this cone corresponds to the shape of the flame, and if the screen be placed nearer to the eye than the flame, the shape of the base of the cone remains the same, but the size of the base becomes smaller; hence the impression conveyed to the mind is, that the dark image of the gas flame is smaller, and *vice versa*. When the screen is removed from the eye further than the gas flame, the base of the dark cone is larger, and therefore the mind receives the impression of a larger dark image of the gas flame.

Although I have followed the example of Mr. Brothers, in speaking of the dark patch seen on the screen as the dark image of the flame, I have only done so to enable me to word the above explanation more simply; strictly speaking, it will be evident that it is wrong to speak of it as an image. It is simply a blank space in the field of vision, corresponding in shape exactly to that of the source of light; hence it will be equally evident that the laws of perspective are in no way applicable to the case under consideration, for the origin of the impression conveyed to the mind by the nerve of sight is really a condition of a certain area of the retina, and behind the dioptric system of the eye; whereas, when we look at objects placed at varying distances from our eyes, the cause of the impression is in front of the dioptric system of the eye.—I am, yours obediently, Wm. Thomas Jackman, M.R.C.S., &c.

THE LATEST PORTRAIT OF THE CLAIMANT.

Sir,—I have not failed to peruse your "Note" relating to the recently-issued portrait of the Tichborne Claimant. But the photograph in question has not yet reached this locality. However, I have no hesitation in committing myself beforehand to an opinion—an opinion, sir, by which I am prepared to stand or fall. I am bold to assert that the new portrait will coincide as faithfully and as absolutely with the old one, as both of them will be found to conjoin with the original Daguerreotype of young Roger Tichborne. Whether in the identiscope or in the camera—whether mathematically superimposed or set in geometric bisection together—the result shall be alike unimpeachable. Moreover, my challenge would be incomplete if I did not add that no other photographic faces than those of the Claimant and the original Tichborne shall, by any possibility, be found, that will fulfil, as they fulfil, the twelve requisite conditions of agreement. Those conditions were some months since, I believe, reproduced in your columns. But why do not the *savants* put this matter fairly and fully to the test? The identiscope is but a *pro tempore* substitute for the camera. The mathematics of identification have a yet wider significance than even the solution of the identity of the Tichborne Claimant. Since 1875, the geometric formulary of procedure has had publicity, and was again recently reproduced in the pages of the *Lancet* and elsewhere. It has been variously and efficiently illustrated, and its reliability evidenced, before medical scientists and photographers of experience. Yet the *savants* and the Press have maintained a significant neutrality.—I am, sir, with great respect,

Bristol, June 27th, 1885. William Mathew.

P.S.—I take leave to enclose you a carte. It presents the admeasured photos. of the two epochs, bisected respectively at their true centres, and forming conjointly one portrait. Possibly, in some future issue of your valuable journal, you may be disposed to reproduce it as a phototype. Your readers would be thus in a position to judge if any discrepancy exists between the two sections other than such as may be naturally accounted for.

CHANGING PLATES ON A TOUR.

Sir,—I think that if photographers in the country and small towns were to place a card in their window, stating that the use of their dark-room could be had for changing plates for the charge of, say 3d., or for developing 6d., it would be a source of comfort to amateurs, and also a slight income to themselves. It is not a nice sensation to go into a studio and ask for permission, as one knows that he is trespassing upon both the time and complaisance of the owner.

Few have the confidence to ask a professional for this accommodation, and those who do beg this privilege, cannot repeat it upon a second visit. By adopting my suggestion this feeling would be removed. Hoping you will find space in your valuable paper—I am, yours respectfully, R. D. Herring.

CHEAP RAILWAY TRAVELLING FOR PHOTOGRAPHERS.

Dear Sir,—I enclose copy of a letter sent to all the photographic societies in Great Britain whose names and addresses I know.

I have received from the greater number of the societies addressed very kindly promises of support.

We are drawing up a petition which will, in the course of a few days, be in the hands of every secretary of the said societies, and if there are any whom I have not addressed, I should like to assure them it has been from ignorance of their addresses, and from no intentional omission.

We do not desire to claim any special merit in this movement. We do not forget the credit of its commencement is due to the Oldham Society. We believe that union is strength in such a matter as this, and we have striven to arrange the proceedings in such a way as to bring the full weight of amateur influence to our aid without appearing unduly prominent in the matter ourselves.—Yours faithfully,

H. Norwood Atkins,
Hon. Sec. Liverpool Amateur Photographic Association.

Dear Sir,—I shall be glad to have your opinion as to the possibility of obtaining from the various Railway Companies such privileges as they now accord to the Anglers' Association.

Our Association believes that with the aid of your Society and that of the other photographic associations of the kingdom, we may be able to obtain what the Oldham Society, by itself, failed to gain.

At our last meeting it was decided to ask for your co-operation, and we wish to know if your President and your good self will either sign a request drawn up by us addressed to the various Railway Companies, giving the number of members you represent, or whether you will present *simultaneously with us* a petition from your own Society. We shall be glad of your aid in either way. Awaiting the favour of your reply, I remain, yours very truly, H. Norwood Atkins.

SENSITOMETER READINGS.

Sir,—In comparing Warnerke's sensitometer readings for the relative rapidity of gelatine dry plates and collodion, English and Continental authorities and plate-makers seem to differ to the extent of about 9 to 1. For instance, Swan's plates, giving 8, 11, and 14 on the sensitometer, are calculated as being 5, 10, and 20 times quicker than collodion; that is, that collodion would give 2 on the sensitometer. Foreign plate-makers, in stating the rapidity, start from the principle that collodion gives 10 on the sensitometer, and a plate giving 21 would be stated by them as being 21 times the rapidity of normal collodion, whereas the English makers would make it out to be 192 times as rapid!

How can these rapidities be reconciled, unless under the supposition that English made collodion is very slow?

Green and Fiiidge's actinometer, apart from chloride of silver being sensitive in a different manner to bromide of silver, would seem to me to have the objection that the paper would, in feebly-lighted places, take more time to tint than one would always have at one's disposal. Would it not be possible to have some *visibly printing* paper for use with Warnerke's sensitometer which should be several times more rapid than ordinary sensitized paper? If not, Simonof's photometer would appear quite as practical, and entailing less time and trouble? Is this instrument obtainable in the open market anywhere?

Supposing magnesium ribbon not to be at hand, what length of exposure to sunlight, diffused daylight, or an ordinary candle, would give the equivalent luminosity as an inch of ribbon burnt, to the tablet?—Yours obediently,

British Vice-Consulate, Varna. A. G. Brophy.

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE annual meeting of this Society was held on Thursday, the 25th ult., Mr. A. HADDON in the chair.

The financial statement, duly audited by Messrs. A. Cowan and W. M. Ashman, was read and accepted; the balance in the hands of the Treasurer, after meeting all liabilities incurred during the financial year, being £13 12s. 1d.

The SECRETARY then read his

Annual Report.

The third annual report of the Association gives the members every assurance of the unabated prosperity of the Association, and of that safe and steady progress which has, up to the present time, distinguished its career.

The attention of the members is invited to the statement of receipts and expenditure for the past year.

The operations of the Association during the past twelve months have been of the usual active character. The regular series of weekly meetings have been largely attended, and members, by their hearty co-operation in bringing forward interesting matter and experiments on each occasion, have rendered these meetings a source of useful information on all matters bearing upon photography.

The series of lecturettes, inaugurated the previous year by your curator, have been regularly continued, and followed with increased interest on the part of the members and visitors.

The following lecturettes have been given:—On October 23rd—"The Toning of Silver Prints," by W. M. Ashman. December 11th—"Avoiding Reflection and Granularity in Copying," by Mr. W. E. Debenham. January 8th—"Instantaneous Photography," by Mr. W. Cobb. February 12th—"A Chat about the Lime-light and Interference," by Mr. Chas. Darker. March 12th—"Some Recent Experiments in Emulsion-making," by Mr. A. L. Henderson. April 16—"Modern Developers," by Mr. W. K. Burton.

Demonstrations have also been given by Messrs. Marion and Co., and Morgan and Kidd, on the printing and development of their new printing papers.

The Lantern Exhibition which took place in the early part of the season, suggested by Mr. W. E. Debenham, for a comparison of transparencies made from the various known processes, although not exhaustive in itself, was the means of creating much interest in other societies, as evinced by the applications received by your secretary for the loan of the original slides.

No better testimony of the excellent work the Association is doing, or surer index of its usefulness, can be cited than the interesting discussions that have followed these papers, giving every encouragement of a good hope that these lecturettes will be maintained in the future, and form a permanent feature in the working of the Society.

Special thanks are due to the lecturers for the time and care bestowed in bringing these admirable papers before the Society. Thanks are also due to and mention made of appreciation for the regular supply each week of the following journals from their respective proprietors:—The PHOTOGRAPHIC NEWS, the *British Journal*, the *Photographic Times*, and the *Scientific American*.

It is with a deep expression of regret that the death of a member has to be recorded—that of Mr. Henry Greenwood—a name well known in connection with the literature of photography. He took a deep interest in the advancement of photography, and although from his position this was never brought into prominence, it is a fact well known to his many friends.

It is always a pleasing duty to acknowledge timely acts of generosity. The want of a dark-room for the more efficiently completing the exhibits of an experimental nature, brought forth a generous offer from Mr. H. Trinks to defray the expenses incidental thereto. A sub-committee was formed for this purpose, who ultimately entered into arrangements with the present proprietor, whereby this object was satisfactorily secured.

The Association has now an excellent dark-room fitted with cupboards, spring roller-blinds, and an efficient water supply, available on each meeting night for the use of the members.

As an additional proof of the great interest taken in the Association, Mr. H Trinks has supplemented this gift by a further sum of five pounds, to be awarded to the member "who should have, during a period of six months, brought before the Society any original article, improvement, or process, of any kind, which shall appear to be of the greatest benefit to photographers in general."

The period just alluded to expires this evening, and the members will be called upon to give their decision in this matter.

It would thus be seen that the objects of the Society have been steadily and effectively maintained, fully justifying the confidence of its members. The great and increasing usefulness of a Society of this kind commends itself to all interested in the wide-spreading art science of photography; and the earnest and good work it has already done should be sufficient to win further favour alike from the professional and amateur.

Upon motion, a vote of thanks was passed to the officers *en bloc* for their services during the year. Votes of thanks were also passed to the proprietors of the PHOTOGRAPHIC NEWS, *British Journal*, *Photographic Times*, and *Scientific American* for copies of their respective journals.

The following gentlemen were then elected officers for the ensuing year:—

Trustees—Messrs. C. Heinrich Trinks, and W. K. Burton.
Curator—Mr. A. Haddon.
Treasurer—Mr. W. H. Prestwich.
Secretary—Mr. J. J. Briginshaw.

A motion in favour of electing a permanent committee was read and discussed. In the resulting ballot four favoured the motion, and there were fifteen against.

The time fixed for awarding the "Trinks Prize" having arrived (see page 831 of the last volume), the following motion was put and carried:—

Proposed that the afternamed be members of a sub-committee in order to weed out processes, and to bring before the Association in committee those which they deem most worthy of competing for the prize:—Messrs. Ashman, Briginshaw, Burton, Cowan, Haddon, and Prestwich were elected.

The business of the annual meeting having concluded,

Mr. GRIMSTON exhibited his patent "Instantaneous Shutter" illustrated on page 416.

Mr. A. L. HENDERSON passed round several prints on glass—imitation opals—made by adding ten per cent of barium sulphate to what he termed his argentic stain; fifteen or twenty per cent. he thought would be better. The results were pleasing, and they were more opaque when wet than dry.

Mr. W. E. DEBENHAM thought the semi-transparency obtained, advantageous for some purposes, as it would lend itself to an application of colour at the back, and in this way better effects could probably be obtained than is the case by the crystoleum process.

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.

THE fourth ramble of the season was arranged for Bolton Abbey and the neighbourhood. Leaving Manchester by train for Skipton, the party proceeded by conveyance to Barden Tower. One or two views were taken of the ruined tower, but real work did not commence until the Strid was reached. Standing beside the Strid, the visitor can look upon the pent-up waters foaming and hurrying through the narrow gulf below; can ramble through the glorious woods which clothe both banks of the stream for three miles upward, and can gaze upon the scenes which inspired the genius of Turner, "the greatest Englishman who ever mixed colours on his palette." The grand old Priory rises before us on a gentle eminence, the rapid river sparkling and murmuring on one side, and hills and woods shielding the other; a combination of pictorial beauty rich and rare.

Over sixty plates were exposed from the Strid to the Abbey; and after a pleasant drive back to Skipton, two more plates were given up to groups of the party posed in the gateway of the Castle.

Manchester was reached at 10 30 p.m., a busy and thoroughly enjoyable day having been spent.

The fifth ramble to Whaley Bridge and Taxal was made under the leadership of Mr. S. F. Flower, and the large number who composed the party on Saturday last were rewarded with glorious photographic weather. Reaching Whaley Bridge a little before three o'clock, the party made its way to the Todd-brook reservoir, one of the store houses of the Peak Forest Canal. Crossing the field, then through the farm, and over the road, a farm buried in the trees which skirt the path to the church at Taxal was reached. Here was the opportunity for unshipping cameras and commencing the business of the afternoon.

Crossing the river Gout, from Cheshire into Derbyshire, the landscape, both up and down the river, is finely wooded, and so varied and pleasing, that the party quickly separated into groups, each one finding something worthy of his best efforts, with still something left to well repay another visit to this delightful neighbourhood.

Birmingham Photographic Society.

The usual monthly meeting was held on Thursday last, at the Technical School, Bridge Street, Mr. Karleese in the chair.

After the usual business had been transacted, Mr. Harrison was called upon to give his paper on "The Objects of the Society" (see page 421). A hearty vote of thanks was accorded for the paper.

Mr. Foster offered a donation of books to the Library, which was accepted with thanks.

An excursion was arranged for Saturday, June 27th, to Salford Priors.

The meeting then adjourned till July 9th, which will be a special meeting.

Notts Photographic Association.

On Thursday, June 18th, a small party of members of the Association participated in the pleasure of a thoroughly enjoyable photographic outing. Fortunately the weather was all that could be desired for the purpose, and the result of eight cameras at work was the exposure of some sixty plates of various sizes. The spot chosen for the occasion was Haddon Hall, Derbyshire, and it need scarcely be remarked that no lack of subject presented itself. On this occasion there was a friendly rivalry for a small prize offered by the President of the Association for the best photographs of Haddon.

The Association, in this its second year of existence, numbers sixty-five members.

Liverpool Amateur Photographic Association.

The monthly meeting was held on the 25th June, Mr. J. H. Day in the chair.

The Hon. Secretary pointed out that, in accordance with the rules, meetings would be held on the last Thursday of each month. He also explained the steps that were being taken in regard to the railway privilege question, and announced that most courteous and hearty promises of help had been received from the majority of the photographic associations in Great Britain.

Some enquiries were made respecting the potash developer advocated by Mr. Beach, and it was resolved that a discussion on various forms of developers should be held at the July meeting.

Mr. H. Norwood Atkins then proceeded to demonstrate to the new members the treatment of platinotype prints, and about a dozen views already printed were *developed*. The simplicity and abruptness of the process seemed to interest all who were previously unacquainted with it; and he was accorded a hearty vote of thanks.

Talk in the Studio.

A Novelist on Photography and its Applications.—George Bernard Shaw makes one of his heroes responsible for the subjoined criticism of photography, and the idea of applying it to the elucidation of certain points of political economy. "The only art that interests me is photography," said Trefusis. "The artists are sticking to the old barbarous, difficult, and imperfect processes of etching and portrait painting merely to keep up the value of their monopoly of the required skill. They have left the new, more complexly organised, and more perfect, yet simple and beautiful method of photography in the hands of tradesmen, sneering at it publicly, and resorting to its aid surreptitiously. The result is that the tradesmen are becoming better artists than they; and naturally so, for where, as in photography, the drawing counts for nothing, the thought and judgment count for everything; whereas, in the old etching and daubing processes, where great technical skill is needed to produce anything that the eye can endure, the execution counts for more than the thought. This is the collection of photographs of which I spoke to you," continued Trefusis, opening one of the books. "I took many of these myself under great difficulties with regard to light—the only difficulty that money could not always remove. This is a view of my father's house—or, rather, one of his houses. It cost seventy-five thousand pounds." The figures were actually written beneath the picture. "This is the drawing room; and this one of the best bed-rooms. You will see jotted down below a note of the cost of the furniture, fittings, napery, and so forth. They were of the most luxurious description. Here is a view—this is the first of my own attempts—of the apartment of one of the under servants. It is comfortable and spacious, and solidly furnished. These are the stables; are they not handsome? There is every luxury that a horse could desire, including plenty of valets to wait on him. You are noting the figures, I hope. There is the cost of the building, and the expenditure per horse per annum. Now we come to more of my amateur photographs. Here is the exterior of a house. Here is a view of the best room in it. Photography gives you a fair idea of the broken flooring, and patched windows; but you must imagine the dirt and odour of the place. Some of the stains are weather stains, others came from smoke and filth. The landlord of the house holds it from a peer, and lets it out in tenements. Three families occupied that room when I photographed it. You will see by the figures in the corner that it is more profitable to the landlord than an average house in Mayfair. Here is the cellar, let to a family for one-and-sixpence a week, and considered a bargain. The sun never shines there, of course; I took it by artificial light. Here is the yard. Seven of the inhabitants of that house worked in my father's mill—that is, their labour created the vast sums of money to which you were disgusted with me for drawing your attention just now. You can see how their condition contrasts with that of my father's horses. The seven men to whom I have alluded, with three hundred others, were afterwards thrown destitute on the streets by this." (Here he turned over a leaf, and displayed a photograph of an elaborate machine.) "It enabled my father to dispense with their services, and to replace them by a handful of women and children. He had bought the patent of the machine from the inventor (who was almost ruined by the expenses of his ingenuity) for fifty pounds. This is a photograph of a lace school. It was a filthy room, twelve feet square. It was paved with brick; and the children were not allowed to wear their boots, lest the lace should get muddy. However, as there were twenty of them working there for fifteen hours a day—all girls—they did not suffer much from cold. They were pretty tightly packed—may be still, for aught I know. They brought three or four shillings a week sometimes to their fond parents; and they were very quick-fingered little creatures, and stuck intensely to their work, as the overseer always hit them when they looked up or——" "Trefusis," said Sir Charles, turning away from the table, "I beg your pardon, but I have no appetite for horrors. You really must not ask me to go through your collection. It is no doubt very interesting; but I can't stand it. Have you nothing pleasant to entertain me with?" "Pooh! you are squeamish; however, as you are a novice, let us put off the rest till you are seasoned. The pictures are not all horrible. Each book refers to a different country. That one contains illustrations of modern civilization in Germany, for instance. That one is France; that, British India. Here is the United States of America."

Eleven Months' Experience with Toughened Glass Beakers. — R. J. Friswell (Proceedings of the Chemical Society) says:—In July, 1884, twenty-one beakers were purchased of the Toughened Glass Company, working De la Bastie's patents. One of these was broken by an accident, and twenty were taken into use in the laboratory of the Atlas Works. They had the form of thin tumblers furnished with a lip. The bottom is about three times as thick as the sides, and weight, for weight, they are two and a-half times as heavy as the Bohemian beaker of about the same capacity. The result of eleven months' use may thus be summarised:—Of 20 beakers—

2 burst spontaneously ... ... =	10 per cent.
1 ,, on hot water being poured in	5 ,,
6 useless from fissures and enfoliation	30 ,,
8 are in good condition	40 ,,
3 have been broken by unknown means	15 ,,
20	100

Taking into consideration the loss of confidence caused by the high percentage of spontaneous bursting, it may be said that toughened glass is a complete failure in the laboratory.

Dr. Vogel's Researches in Colour Photography.—Next week we shall publish an article on "A New System in Heliochromy," by Dr. Vogel, and we shall have something to say about his new book, "Die Photographie farbiger Gegenstände," which has just been published by Oppenheim, of Berlin.

On the Manner in which Light Affects the Resistance of Selenium and Sulphur Cells. By Shelford Bidwell.—In a communication made to the Physical Society at its last meeting, the author described a sulphur cell which behaved in all respects like a selenium cell when exposed to light. The action of this cell was supposed to be electrolytic, the sulphur containing a small quantity of sulphide of silver. If this were the case, the result of a current traversing the cell would be to deposit sulphur upon the anode, and as sulphur has an enormous resistance, that of the cell would increase unless the sulphur thus deposited combined with the silver. It is this combination that is believed to be much facilitated by light, a supposition the author believed he had confirmed by direct experiment. Mr. Bidwell had also measured the resistance of a piece of selenium that was believed never to have been heated in contact with a metal. The specimen was crystallised by heating for some time in a glass mould, two opposite sides cleaned, and two pieces of tin-foil, between which the resistance was measured, pressed against them. In this way the specific resistance was found to be 2,500 megohms, which is enormously higher than that of the selenium in the cells, a fact tending to confirm the theory that the conduction in such cells is due to the electrolysis of the selenides of the metals forming the terminals produced in the "looking," and similar to that of the sulphur cell described above.—*Proceedings of the Chemical Society.*

A Photographic Measure of Fidget.—"Latterly," writes 'F. G.' in *Nature*, "I was present at a crowded and expectant meeting. The communication proved tedious, and I could not hear much of it, so from my position at the back of the platform I studied the expressions and gestures of the bored audience. The feature that an instantaneous photograph, taken at any moment, would have most prominently displayed was the unequal horizontal interspace between head and head. When the audience is intent, each person forgets his muscular weariness and skin discomfort, and he holds himself rigidly in the best position for seeing and hearing. As this is practically identical for persons who sit side by side, their bodies are parallel, and, again, as they sit at much the same distances apart, their heads are correspondingly equidistant. But when the audience is bored the several individuals cease to forget themselves, and they begin to pay much attention to the discomforts attendant on sitting long in the same position. They sway from side to side, each in his own way, and the intervals between their faces, which lie at the free end of the radius formed by their bodies, with their seat as the centre of rotation, varies greatly."

A Cow in a Photograph Gallery.—A strange cow visited Panneberg's photograph gallery in Fred Bentzinger's building, corner of North Avenue and Orchard Street, a few nights ago. She had sauntered lazily down the street, stopping here and there to smell of ash-heaps and other refuse. She stopped before the Bentzinger building, and with head erect and eyes intent, walked straight to a show-case filled with photographs standing at one side of the entrance. After rubbing the plate-glass with her nose for a few minutes, the cow turned, and with a decided air started up the stairs. She ascended two flights, upsetting several boxes on the way, and boldly walked into the photographer's parlour. Police Officer Franzen was called. He and the proprietor timidly entered the gallery and turned on the gas. They were surprised to see a cow standing before the camera munching bits of scenery. They attempted to drive her out. The officer beat her with his club, but she refused to budge. The photographer vainly endeavoured to coax her out with a pail of water. Finally the officer stumbled on an idea. He grabbed the cow's tail and twisted it vigorously. The cow suddenly turned, threw her hind legs in the air, and started for the stairs. She kicked over the pail of water, which fell on the photographer, knocking him down and wetting his clothes from head to foot. The officer clung to her tail and was dragged down the two flights, managing to keep erect, though it is doubtful if his feet touched many stairs on his perilous journey. When they reached the bottom the inquisitive bovine tossed back her heels, sent the policeman sprawling on the sidewalk, and bounded into the street. She has not been seen since. Officer Franzen was considerably bruised, and the photographer's property was damaged to the amount of $15.—*Chicago News.*

Photographic Club.—The subject for discussion on July 8 will be "The Final Washing of Silver Prints." Saturday out-door meeting at West Drayton; trains from Paddington at 2.30 p.m.

To Correspondents.

⁂ We cannot undertake to return rejected communications.

T. R. Young.—Nearly, but perhaps not quite. Apply to Dallas, 12, Crane Court, Fleet Street; or Swan, 58, Farringdon Street.

Gil Blas.—1. Yes, if it is well made and the metal is hard. 2. We have not seen them, but should suggest a careful examination on your part. See page 330 of our volume for 1883.

T. S. W.—1. The best information is contained in Major Waterhouse's articles, which are now appearing in the Photographic News. 2. In this case it is probable that you soaked too long in water. 3. Probably the result of keeping the sensitive material too long, or of drying in a room where gas was burning.

J. W. Lindt.—Your idea is an excellent one, and we wish you every success; but we certainly cannot in any way act as business agents for you. Write direct to the firms you mention—Crosscup and West Engraving Co., Philadelphia, Pa., U.S.A., exploiters of the Ives' process; Sprague and Co., 22, Martin's Lane, Cannon Street, London; and the Meisenbach Company, 31, Farringdon Street, London. Thank you for your proposal to send us an account of your tour.

Zinco.—1. Perhaps you wash off every trace of gum; in applying gum it is well to rub it in thoroughly with a soft sponge, so that it can become well locked up in the roughness of the metal. 2. Quite right; but in ordinary cases the usual letterpress ink will answer well without any addition. Try it. Without seeing your roller, it is not possible to judge. 3. All lithographic materials can be obtained from Winstone, 100, Shoe Lane, London. Write for a list. Also obtain Richmond's Grammar of Lithography; it only costs a few shillings, and is published by Wyman, of Great Queen Street, London. 4. It is better to brush it away. 5. You can see the operation of etching the zinc at the Inventions' Exhibition.

W. T. J. (Coggeshall).—Thank you for the communication. You will find a special series of articles in our volume for 1882, pages 673, 690, 706, 738, 770; and also much information in Abney's "Instruction in Photography." Let us know how you progress in the special work your have in hand.

E. G.—There is no law that will help you, as the copyright of the picture was not protected; but in several similar cases the aggrieved parties have taken the matter into their own hands by destroying the photographs and chastising the offender. In one such case the person so acting was ordered to pay the mere value of the cardboard on which the photograph had been mounted.

Forester.—1. It is merely carbonate of soda (washing soda) in small granular crystals, and it is only a matter of convenience to use this instead of large crystals. 2. We will try to get it for you; but are doubtful of being able.

J. J. S. C.—It is probable that you either over-heat the mixture, or do not sufficiently clean your vessels from all traces of previous batches.

M. E. D.—1. Our impression is that he resided in Philadelphia lately, but we have not his address. 2. If it is not in accordance with description, you had better return it.

W. Gamble.—1. Your experience accords with that of many others, and we think you had better continue to employ the wet process for such work. The specimen is very satisfactory, and we shall be glad to have a block for insertion in the News, together with a description of the process. 2. It is very likely it is so. 3. We do not think it is good, and it is certainly more difficult. 4. You cannot buy it ready made. Thank you for your good wishes and intention of sending the results of your experience.

A. E. S.—It is a collotype print. See Year-Book page 124.

The Photographic News.

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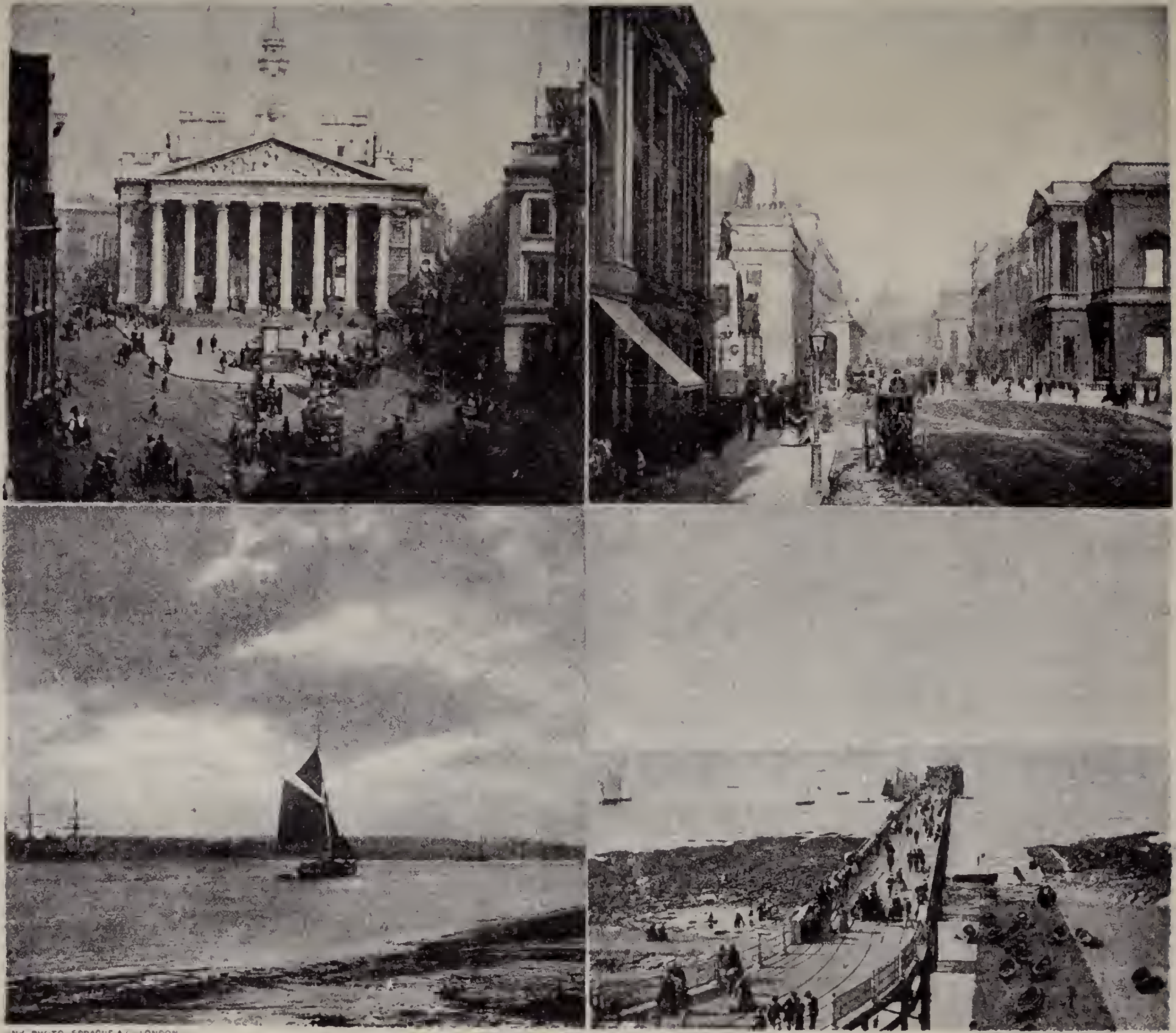

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INSTANTANEOUS PHOTOGRAPHS TAKEN ON WET COLLODION PLATES.
VALENTINE BLANCHARD, 1862-1863

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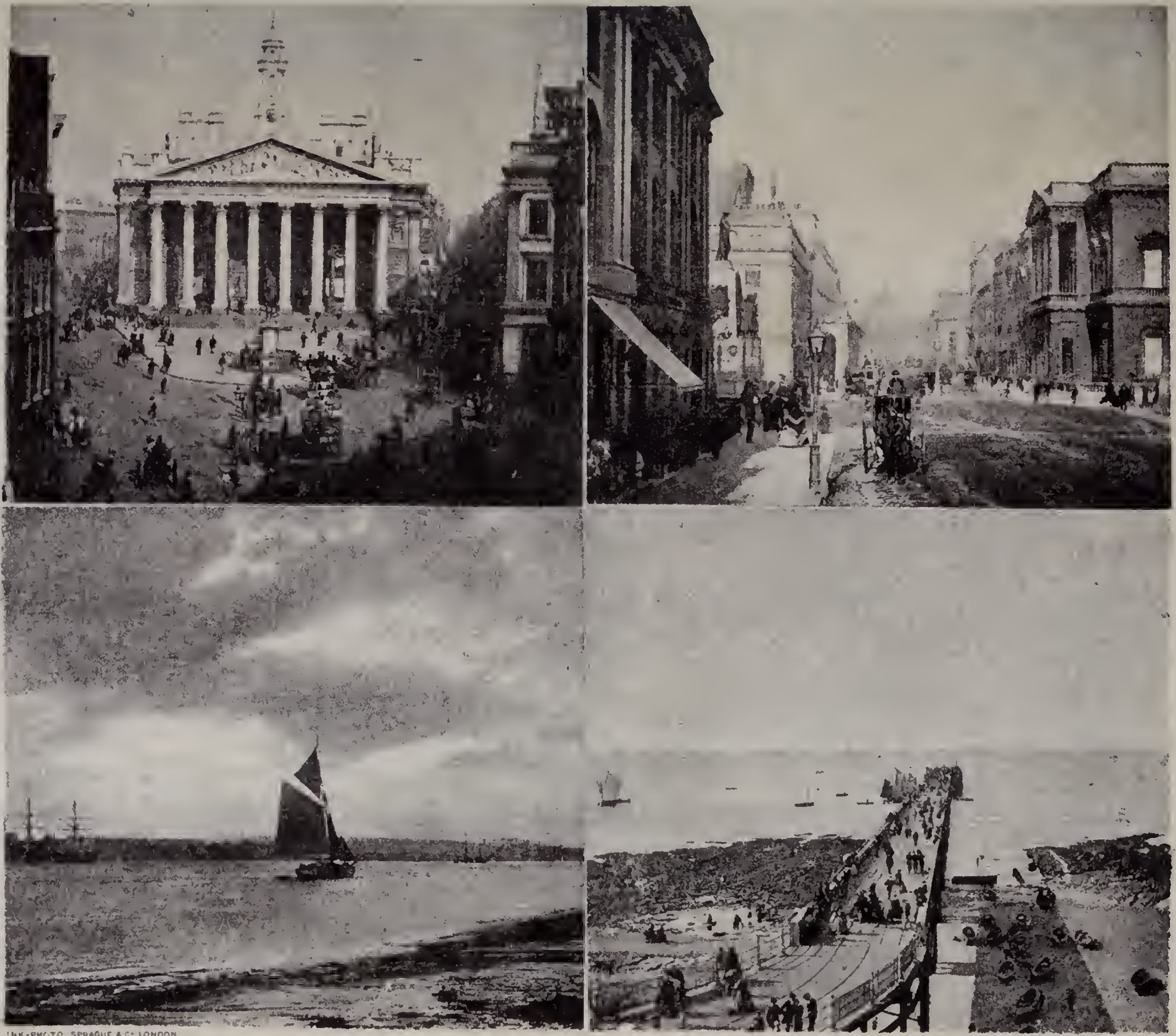
SUPPLEMENT TO "THE PHOTOGRAPHIC NEWS" 3RD JULY, 1885.



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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1401.—July 10, 1885.

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A FINDER ON THE CAMERA.

THE simplest finder, and one which will serve to enable the operator to follow a moving object along its path, consists merely of a pair of sights, like gun sights, attached to the top of the camera, and the adjustment of these is an extremely easy matter.

A small brass screw eye, with a hole about a quarter of an inch in diameter, is screwed into the top of the camera close to the back, and so as to be immediately over a continuation of the axial line of the lens; after which a second screw eye is screwed into the top of the camera towards the front and immediately over the lens mount. To adjust these sights the camera is placed on a stand, so that the image of some small and easily recognizable object situated at a distance of about fifty times the focal length of the lens falls upon the central portion of the ground glass, and if on taking a sight through both screw eyes the object selected is centrally situated in the line of sight, no further adjustment will be required. If, however, this should not be the case, one or the other of the screw eyes should be raised, lowered, or shifted sideways, until the adjustment is sufficiently accurate.

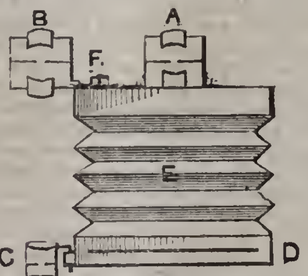
Of course the vertical adjustment is a very simple matter, as either eye can be raised or lowered by screwing it in or out; but should a horizontal adjustment be required, a fresh hole would have to be made in the camera. Considering this, it is desirable not to screw in the second eye until its position has been determined by ascertaining that a line of sight taken through the first screw eye, and over the proposed position for the second, corresponds in horizontal position with the object focussed on the central part of the ground glass.

Even when no sights are fitted to the camera, a fairly good aim may generally be made by taking a sight along one of the upper edges of the apparatus.

When the finder is to be used for accurate focussing as well as for finding the position, nothing is superior to the following, and we quote the description from a previous number of the NEWS.

Let E represent a camera. Bolted to the front, and in the position shown in the diagram, is a duplicate objective, B, this objective being of the same equivalent focal length as the working objective, A; but it is by no means essential that it should correspond as regards construction or as regards excellence of optical work. The image formed by the finder object glass is either viewed by means of an astronomical eye-piece (*c*), or, if preferred, an erecting eye-piece may be used. In either case, the most convenient method of obtaining the eye-piece is to purchase a low-priced second-hand telescope (not a Galileo telescope or opera glass), and to appropriate the eye-piece, either retaining or rejecting the erecting lenses as may seem convenient. The eye-piece is bracketed on to the side of the camera as shown in the sketch, and it is convenient to retain a small piece of the outer mounting tube, so that the eye-piece will slide to the extent of about a quarter of an inch.

To adjust the finder, a card is marked with two distinctive characters—say a cross and a circle—the centres of these being as far apart as the centres of the two objectives. This is placed at about thirty feet from the apparatus, and the camera is shifted until that character which is opposite the working objective is focussed exactly on the centre of the ground glass. The finder objective and its eye-piece are now shifted either by packing small pieces of paper under the supporting plates, or by other suitable means, until that character which is opposite the finder is seen sharply defined in the middle of the field.



The final adjustment for focus is best made as follows, and it corrects all errors as to adjustment of the ground glass in its frame, the actinic correction of the lenses, and the personal characteristics of the user's vision. Place a number of cards one behind the other, and each a little higher than the previous one—the arrangement being similar to the risers of a staircase—and focus the middle card. Without disturbing the apparatus, now take a photograph of the cards, and note which card appears most sharply defined in the series. Next adjust the eye-piece in its sliding tube until that card which was best defined on the picture appears to the eye with the best definition. This being done, it is merely necessary either to fix the eye-piece in its sliding tube by a touch of a solder, or to rule a line so that the position may be found again when required.

As the "accommodation" of the eye may occasionally interfere with the extreme accuracy in focussing with this arrangement, readers should refer to Mr. Jackman's article on the subject, page 388 of our issue for June 19th.

THE WOODBURY FUND.

THE final meeting of the Woodbury Fund Committee was held on Thursday, July 2nd, at 74, New Oxford Street, Mr. James Glaisher, F.R.S., in the chair, at which the accounts of the treasurer were audited and passed, and the balance in hand forwarded to Mr. Woodbury.

The total amount received has been £316 15s., a considerable portion of which was expended in carrying Mr. Woodbury over a period of three months' serious illness;

but the Committee had the satisfaction to know that his health and strength were now greatly restored, enabling him to recommence with fresh vigour the prosecution (to successful issue, it is hoped) of some inventions in hand, one of which was made the subject of a patent during his illness.

The special services of Mr. E. S. Bent, who may be said to have originated the Committee, and of the Treasurer, were acknowledged, and the Chairman was thanked for his constant and influential assistance on the Committee, which it was agreed to dissolve, the Treasurer, Mr. Bird, undertaking to receive and convey to their destination any further contributions that might arrive from abroad.

We are asked to publish the list as below of subscriptions not hitherto publicly acknowledged :—

Fry, Samuel	£5	5	0
Unwin Brothers	1	1	0
Harding Warner and Co.	1	1	0
Kmikler, Edward C. E., Bâle	1	1	0
Chesterman, C. T., St. Petersburgh	1	0	0
Seamoni, Georg, St. Petersburgh	1	0	0

Mr. Woodbury has addressed the following to Mr. James Glaisher, the Chairman of the fund :—

"Dear Sir,—Allow me, through you, to return my most heartfelt thanks to the members of the Committee for their spontaneous efforts on my behalf.

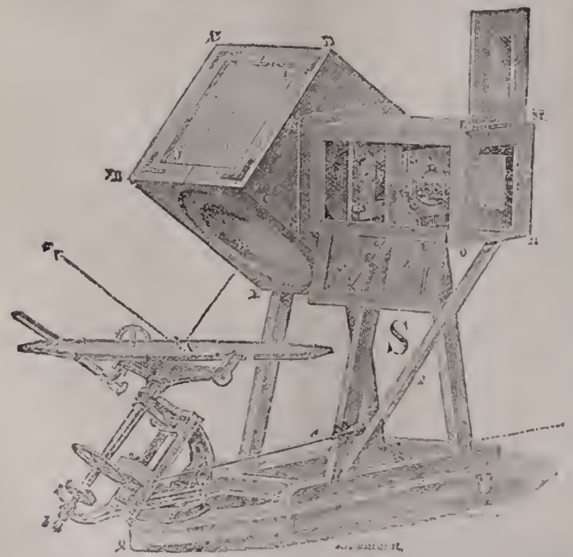
"To you as Chairman, the Treasurer, and the Honorary Secretary, my thanks are especially due for your arduous and unremitting exertions. The Treasurer's labours have been performed with that care and promptitude for which he is so well known.

"I must also thank the Photographic Press for the kind manner in which they aided the Committee. And last, but not least, I must thank my friends and the members of the different Photographic Societies, and the subscribers generally, for their generous response to your appeal, and I am happy to say that it has been the means of materially restoring my health and strength."

◆

MONCKHOVEN SOLAR CAMERA.

The annexed illustration represents the solar camera with special heliostat, designed by the late Dr. Van Monckhoven, and the arrangement created considerable interest in the photographic department of the Belgian section.



In this apparatus, instead of the reflecting mirror being tilted to a considerable extent, it is set in nearly horizontal position ; but one of the lenses of the condenser is fixed at an angle of about 45 degrees. The mirror is so set that the solar rays are directed through the centre of the first half of the condenser H, then, impinging against the silvered glass, B D, the rays are reflected horizontally through the second condenser U, the negative V, the lens X, and finally on to the sensitive film destined to receive the enlarged image.

It is claimed for this apparatus, that it is equally serviceable at all periods of the year, for the mirror being always set in a nearly horizontal position, it is capable of including a very much wider angle of view. Thus, without alteration, the same apparatus could be used either on the 21st of December, when the sun appears at its lowest ; or, again, on the 30th of June, when it is at its highest.

◆

A NEW HELIOCHROMIC PRINCIPLE.

BY DR. H. W. VOGEL.

In the heliochromic processes of Ducos du Hauron, or of Albert, three negatives are taken through violet glass, green glass, and orange glass respectively, and from each of these a collotype plate is made, and printed with a colour complementary with that of the glass, the three coloured prints being, as is well known, superimposed on the same surface. In this method, it should be noted, no very great progress has been made ; but it may be mentioned that Ducos du Hauron used eosine collodion in taking all three negatives, no matter whether through red, green, or yellow glass.

Now eoside of silver is sensitive primarily for green, less for violet, and least of all for red, and is, therefore the worst material when the medium is red glass ; and one can hardly recognise it as the best when blue glass or violet glass is employed, as the special green sensitiveness is not utilised.

For exposures through blue glass, pure bromide should be the best material ; while when red glass, cyanin gelatine plates are indicated.

Another fault of the Ducos method is the apparently arbitrary nature of the selection of printing colours. The rule that the negative exposed through glass of any given colour should be printed in a complementary colour is inexact, and allows wide latitude. One may say that the complementary colour of red is green ; but the kind of green is undetermined. As a matter of fact, the complementary colour of a certain red is rather blue than green. The author proposes the following.

1. That instead of one single sensitizer being used, that this should be varied according to the colour of the glass used as a medium.

2. That the optical sensitisers shall themselves be used as the printing colours ; or, if this be not practicable, that colours having the nearest spectroscopic relations to them be selected.

This last condition will be understood when one considers that the printing colours must reflect those rays which were not absorbed by the sensitive plate.

Up to now we have available a relatively small number of optical sensitisers ; but chemical science is constantly bringing new colouring matters to the front, and many of these promise well. Many things which appear difficult to-day, either from an optical or chemico-technical point of view, may be mere bagatelles in ten years' time. Then will the colour-sensitive process in photography, and the method of printing in several colours, become a real boon.

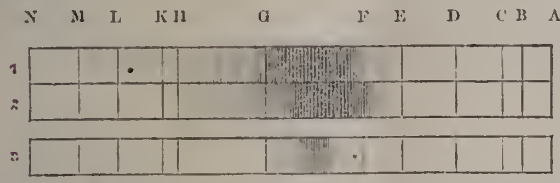
◆

SPECTROSCOPIC RESEARCHES ON NORMAL-LIGHT SOURCES, AND THEIR APPLICATION IN THE MEASURING OF PHOTOGRAPHIC SENSITIVENESS.

BY DR. J. M. EDER.

As a standard of comparison in measuring the intensity of various sources of light, Hefner-Altenek, and Siemens, have proposed to use a flame produced by burning amyl-acetate at a wick of 8 m.m. diameter; this wick being adjusted so that the flame is 40 m.m. high. Abney and Schumann propose to use this standard flame to determine the photographic sensitiveness of photographic preparations —in fact, as a sensitometric standard.

In order to determine the usefulness of the amyl-acetate lamp for photo-chemical purposes, I photographed the spectrum of its flame by means of the large Steinheil spectrograph, and compared the intensity of individual parts of the spectrum with that of corresponding parts of solar or other spectra. The following figure shows the results.



1. Solar spectrum photographed on bromide of silver. 2. Spectrum of the burning amyl-acetate, photographed on bromide of silver. 3. Spectrum of phosphorescent sulphide of calcium.

In the case of No. 1, it will be seen that the maximum of action is about midway between G and F, while the action extends far beyond the visible violet—indeed, into the ultra-violet as far as M.

The amyl-acetate spectrum (No. 2) does not extend nearly so far into the ultra-violet; indeed, is very weak even in the visible violet (G to H), while the maximum of action lies much nearer F than in the previous case. When the exposure is prolonged, the intensity of the image increases towards the green; but the action in the violet and the ultra-violet is always relatively feeble. From this, one may conclude that the burning amyl-acetate emits light which is relatively poor in the violet and ultra-violet rays (that is to say, in comparison with sunlight).

When the flame of an ordinary gas jet is photographed by means of the spectrograph, a result is obtained which is very similar to that obtained in the case of amyl-acetate; it shows, however, a somewhat greater relative brightness in the violet.

These results confirm the observations of Crova, Pickering, and others who have experimented on the optical brightness of flame-spectra by means of quantitative spectral analysis.

Next in order comes the consideration of the blue phosphorescent light of sulphide of calcium (Balmain's luminous paint), which substance Warnerke has introduced as a normal light in his sensitometer, an instrument largely used in practice. The third figure shows the whole extent of the spectrum of the phosphorescent sulphide: this being confined to a narrow band between G and F in the blue. Abney, who has also investigated this spectrum, noticed a second, but much weaker, band between E and C; but V. Schumann, who has also worked in this direction, was —like myself—unable to detect any action in the red or the yellow.

(To be continued.)

ARTISTIC FEELING IN PHOTOGRAPHY.

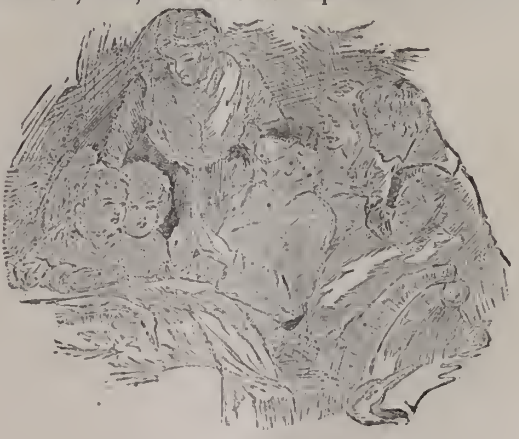
BY A. H. WALL.

Part IV.—Grouping in Portraiture.

I remember hearing Mr. O. G. Rejlander say, in the course of a discussion on theory *versus* practice in art study, some twenty or more years ago: "In composition the thought must take foremost place; everything else is but the language in which it finds forcible or feeble utterance." He afterwards added, "The thought first, the language to express it in afterwards. First catch your hare," quoting Mrs. Glass (who, by-the-bye, as a matter of fact, never did write those now memorable words). And he gave silent, but not less forcible expression to his idea in a thoroughly practical shape, when, at the close of the discussion, he exhibited his photographic study of a single figure called "Grief," and explained how he made this picture, by its low scale of subdued tones, blend with the pose to assist in expressing forcibly the original thought's natural sentiment and feeling. He used the light as a painter would his brush, toning down the whites, giving depth to the darker shadows, softening harsh contrasts, and obscuring outlines which were too prominent or hard, giving that quietly solemn twilight effect which is always associated in the mind with pensive thoughts and feelings. I afterwards had the opportunity of comparing the print so treated with one printed in the ordinary mechanical way. The difference was most remarkable, the latter being, in comparison, quite poor and common-place, fine as it was in all other essentials of a picture—gracefulness and unity of outlines, breadth of light and shade, expression in pose, arrangement of flowing drapery, and composition generally.

The Thought thus elevated into dominance, not only by Mr. Rejlander, but by many other clever young painters, sculptors, and one eminent young architect present on that occasion, is precisely the element most frequently missed by photographers in grouping a number of figures. The only idea they generally express is that of being photographed. Stationed more or less in a line, with some standing and some sitting by way of variety, there the figures are, and on every face you read, "Now then, be quite still!" which, interpreted by the photographic result, might be, "Let us appear as little like life as we can." But given some thought in the expression of which each person depicted plays a characteristic or individually-expressive part, and the work of effective artistic grouping at once becomes simplified; the actors fall naturally into their relative places; there is unity of idea without monotony variety, sentiment, and feeling, which is yet subjective to the dominant thought, and a result which is indeed very different from the utterly unanimated one, that which we may call the "now-be-quite-still" idea. In three words it tells a story. As the thought, by the feeling it inspires, suggests suitable language in speaking or writing, so does it suggest suitable treatment in art.

And this brings me to my first pen-and-ink sketch—a group of six figures from a painting by Millais in this year's R.A. exhibition, where the Thought is put before us very forcibly in a group admirable for its composition, sentiment, and feeling. Nominally it is not a portrait group, but in reality I believe it is, being the family of Mr. Barlow, R.A., who is himself represented surrounded by his children. It is the picture from which I gave a pen-and-ink sketch to illustrate my last paper.



GROUP FROM MILLAIS' PICTURE, "THE RULING PASSION."

A simpler group, consisting of two figures—always particularly difficult to put together expressively—is taken from a picture which was exhibited by G. D. Leslie, R.A., in the Academy Exhibition of 1879. Here the idea expressed was that of a mother reading to her child from "Alice in Wonderland." The value of the original thought was not merely in the reading of a book to the little one, but in the reading this particular book, the effects of which on the mind of the child, and her consequent expression, can be easily imagined by those who remember that very clever original story. Mr. Leslie caught but part of this effect. His child-model was listening intently—palpably—absorbed and interested, but she was hardly deep enough in "Wonderland." Could a photographer catch such an expression? I see no reason why he should not. But the process of catching the metaphorical and proverbial "hare" would be very different from that commonly adopted. It certainly would not be done by merely posing a couple of unimaginative, uninterested, or unappreciative models, and giving one a book to hold open as if reading. Rejlander's principle would have to be adopted; given a good reader and an intelligent imaginative child, the expression wanted should be actually created, and until the very quiet, and if possible, unseen operator saw it, he should leave his plate unexposed.

GROUP FROM G. D. LESLIE'S "ALICE IN WONDERLAND."

GROUP FROM ROMNEY'S PICTURE OF "LADY WARWICK AND HER CHILDREN."

Romney, a fashionable last-century portrait painter, the son of a cabinet maker, who began his career as an itinerant artist, and whose pictures now figure in many world-famous collections, will supply us with another example of grouping. Here, again, we have two figures, of which my sketch must be accepted as a mere suggestive memorandum; but in the original there are three. The mother is in the attitude of listening to the child who is speaking, and the posing of both is charmingly expressive of the loving tenderness which unites them. The thought is here simple enough, but it is full of feeling. The original work, a portrait of Lady Warwick with her two children, is in the family picture gallery of the Earl of Warwick; but engravings from it are abundant and well-known. Here I can only give you some idea of the posing; all the rest will depend upon the feeling with which the artist inspires his models and treats his subjects.

Review.

Dr. Vogel's Hand-Book of Orthochromatic Photography.*

Few matters have so much occupied the attention of the photographic experimentalist of late as a study of the methods by which coloured objects can be photographed so as to represent all the colours in an approximately just degree of intensity, and no worker has made this subject so peculiarly his own as Dr. Vogel.

The work before us is a comprehensive one, consisting of a hundred and fifty octavo pages: also a coloured inset with photographic reproductions, intended to show the remarkable difference as regards colour sensitiveness which exists between an ordinary dry plate and an azaline plate.

The whole question of isochromatic photography is dealt with in a thoroughly practical manner, but theoretical considerations are by no means neglected, and we heartily advise any reader who is likely to have occasion to photograph oil paintings to read and to carefully study all that Dr. Vogel has to say.

Kelly's Directory of Chemists and Druggists. (51, *Great Queen Street, London, W.C.*)

The new edition of this work is calculated to be of value and interest to photographers, as it not only includes those who are ordinarily known as "chemists and druggists," but also manufacturers of and dealers in chemical products and scientific apparatus throughout the country.

IS COSTLY APPARATUS NECESSARY FOR THE PRACTICE OF PHOTO-MICROGRAPHY?

The above subject was suggested to us by the perusal of two articles which have recently been published—very nearly simultaneosuly—one in England, the other in America. The latter was the very able and exhaustive "communication" of Mr. W. H. Walmsley to the New York Amateur Society (May 12), on "Photo-Micrography by Lamplight;" the former, a short article by Mr. Selimo Bottone, in the Photographic News of May 8th.

It may be as well to remark here, that we are now dealing solely with apparatus for working with artificial light; the elaborate machinery and fixtures necessary for utilizing sunlight, as described by Dr. Miller in his lecture on the "Theory and Practice of Photo-Micrography," read before the Photographic Section of the American Institute, placing that method of working out of reach of any but the most fortunately situated amateurs. However, the main point in controversy will apply equally in this case, seeing that it is a question of objectives. The entire microscope, according to the list of requirements set forth by Mr. Walmsley, would be of the most costly kind; and, if this gentleman had been writing for professional microscopists, doubtless his recommendations are sound; but, seeing that his communication was addressed to an amateur society (although, as we are fully aware, that society numbers among its members several eminent physicians and professional men), we are inclined to think his remarks will have a tendency to discourage many from embarking in this fascinating amusement who might otherwise have been disposed to do so.

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* "Die Photographie farbiger Gegenstande in den richtigen Tonverhaltnissen," von Dr. Prof. H. W. Vogel. (*Berlin: Robert Oppenheim.*)

Passing by the other features of the instrument, however, let us consider that of objectives. Mr. Walmsley insists that "the objectives should be the *very best*, specially corrected for photography in all powers under 1-5," and specially recommends the very expensive lenses made by R. and J. Beck (*for which he happens to be agent*) as fulfilling the essential requirements.

Now, while Mr. Walmsley is, we believe, an amateur so far as photo-micrography is concerned, yet he has had peculiar facilities for obtaining costly apparatus, such as are enjoyed by few amateurs. We have been favoured with an opportunity for inspecting some of Mr. Walmsley's work, and feel compelled to admit that it is simply magnificent; how far its excellence is to be attributed to the use of high-class apparatus, and how far to the individual skill of the operator, we are not in a position to judge; but, from comparing it with results achieved by some other operators of our acquaintance, who are also provided with expensive outfits, it seems reasonable to give the lion's share of the credit to the latter element.

We are disposed to think that Mr. Bottone has made out a pretty strong case for the cheap objective; but we should be glad to hear from any of our readers who may have experimented with similar lenses.—*The Chicago Eye.*

ACTINISM AND THE BIRTH OF PHOTOGRAPHY.

BY PROFESSOR CHARLES F. HIMES, PH.D.*

The branch of science which considers the chemical changes produced by the action of light—named, many years ago by Herschel, Actino-chemistry—has been so developed within recent years, that it has won its way to recognition as a most important, as well as interesting, field of investigation. But, apart from its intrinsic interest, there seems to be an especial appropriateness in its consideration at this time, and in this place. Electrical illumination has converted night into day upon your streets, has rendered your shopkeepers independant of sunlight; and it promises, also, by reason of its richness in those very rays that effect chemical changes, to render those who employ the actinic power of light equally independent of the variable and uncertain light of the sun.

Our treatment of the subject this evening must necessarily be controlled by the limited time at our disposal, and it has seemed to me that the most may be accomplished by adopting as a general plan, as indicated in the syllabus, first, a rapid survey of the leading facts, as they present themselves in the development of the science and the illustration of these by typical experiments, and then a consideration of these, as far as possible, in their connection, as explained by the wave theory of light. Uniform treatment of the subject is almost as necessarily excluded as exhaustive treatment, and it will be found necessary to pass by features of the highest interest, and possibly of even greater importance than those presented, without even an allusion. Again, whilst photographic processes and manipulations, as such, do not constitute the subject for our consideration, we will find it convenient, and even necessary, at times to employ the terms and processes of photography; but we will do so only in so far as they may assist in the discussion of those general facts and principles that constitute the scientific basis of all photographic practice.

The fact that a pure white compound of silver, called by the alchemists horn silver, by us silver chloride, darkens in the light, was the first observed chemical effect of light, and occupies, in this connection, the same place that the attractive power imparted to amber by friction occupies in the history of electrical science.

I have here, in a protected roll, a piece of paper, coated with a thin layer of this substance. I unroll it, as you see, in the mellow light of these incandescent lamps, without any precaution whatever. That light, comfortable as it is to the eye, is comparatively feeble in its effect upon silver chloride. But Mr. Knapp will expose it for a short time to the light of our arc lamp, and, that any effect produced may be more readily noticed, I will first cover it with this cardboard with a design cut out of it, so that a portion of the paper will be completely protected, whilst the other portion will receive the full effect of the light, and we may thus have the advantage of the contrast. In giving this fact the prominence I do, as the first observed in this connection, I do not, of course, ignore the general observation of the effect of light upon animal and vegetable life. That forced itself upon the attention of man in all ages. The necessity of light for healthy animal and vegetable growth, for the production of colour in the flower and bloom upon the fruit, of course could not be overlooked. But in all these cases the action of light is so complicated with so-called vital processes, controlled by so-called vital force, that there is scarcely a hint at its action *per se*. The darkening of this compound, noticed as well by miners in an ore of silver as by the alchemists in a laboratory preparation, was unique, in that it was entirely uncomplicated with mysterious vital processes, in that it was purely a laboratory experiment that invited investigation by ordinary methods.

You notice now, as I uncover this paper, returned to me after exposure, as you have seen, to the light of the arc lamp, how the unprotected portion, represented by the design cut out of the cardboard, has been decidedly darkened. This has been accomplished in less than a minute. Any one conversant with photographic practice will understand what that means, and will be surprised at the wonderful actinic power of this arc lamp. For this substance darkens but slowly in diffused sunlight. Now, just as the isolated observed fact in electricity awaited Gilbert to expand it into a branch of science, so this fact waited until, about a century ago, Scheele, the eminent Swedish chemist, undertook its systematic investigation, and did for actino-chemistry what Gilbert had done for electricity. He explained the change effected by light, *practically*, as we understand it to-day, as a separation of chlorine. But he did more. The query arose in his mind whether all the rays of sunlight were equally effective. He investigated the problem experimentally. Availing himself of the beautiful discovery of Newton, he threw, by means of a prism, the parti-coloured band of light called the spectrum upon the floor of the room, and in it placed powdered silvered chloride. He found the effect greatest at the blue end. We have not sunlight at our disposal to repeat the experiment as he did, but we will avail ourselves of our arc light, which we have already tested as to its actinic power. The beautiful spectrum you now see upon the screen is similar to his. In it we will now test the actinism of the extreme ends—the blue and the red portions. We will employ an ordinary photographic glass plate, sensitive to light, so that the result can be exhibited by the lantern upon the screen. But first, in this case, all our incandescent lamps must be turned off. The reason for this will be apparent as we proceed. Now, as you see, one end of the plate is exposed behind one-half of a stereoscopic negative in the red end of the spectrum, and now the other half is held in the same way in the blue end of the spectrum. The exposure in each case has not exceeded thirty seconds. I now pass our plate to be developed, with the request that the developed plate be exhibited to us, in time, by means of the lantern upon the screen. Whilst we await the result I will consider some very natural queries that may have arisen. Why is this experiment conducted so differently from that of a moment ago? Why are the results not exhibited at once, as then? What is implied in this connection in the word "developed?" I would simply say, first, that not the slightest trace of the action of light would have been visible upon the plate just exposed, upon either end, even upon the closest and most careful examination. But, secondly, in response to proper chemical tests, called developers, an invisible effect, sometimes called a latent effect, or image, will become visible, that is, of course, if it has been produced.

It is the possibility of the production of such an invisible latent, but developable effect of the action of light that constitutes the grand discovery of Daguerre, a discovery that may well be regarded as the initial fact of modern photography, and one that renders Daguerre the central figure around which the facts in photographic history most naturally group themselves. In this statement I have no disposition to deny or detract from the merits of other investigators in this direction. After Scheele, almost every chemist and physicist of eminence had experimented to some extent with compounds sensitive to light. Among them, Davy, Wedgewood, Wollaston, Herschel, Niépce, Talbot, and many others whose names we cannot even take time to recall. Many of these, or most of them indeed, worked much more scientifically than Daguerre; many of them had a great measure of success in some directions; but all efforts to fix an impression of the image formed in the camera obscura upon a sensitive surface were practically failures up to the time of Daguerre's discovery. It may, therefore, be allowable to give a more detailed account of it, in order to emphasize its historic prominence.

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* A Lecture delivered at the International Electrical Exhibition. Abstract from the *Photographic Times*.

Daguerre was a scene printer in Paris, and an artist of considerable merit, and highly successful in his profession. About 1824 he was first seized with the infatuation to fix permanently the evanescent pictures of the camera, which he employed to assist him in his profession. Nothing already accomplished in that direction seems to have incited him, or encouraged him.

And now let us return to the history of the discovery of this developable effect. Some portions of it remind us of those little bits of embellishment often thrown around the history of science, as well as civil history. I would hesitate to give it had I not strongest ground for belief in its authenticity. No alchemist had ever gone to work at a more unpromising task than that Daguerre had imposed upon himself. As years rolled on the passion only took deeper hold upon him. In spite of utter failures and discouragement of all kinds for years, in loneliness and in secrecy, suspected of mental weakness, even by his wife, he kept on in the same line of experiment. Finally one of those accidents that only strike men who work their way across their path brought him most remarkable success. One of his methods, in brief, was to subject polished plates of silver to the vapour of iodine until they became coated with a creamy film of silver iodide, then to expose this surface to the image in the camera; but always without the hoped-for effect. The plates thus exposed, were then stowed away in the rubbish closet until the supply was exhausted. They were then taken out, re-polished, and re-posed in the camera with the same discouraging results. Upon one occasion, on removal of the plate from the rubbish closet, he found upon it, to his great surprise, the very image that had fallen upon it in camera. He proceeded to investigate. He exposed another plate in the camera, and placed it in the closet with a similar result. Then exposing one plate after another in the camera, and each time removing from the closet some article before stowing the plate in it, each time he found upon it the same faithful delineation of his camera picture. At last everything had been removed, and still the exposed plate placed in the closet exhibited the developed image. Some mercury spilled upon the floor of he closet alone remained. The magician was detected. The vapour of mercury developed the invisiable or latent image on the exposed iodized plate. For some reason or other, the mercury adhered to the portions acted upon by the light, and in proportion to the action of the light, thus rendering faithfully all the gradation of tones. The excitement in the scientific world upon the announcement of the success was intense. Capital, however, hesitated to patronize the invention; but Arago, struck with the exquisite beauty of these first Daguerreotypes, and the promises of the discovery, undertook its advocacy, and the French Legislature pensioned Daguerre and his co-laborateur Niépce, that it might present the invention as a gift to the world. The formal announcement of the process was made before one of the most brilliant assemblages of the French capital. But it may be asked:—"After all, what was there so important in the discovery of an invisible effect that needed development?" The great value lay in the rapidity with which this developable effect could be produced. Hours required before to produce the feeblest visible effect were now reduced to minutes, and even seconds. It was permitted to hope that portraits would become possible. The first successful attempts at photographic portraiture were not, however, made by Daguerre, but by that remarkable man, Dr. John W. Draper, of New York. By his previous careful scientific investigations, he was prepared at once to see the importance of Daguerre's discovery, and to utilize it. But these compounds as then produced were comparatively so slow to receive even the latent effect, that the subject was obliged to sit with powdered face in the bright sunshine.

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THE SUN'S ENERGY.

BY PROFESSOR S. P. LANGLEY.*

It is not necessary, however, that a body should be moving rapidly to develop heat, for arrested motion always generates it, whether the motion be fast or slow, though in the latter case the mass arrested must be larger to produce the same result. It is in the slow settlement of the sun's own substance toward its centre, as it contracts in cooling, that we find a sufficient cause for the heat developed.

This explanation is often unsatisfactory to those who have not studied the subject, because the fact that heat so generated is not made familiar to most of us by observation.

Perhaps the following illustration will make the matter plainer. When we are carried up in a lift, or elevator, we know well enough that heat has been expended under the boiler of some engine to drag us up against the power of gravity. When the elevator is at the top of its course, it is ready to give out in descending just the same amount of power needed to raise it, as we see by its drawing up a nearly equal counterpoise in the descent. It can and must give out in coming down the power that was spent in raising it up; and though there is no practical occasion to do so, a large part of this power could, if we wished, be actually recovered in the form of heat again. In the case of a larger body, such as the pyramid of Ghizeh, which weighs between 6,000,000 and 7,000,000 tons, all the furnaces in the world, burning coal under all its engines, would have to supply their heat for a measurable time to lift it a mile high; and then, if it were allowed to come down, whether it fell at once or was made to descend with imperceptible slowness, by the time it touched the earth the same heat would be given out again.

Perhaps the fact that the sun is gaseous rather than solid makes it less easy to realize the enormous weight which is consistent with this vaporous constitution. A cubic mile of hydrogen gas (the lightest substance known) would weigh much more at the sun's surface than the great pyramid does here, and the number of these cubic miles in a stratum one mile deep below its surface is over 2,000,000,000,000! This alone is enough to show that, as they settle downward as the solar globe shrinks, here is a possible source of supply for all the heat the sun sends out. Exacter calculation shows that it is sufficient, and that a contraction of 300 feet a year (which in 10,000 years would make a shrinkage hardly visible in the most powerful telescope) would give all the immense outflow of heat we see.

There is an ultimate limit, however, to the sun's shrinking, and there must have been some bounds to the heat he can already have thus acquired; for—though the greater the original diameter of his sphere, the greater the gain of heat by shrinking to its present size—if the original diameter be supposed as great as possible, there is still a finite limit to the heat gained.

Suppose, in other words, the sun itself and all the planets ground to powder, and distributed on the surface of a sphere whose radius is infinite, and that this matter (the same in amount as that constituting the present solar system) is allowed to fall together at the centre. The actual shrinkage cannot possibly be greater than in this extreme case; but even in this practically impossible instance, it is easy to calculate that the heat given out would not support the present radiation over 18,000,000 years, and thus we are enabled to look back over past time and fix an approximate limit to the present age of the sun and earth.

If we would look into the future, also, we find that at the present rate we may say that the sun's heat-supply is enough to last for some such term as four or five million years before it sensibly fails; for so long as the sun is purely gaseous, it actually grows hotter instead of cooler as it contracts; that is, there is less potential but more actual heat in it. It is certainly remarkable that by the aid of our science, man can look out from this "bank and shoal of time," where his fleeting existence is spent, not only back on the almost infinite lapse of ages past, but that he can forecast with some sort of assurance what is to happen in an almost infinitely distant future, long after the human race itself will have disappeared from its present home. But so it is, and we may say—with something like awe at the meaning to which science points—that the whole past of the sun cannot then have been over 18,000,000 years, and its whole future radiation cannot last so much more. Its probable life is covered by about 30,000,000 years. No reasonable allowance for the fall of meteors or for all other known causes of supply could possibly raise the whole term of its existence to 60,000,000 years.

This is substantially Professor Young's view, and he adds:—"At the same time it is, of course, impossible to assert that there has been no catastrophe in the past—no collision with some wandering star . . . producing a shock which might in a few hours, or moments even, restore the wasted energy of ages.

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* Continued from page 151.

Neither is it wholly safe to assume that there may not be ways, of which we as yet have no conception, by which the energy apparently lost in space may be returned. But the whole cause and tendency of nature, so far as science now makes out, points backward to a beginning and forward to an end. The present order of things seems to be bounded both in the past and in the future by terminal catastrophes which are veiled in clouds as yet inscrutable."

Perhaps the highest temperature we can get on a large scale in the arts is that of molten steel in the Bessemer converter. As many may be as ignorant of what this is, as I was before I tried the experiment, I will try to describe it.

The "converter" is an enormous iron pot, lined with fire-brick, and capable of holding thirty or forty thousand pounds of melted metal; and it is swung on trunnions so that it can be raised by an engine to a vertical position, or lowered by machinery so as to pour its contents out into a caldron. First the empty converter is inclined, and fifteen thousand pounds of fluid iron streams down into the mouth from an adjacent furnace where it has been melted. Then the engine lifts the converter into an erect position, while an air-blast from a blowing-engine is forced in at the bottom and through the liquid iron, which has combined with it nearly half a ton of silicon and carbon,—materials which, with the oxygen of the blast, create a heat which leaves that of the already molten iron far behind. After some time the converter is tipped forward, and fifteen hundred pounds more of melted iron is added to that already in it. What the temperature of this last is, may be judged from the fact that though a stream of ordinary melted iron is dazzlingly bright, the melted metal in the converter is so much brighter still that the entering stream is dark brown by comparison, presenting a contrast like that of chocolate poured into a white cup. The contents are now no longer iron, but liquid steel, ready for pouring into the caldron; and, looking from the front down into the inclined vessel, we see the almost blindingly bright interior dripping with the drainage of the metal running down its side, so that the circular mouth, which is twenty-four inches in diameter, presents the effect of a disc of molten metal of that size (were it possible to maintain such a disc in a vertical position). In addition, we have the actual stream of falling metal, which continues nearly a minute, and presents an area of some square feet The shower of scintillations from this cataract of what seems at first "sun-like" brilliancy, and the area whence such intense heat and light are for a brief time radiated, make the spectacle a most striking one.

The "pour" is preceded by a shower of sparks, consisting of little particles of molten steel which are projected fully a hundred feet in the direction of the open mouth of the converter. In the line of this my apparatus was stationed in an open window, at a point where its view could be directed down into the converter on one side, and up at the sun on the other. This apparatus consisted of a long photometer-box with a *port lumière* at one end. The mirror of this reflected the sun's rays through the box and then on to the pouring metal, tracing their way to it by a beam visible in the dusty air. In the path of this beam was placed the measuring apparatus, both for heat and light. As the best point of observation was in the line of the blast, a shower of sparks was driven over the instrument and observer at every "pour"; and the rain of wet soot from chimneys without, the bombardment from within, and the moving masses of red-hot iron around, made the experiment an altogether peculiar one. The apparatus was arranged in such a way that the effect (except for the absorption of its beams on the way) was independent of the size or distance of the sun, and depended on the absolute radiation there, and was equivalent, in fact, to taking a sample piece of the sun's face of equal size with the fluid metal, bringing them face to face, and seeing which was the hotter and brighter. The comparison, however, was unfair to the sun, because its rays were in reality partly absorbed by the atmosphere on the way, while those of the furnace were not. Under these circumstances, the heat from any single square foot of the sun's surface was found to be at least eighty-seven times that from a square foot of the melted metal, while the light from the sun was proved to be, foot for foot, over five thousand times that from the molten steel; though the latter, separately considered, seemed to be itself, as I have said, of quite sun-like brilliancy.

We must not conclude from this that the temperature of the sun was five thousand times that of the steel, but we may be certain that it was at any rate a great deal the higher of the two. It is probable, from all experiments made up to this date, that the solar effective temperature is not less than 3,000 nor more than 30,000 degrees of the Centigrade thermometer. Sir William Siemens, whose opinion on any question as to heat is entitled to great respect, thought the lower value nearer the truth, but this is doubtful.

We have, in all that has preceded, been speaking of the sun's constitution and appearance, and have hardly entered on the question of its industrial relations to man. It must be evident, however, that if we derive, as it is asserted we do, almost all our mechanical power from this solar heat—if our water-wheel is driven by rivers which the sun feeds by the rain he sucks up for them into the clouds, if the coal is stored sun-power, and if, as Stevenson said, it really is the sun which drives our engines, though at second hand—there is an immense fund of possible mechanical power still coming to us from him which might be economically utilized. Leaving out of sight all our more important relations to him (for, as has been already said, he is in a physical sense our creator, and he keeps us alive from hour to hour), and considering him only as a possible servant to grind our corn and spin our flax, we find that even in this light there are startling possibilities of profit in the study of our subject. From recent measures it appears that from every square yard of the earth exposed perpendicularly to the sun's rays, in the absence of an absorbing atmosphere there could be derived more then one horse-power, if the heat were all converted into this use, and that even on such a little area as the island of Manhattan, or that occupied by the city of London, the noontide heat is enough, could it all be utilized, to drive all the steam-engines in the world. It will not be surprising, then, to hear that many practical men are turning their attention to this as a source of power, and that, though it has hitherto cost more to utilize the power than it is worth, there is reason to believe that some of the greatest changes which civilization has to bring may yet be due to such investigations. The visitor to the last Paris Exposition may remember an extraordinary machine on the grounds of the Trocadéro, looking like a gigantic inverted umbrella pointed sunward. This was the sun-machine of M. Mouchot, consisting of a great parabolic reflector which concentrated the heat on a boiler in the focus, and drove a steam-engine with it, which was employed in turn to work a printing-press. Because these constructions have been hitherto little more than playthings, we are not to think of them as useless. If toys, they are the toys of the childhood of a science which is destined to grow, and in its maturity to apply this solar energy to the use of all mankind.

Even now they are beginning to pass into the region of practical utility, and, in the form of the latest achievement of Mr. Ericsson's ever-young genius, are ready for actual work on an economical scale. His new solar engine is actually at work in New York, which there is every reason to believe is more efficient than Mouchot's, and probably capable of being used with economical advantage in pumping water in desert regions of our own country. It is pregnant with suggestion of the future, if we consider the growing demand for power in the world, and the fact that its stock of coal, though vast, is strictly limited, in the sense that when it is gone we can get absolutely no more. The sun has been making a little every day for millions of years—so little and for so long, that it is as though time had daily dropped a single penny into the bank to our credit for untold ages, until an enormous fund had been thus slowly accumulated in our favour. We are drawing on this fund like a prodigal who thinks his means endless; but the day will come when our check will no longer be honoured, and what shall we do then?

The exhaustion of some of the coal-beds is an affair of the immediate future, by comparison with the vast period of time we have been speaking of. The English coal-beds, it is asserted, will, from present indications, be quite used up in about three hundred years more. Three hundred years ago the sun, looking down on the England of our forefathers, saw a fair land of green woods and quiet waters, a land unvexed with noisier machinery than the spinning-wheel, or the needles of the "free maids that weave their threads with bones." Because of the coal which has been dug from its soil, he sees it now soot-blackened, furrowed with railway-cuttings, covered with noisy manufactories, filled with grimy operatives, while the island shakes with the throb of coal-driven engines, and its once quiet waters are churned by the wheels of steamships. Many generations of the lives of men have paased to make the England of Elizabeth into the England of Victoria; but what a moment this time is compared with the vast lapse of ages during which the coal was being stored! What a moment in the life of the "all-beholding sun," who in a few hundred years—his gift exhausted and the last furnace-fire out—may send his beams through rents in the ivy-grown walls of deserted factories, upon silent engines brown with eating rust, while the mill-hand has gone to other lands, the rivers are clean again, the harbours show only white sails, and England's "black country" is green once more! To America, too, such a time may come, though at a greatly longer distance.

Does this all seem but the idlest fancy? That something like it will come to pass sooner or later is a most certain fact—as certain as any process of nature—if we do not find a new source of power; for of the coal which has supplied us, after a time we can get no more.

Future ages may see the seat of empire transferred to regions of the earth now barren and desolated under intense solar heat—countries which, for that very cause, will not improbably become the seat of mechanical and thence of political power. Whoever finds the way to make industrially useful the vast sun power now wasted on the deserts of North Africa or the shores of the Red Sea, will effect a greater change in men's affairs than any conqueror in history has done; for he will once more people those waste places with the life that swarmed there in the best days of Carthage and of old Egypt, but under another civilization, where man shall no longer worship the sun as a god, but shall have learned to make it his servant.

Notes.

Photographs of considerable merit illustrative of the Soudan Expedition have been taken by G. E. Hale, of the Medical Staff.

Several views show Wady Halfa, with its Military Hospital and hastily-built—if one may use the term—bazaar; while the view of the Philae Temple above the first cataract, and that showing "Dahbeans," Upper Nile, are perhaps of more general, but less special, interest.

A new official departure was taken on Tuesday at the Post Office, when the Postmaster-General was actually photographed in the act of closing the last case of the first Indian Parcel Post consignment. This interesting picture ought assuredly to be the initial one of a series which might be called "Cabinet Cartes, or Ministers at Work." Only think how interesting it would be to have a photograph of the new Premier studying the Russo-Afghan frontier question on a large map; or Lord R. Churchill up to his eyes in momentous Indian telegrams and despatches; and of Sir M. Hicks-Beach putting the last figures in his new budget.

Equally interesting, too, would be a view of Sir R. Cross, as Home Secretary, testing the efficacy of the plank beds of the convict prison; of Lord George Hamilton getting up the names of a ship's spars from a lettered plan; or of Mr. Henry Chaplin wrestling with the latest batch of foot-and-mouth disease statistics at the Duchy of Lancaster Office. But perhaps the most interesting photograph of all would be that of the new Lord Chancellor studying the habits of the Great Seal in the privacy of his home. The sale of such a subject could not but be immense.

Photographic engraving processes have an advantage not possessed by wood engraving. The pictures, if necessary, can be reversed. This property was found very useful by an artist friend the other day. He had to draw two pictures of the same object seen from opposite sides, and, inadvertently, he drew the second picture as though the object had been turned round; in point of fact, he had represented the same side twice over. Had the drawings been on wood or "transfer" paper, the mistake would have been fatal; but having to be photographed, the reversal of the second picture was an easy matter, and involved no more than a delay of an hour or so.

A photograph showing a portion of Paris has been taken from a balloon by Gaston Tissandier and J. Ducom, and it does not embrace anything like the area, or show the fine detail, included in Mr. Shadbolt's view of the Thames recently reproduced in the Photographic News, but it is very vigorous and clear. *La Nature* reproduces it in block form.

One of the most interesting practical applications which has been made of recent years, of an abstract scientific experiment, has indirectly an important bearing upon photography. At one of the meetings of the British Association at Montreal, Professor Oliver J. Lodge delivered a discourse upon "Dust." It had before been shown by Mr. Aitken, that fog consisted of a particle of moisture which had condensed itself round a minute solid dust atom, and consequently it was urged that if dust could be removed from the atmosphere, fogs would go as well. Professor Lodge proceeded a step further, and demonstrated how dust could be "settled" by discharging electricity into it. The mediums selected for experiment were magnesium smoke, and steam, and in each case, when electricity was discharged through the vessel containing the vapour, a deposit almost immediately took place; in the first instance, in the form of powder; in the second, in the form of fine rain. A firm of lead smelters in North Wales, reading Professor Lodge's paper, conceived that the experiment could be adapted on a large scale to get rid of the lead fumes, which cannot be prevented escaping into the air and poisoning it, despite the utmost care and expense on the part of the smelter. Acting under the advice of Professor Lodge, the firm in question tried electricity, and, says the *English Mechanic*, with the most satisfactory results. It is evident that the method is capable of very wide application, and when we read that Professor Lodge contemplates trying it upon an Atlantic fog, we need not despair of having some day the atmosphere of London as clear as it must have been centuries ago, before the coal smoke from thousands of chimneys polluted it. What a boon this would be to photographers we need not say.

The peripatetic photographer in this country is not usually lacking in enterprise, but from what happened last week at the annual pleasure-fair at Neuilly, near Paris, it would seem that he has still something to learn from his French *camarade*—a word which we may be perhaps allowed under the circumstances to write *camerade*. The fair in question is approached by a long avenue, and it is the "correct thing" to drive out to it from Paris, the road being on the occasion, in a small way, like the thoroughfares leading to Epsom on the Derby Day. Now, last week it seems each carriage, as it debouched from the avenue, was approached by an energetic individual who at once seized the horse's bridle, and doubtless suggested highwaymen to the more nervous of the visitors.

As it turned out, however, the stoppage was due to no felonious design; the energetic individual being in every case, in fact, a member of a band of enterprising photographers who had occupied the end of the avenue in force, their purpose being to take not merely the portraits of the visitors, but more especially of the assorted equipages in which they drove up. Thus, for one *franc*, a party could secure not only the reproduction of their own physiognomies, but a *carte* of the carriage hired by them for the day, the coachman and all included. And according to the Paris papers, the appeal, baited, so to speak, with the chance of posing in a real carriage like their betters, was too much for most of the visitors. The large majority willingly submitted to the necessary short delay, and a roaring trade was done.

Here, then, is a notion which surely the peripatetic artists of Old England will not fail to act upon. "'Arry on 'orseback," whether he be at Epsom or 'Appy 'Ampton, will fall a willing prey to them. To have a carte of his jobbed horse, as well as of himself, will be his eager ambition. So, too, ambulating photographers will doubtless be able to give a spurt to their business by taking "wheel men" on their bi- or tricycles; cockney oarsmen in their "blazers" and hired boats, and so on and so forth. Novelty is the great desideratum of the day, and special inducements must be offered to "sitters," to quote the circular of the transpontine artist who practically carried out his thesis by dressing up his tout as a "guardsman," and including him, without extra charge, in the "picture" of every servant girl who gave him "a sitting."

Messrs. Marsh, the well-known photographers of Henley, did a pretty bit of smart work during the Regatta week. On Friday morning photographs—and capital photographs, too—of the Thursday's racing were on sale at their establishment. An ingenious group arrangement exhibited in the same window is also worth passing mention. Some ten or a dozen gentlemen in boating costume are sprawling in three groups on a lawn in extremely eccentric attitudes, and at first sight it looks as if they were qualifying themselves for an acrobatic entertainment. But after looking at the picture for a minute or two, it gradually dawns on the mind of the spectator that there is method in their madness, and by degrees it is seen that the three groups take the form of three letters—L. R. C., presumably the initials of the London Rowing Club! The camera has evidently been mounted at a considerable height, and pointed downward, so as to secure the shapes of the letters. The whole effect is very quaint and original.

The London Stereoscopic Company is to be converted into a joint stock concern, it appears. At the time of the Lord Mayor's death the business belonged to three joint proprietors—the Lord Mayor, Charles C. Nottage, and H. J. Kennard; and the Company's circular states that, according to the certificate of R. Mackay and Co., the profits have averaged £6,280 per annum during the past twenty-three years.

The vendors are willing to accept £90,000 for the concern, including the premises, plant, and goodwill, one-third of this sum in fully paid up shares. A usual rule in selling well-established photographic businesses (see Year-Book for 1883, p. 181) is to fix the price at the nett profits for a year and a-half or two years, the fixtures, plant, and premises being taken at a valuation.

One semi-sentimental advantage is open to our amateur friends. By taking a single share of £5, anyone can become vested with the dignity of being—perhaps not a real professional photographer—but, at any rate, a sort of nondescript individual who is certainly not an amateur in the ordinary sense of the term.

The *Lady's Pictorial* advises ladies to suppress their old cartes-de-visite as far as possible, and try to persuade their friends to give up for destruction such as they may possess. We do not quite agree with our contemporary, that old cartes should be destroyed. By all means, though, let them be carefully put away, and only brought out when one's vanity needs checking. "Fashions," the same paper goes on to observe, "change so frequently and so completely. The dress that was thought perfection a few years ago now seems supremely ridiculous. The style of doing the hair that was once thought captivating, now raises only the smile of quiet contempt. The very manner of posing has undergone a complete change, and one would shrink now from assuming the affected attitudes insisted on by the photographers when the art was in its comparative infancy." These remarks are true enough, but the writer fails to supply what would seem to be the obvious moral—a recommendation to everybody to replace their old photographs with new ones.

Remembering what a formidable rival wood engraving has in photography, it is but natural that Mr. W. J. Linton, in his recently published manual of Instruction in Wood Engraving, should severely condemn the use of the camera. It is satisfactory to find, however, that it is not photography alone that has excited his ire. He complains of the artist of the present day who refuses to take pains, and from his "unsatisfactory pretence of drawing, coupled with the unfortunate use of photography instead of drawing on wood, has proceeded the present degradation of the art."

The form of illustration which has gained favour in America, where photography is largely made use of, Mr. Linton is particularly severe upon; and judged from the wood engraver's point of view, no doubt his remarks are justified. He concedes that "colour is kept admirably;

delicacy—that is fineness, thinness of line—is most remarkable; the often needless, sometimes unhappy minuteness, is astonishing;" but he looks "in vain for anything to tell that the engraver had any brains." Probably; but does not Mr. Linton forget another aspect of the question? Question any engraver, and he will not be able to tell you how many times he has to set right the shortcomings of the artist. This, of course, justifies the assertion of Mr. Linton, that engravers have brains; but why should their brains be utilised to make good the defects and compensate the laziness of artists? The editor of an illustrated paper which has lately discarded wood engraving for photographic processes, tells us that in one case an artist who was very successful on wood greatly deteriorated when he came to draw on card, and the reason was that the engraver "translated" his work, and supplied his deficiencies. From photography he derived no such assistance, and his drawings were reproduced in all their feebleness. As a matter of fact, photography forces a man to be more careful. What has Mr. Linton to say on this point?

HOW TO SUCCEED IN TAKING GOOD PICTURES ON GELATINE PLATES.—No. II.

BY S. R. BOTTONE.

We mentioned in our last that if the window of the dark room looked to the sun, it would be better to block it out altogether, and work by a dark lantern only. It is therefore as well that the kind of lantern fit for this work should be described. The ordinary "ruby lantern," sold by the photographic dealers, is perfectly trustworthy, but it generally is so dark as to try the eyes very much.

A lamp that serves our purpose well can be made from a hock bottle. Most of the hock bottles are of a beautiful ruddy orange tint, which is peculiarly non-actinic. If one of these be chosen, and marked deeply round the bottom with a good triangular file (such as is used for setting saws), the bottom will come off clean if the bottle be plunged just up to the mark in boiling water. If the edge be at all uneven, it can be ground smooth on a stone with a little sand and water. An empty Swiss milk tin, with perforations in the bottom to admit air, is placed on the table, bottom upwards; on this is placed a child's night light, and over all the hock bottle (see fig. 1). At one foot from the plate this will be found a safe and pleasant light to work by. The student will do well, however, to test even this light, by exposing a plate for a quarter of an hour to its influence at one foot distance, and then developing, as all bottles are not equally non-actinic. Supposing we have satisfied ourselves that our dark room is really trustworthy, we may proceed to the next step, viz., exposure.

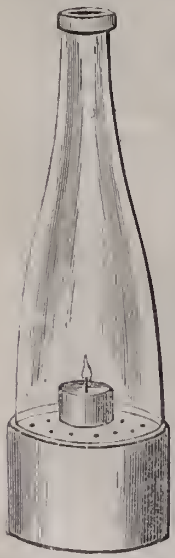

Fig. 1.

Improper Exposure.—More pictures are spoiled and more tempers soured through improper exposures than through all the other causes of failure put together. Many amateurs, having read something about the wonderful sensitiveness of emulsion, give the most extraordinarily short exposures, by the aid of marvellous rapidly closing shutters, with the result of getting here and there a few hard black outlines, all detail being lost in clear glass. Some, again, go to the other extreme, and, in circumstances under which a moderate exposure would suffice, give such prolonged ones that the image, although full of detail, is entirely lacking in density.

The student must remember that the light is continually varying. The best time of the year in England, at which exposures are shortest, is in April and May, when blue skies and light flecky clouds prevail. Then come June and July, good, but not so good as the two former; then August, September, February, and March are about equal. October, November, December, and January are the worst months. Then, again, the time of day has much to do with the quality of the light. Even in the best months, the very early morning and the late afternoon rays of the sun are far behind the mid-day rays in power, owing to the yellow and ruddy tints which prevail at the sunrise and sunset hours. Again, the focal length of the lens, with a given aperture, causes the exposure to vary; and with the same lens, a smaller stop necessitates a longer exposure.

Hence, it is easily seen that while some of these factors of the length of exposure can be reduced to hard-and-fast rules (such as focal length and aperture of lens), others can only be learned by experience. In the following outline of the mode of gaining this experience, we will suppose the student to be working with a portrait lens, quarter-plate size, the aperture of which, when not stopped down, is about $\frac{2}{5}$ of the focal length. Now such a lens could not be used for portraiture without a stop, in a glass house, or out of doors, unless under very exceptional circumstances, as the exposures required would be too short to be given by hand. In an ordinary room the case would be different, as the light is much less.

The student should therefore fit up an extemporary studio looking due north, and open to the north, with any opaque dark background at the south end. It is essential that the background be quite opaque, if the studio is an open-air arrangement; or else the sun may shine through certain parts of fabric, producing all kinds of disagreeable effects.

Perhaps nothing gives such a good background for general purposes as a dark workhouse blanket, stretched tightly across a plank frame, about six feet wide by eight feet in height, the upper eighteen inches being at an angle of about 45° with the rest, to cut off top light (see fig. 2).

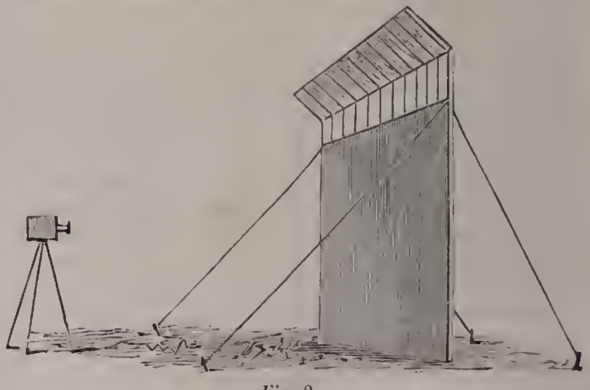

Fig. 2.

This can be kept perfectly steady by means of two ropes and four pegs, as shown.

In making the following experiments, let the student procure a small plaster figure, and place it on a table or other stand, to be used as his subject. It is a great mistake to begin experimenting on bodies that can move, as any motion renders the results indistinct. The camera, having been placed at a convenient distance from the object, must be clamped down rigidly to its stand, so as to be absolutely immovable. This is essential to success in the experiments we are about to perform.

We now take a dark frame, or "back," and measure how much the sliding shutter moves up. We paste or gum down a strip of paper (stamp-strip will do very well) of this length along the front of the slide, and we divide this strip with pencil marks into ten equal parts (see fig. 3). In the dark-room we place a sensitive plate in our "back," having previously placed a half-inch stop on our lens, and carefully focussed our object, the statuette, &c. Removing the ground glass, replacing the cap on the lens, and inserting the dark frame, are the next operations. We then draw up the shutter to the 1st division, and taking our watch in our hand, remove the cap from the lens, and expose while we count one second. Replacing the cap, we carefully pull up the shutter till we reach the 2nd division on the shutter, taking the greatest care not to derange the camera in any way. We then give another second's exposure, and again close the lens. In precisely similar manner, using the same precautions not to disturb the camera during the drawing up the shutter, we expose, one after the other, the whole ten divisions of the plate in the frame. The effect of this mode of procedure is, that on this same plate we have ten different exposures, the bottom end having had ten seconds, the next nine, the next eight, and so on, the top having received only one. What the development will reveal, remains to be told in our next paper.

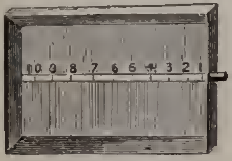

Fig. 3.

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Patent Intelligence.

Applications for Letters Patent.

8148. **Josiah Pumphrey**, 160, Angelina Street, Birmingham, Warwickshire, for "Improvements in photographic and signal lamps."—6th July, 1885.

Patents Sealed.

9612. **Alfred George Brookes**, 55, Chancery Lane, Middlesex, Fellow of the Institute of Patent Agents, for "Improvements in the preparation or manufacture of photographic plates or surfaces for use in the production of etched or printing surfaces."—A communication to him from abroad by **Edward Kunkler**, St. Gall, Civil Engineer, and **Jacques Brunner**, Trüssnacht, Zurich, Photographer and Art Printer, both in Switzerland.—Dated 1st July, 1884.

3778. **Alexander Melville Clark**, 53, Chancery Lane, London, W.C., for "Improvements in photographic paper and in sensitive emulsions therefor."—(I. and H. T. Anthony and Co., United States.)—24th March, 1885.

Specifications Published during the Week.

5725. **Alfred Julius Boult**, of 323, High Holborn, in the county of Middlesex, Engineer, for "Improvements in photographic film holders." (A communication from George Eastman, and William Hall Walker, of Rochester, New York, United States of America, Manufacturers.).—Dated 9th May, 1885.

In the accompanying drawings,* representing this improved film-holder, is a support of suitable material corresponding in size and shape with the glass plates ordinarily used in the production of photographic negatives. This support may be of glass, hard-rubber, celluloid, vulcanite, vulcanized fibre, wood, one or more thicknesses of veneer, paste-board, press-board, metal, or other suitable material. The frame may be made of any suitable metal, preferably in one piece, to avoid laps or joints. The centre of the frame is cut out to within about one-fourth of one inch from the edge of the plate, and two of the opposite sides (preferably the longest) may be turned over for the purpose of stiffening the frame. The shorter sides are turned backwards and bent slightly inward in such a manner as to clasp two of the opposite edges of the support when pressed down upon it.

The method of using this improved film-holder is as follows:—

A sensitive film cut slightly smaller than the support is laid, chemical side upward, upon the support, then the frame is laid down upon it, and pressed down along the edges so that the bent edges or clips of the frame clasp over the edges of the support, and hold the film firmly to its face. The frame, being thin, is generally found in practice not to interfere with the proper focussing of the image on the film. The holder, having the film secured thereto, is then exposed in the camera in any ordinary or suitable exposing frame. In order to facilitate the removal of the film from the holder, the corner or corners of the frame are cut off so as to uncover the corner of the support. The operator detaches the frame from the support by pressing on the corner of the latter.

The claim is:—1. The herein-described photographic film-holder, consisting of the plate or support, and open frame provided with clips, adapted to fit over two opposite sides of the support, and to hold the film against the face side of the support substantially as and for the purposes set forth.

2. The herein-described photographic film-holder, consisting of the plate or support and open frame, having one or more truncated corners, and provided with clips adapted to fit over two opposite sides of the support, and to hold the film against the face side of the support, substantially as and for the purposes set forth.

3. The herein-described photographic film-holder, consisting of the plate or support, and open frame provided with clips, and corrugations at the corners, substantially as and for the purposes set forth.

2851. **John Bell**, Photographic Artist, of 49, Catherine Street, Frome, in the county of Somerset, for "Adjustable back to chair for photographic or other uses."—Dated 28th April, 1885.

The claim is—1st. For the means of adjusting a chair back by the application of an iron bar or lever, which is set in motion by a screw passing through a pivotted boss, and a pivotted nut of brass, which pivots allow the adjustment of the line of the screw as it varies with the motion of the lever, the screw being turned by a small winch handle.

2nd. For the application of a joint to the framework of the chair back to allow for its adjustment at the will of the operator.

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HYDROQUINONE DEVELOPER.

BY HENRY BOLDEN, M.I.C.E.*

When I first read of hydroquinone as a substitute for pyrogallic acid, I found that not only was its cost—12s. per dram—prohibitory, but that all the published formulæ for its use appeared complicated and troublesome. On learning that it could now be bought for 3s. or 4s. per ounce, the element of cost was eliminated, as, owing to its greater power as a developer, and consequently the smaller quantity needed, hydroquinone at 3s. 9d. per ounce is on a par in point of cost with pyrogallic acid at 1s. 9d. per ounce.

Professor Bloxam tells us that, by evaporating the infusion of Peruvian Cinchona bark in dilute hydrochloric acid from which the *Quinine* and *Cinchonine* have been separated by lime, crystals of *Calcium quinate* are obtained, and that on decomposing these crystals with sulphuric acid, a solution is produced from which are derived crystals of *Quinic acid* ($HO_7H_{11}O_6$). When these crystals of quinic acid are distilled with sulphuric acid and manganese dioxide, the oxygen evolved converts the quinic acid into *Quinone*, which condenses into beautiful yellow needles, and by dissolving quinone in water containing sulphurous acid, and evaporating the solution, crystals of *hydroquinone* ($C_6H_6O_2$) are obtained.

Watts, in his "Chemical Dictionary," describes hydroquinone as inodorous, and having a sweetish taste, and to be neutral to vegetable colours. If heated to boiling point it decomposes. It is also decomposed by several oxidising agents, amongst others, nitrate of silver and, probably, bromide of silver.

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* The nature of these is so obvious from the description that it has not been considered necessary to reproduce them.

* Read before the Derby Photographic Society.

Strong nitric acid converts it into oxalic acid. Ammonia and potash give to solutions of hydroquinone a brown-red colour.

Although Watts says hydroquinone dissolves easily in water, my own experience is, that I cannot readily get a solution in *cold* water stronger than eight to ten grains per ounce, and fearing to use *hot*, from its tendency to cause decomposition, I have in all my experiments prepared a concentrated solution of one grain of hydroquinone to the dram of distilled water. To test the keeping properties of the solution, I have exposed it in the full daylight of a window for a month during the warm weather without finding it deteriorate, and I am induced to think that the concentrated solution I have mentioned would keep any reasonable time in a cool cupboard.

On mixing the concentrated solution with various alkalies, I found that though it discoloured, it was a long time before it became turbid, and I subsequently noticed that there was no visible action on an exposed gelatine film till the solution of hydroquinone was discoloured by an alkali. I also made what (to me) was a discovery of what will, I venture to think, prove the strongest recommendation to amateur photographers and ladies to adopt this developer—viz., that it does not stain the hands and clothes, and, at the same time, possesses all the power of correcting under- or over-exposure, which can be accomplished by the intelligent use of pyro and ammonia.

Amateurs who, desirous of keeping their hands clean, have tried the *oxalate* developer, have experienced the difficulty of correctly timing exposure, and also incidentally the impossibility of preserving economical developing solutions ready for an odd negative or two.

Those who are unacquainted with the oxalate developer will forgive me for digressing from my subject to explain that, having first prepared a saturated solution of oxalate of potash, and a saturated solution of protosulplate of iron, special precautions must be taken to preserve the latter, and that when mixed for use, although the mixture will work for a few hours and develop a large number of exactly correctly exposed negatives, it is useless next day, though costing, when mixed, about two shillings per pint. Nor is there any satisfactory means of helping on an under-exposed plate, or retarding one which proves to have been over-exposed.

In order to obtain the greatest latitude in exposure, and to have developing solutions which will keep ready for use, my own practice of development has been to make a preparation of 1 ounce of pyro in 10 ounces of saturated solution of sulphite of soda rendered faintly acid with citric acid; also a solution of 5 per cent. of ammonia (880°) to 1 per cent. of bromide potassium in distilled water.

For use I take (dependent on the make of plate) 15 or 20 drops of the 10 per cent. pyro to the ounce of water, and having flooded the plate, add gradually to each ounce of dilute sulpho-pyro up to one drachm of the ammonia bromide solution. The developer then consists of (varied as the negative dictates):—

Water	1 ounce
Sulpho-pyrogallol	1½ to 2 grains
Ammonia (880°)	1 to 3 minims
Bromide potassium	⅕ to ⅗ grains

Should the negative be fairly exposed, I find that about 30 to 40 minims of the ammonia bromide mixture to the ounce of dilute sulpho-pyro will bring out all details, and give nice printing density; whilst, if the plate is *under*-exposed, I can help it out without risk of fog by using the full dram of ammonia-bromide. Of course, if the plate is over-exposed, I stop the addition of ammonia-bromide at 10, 15, or 20 minims.

By thus varying the amount of ammonia-bromide, I have found it easy to produce fair negatives from exposures of (say) one to four or five seconds, where, had I varied much from the two seconds' exposure suitable for the oxalate developer, the result would have been a plate showing either under or over-exposure.

In experimenting with hydroquinone it will be evident that I was loth to abandon a system which enabled me to correct to so great an extent errors of judgment in exposure, and finding by trials that a dilute solution, containing from ¼ to ½ grain (dependent on the make of plate) of hydroquinone per ounce of water, gave the same amount of density as 1½ to 2 grains of pyro, it was easy to keep a concentrated solution (such as I previously mentioned), and mix 20 to 30 minims to the ounce of water as required. On endeavouring to use dilute hydroquinone with my standard ammonia bromide solution, I was unable to produce a negative, and having learnt that in the use of carbonate alkalies carbonic acid would be liberated and act as an equally efficient restrainer as bromide, I prepared a strong solution of carbonate of potash, adopting a proportion of 1 of potash to 2 of water as being about equal in alkalinity to a solution containing 5 per cent liquor ammonia ·880.

The formula for development I thus arrived at was—flood the plate with a solution of hydroquinone ¼ to ½ grain per ounce (according to the make); then add gradually from 15 to 60 min. of 1 in 2 solution of carbonate of potash as guided by the development showing under- or over-exposure, and the result will be a negative full of detail and nice printing density, although it had only half, or as much as twice the proper exposure for an oxalate developer. You will also keep your fingers, clothes, &c., as unstained as if you had used the oxalate, and not spend more money on your developing than if you had used the time honoured pyro-ammonia-bromide.

These are shortly the advantages of the hydroquinone. There are drawbacks; one is yellowness of the negatives similar to those developed under the old system with dry pyro. A second is, that as hydroquinone does not possess the same tanning action on gelatine that pyro does; the developed film is more tender when being washed and fixed. Of course an alum bath will cure the tenderness of film, but it cannot be used without washing off the developer, and even if then used, the action of the hypo when fixing will be very much retarded. The yellow colour I have not yet been able to overcome, and consequently have to submit to the extra difficulty in judging density.

Seeing the improvement in the colour of negatives from the combination of sulphite of soda with pyro, it was natural that I should expect the same result with hydroquinone; but in this case the sulphite appears to destroy the action of the combined hydroquinone and potash developer. I have also tried a variety of other alkalies, but so far have been unable to discover any which would develop when mixed with hydroquinone without producing the objectionable yellow coloured negatives.

Although an experiment somewhat foreign to our subject, I may mention that I find the 1 in 2 solution of carbonate of potash a most active developer with sulpo-pyrogallol, and that bromide is unnecessary. My experience of this developer is not yet sufficient to speak with authority, but I believe it will be found to work with about half the exposure necessary for ammonia bromide.

In conclusion, I wish to say that though the yellowness of the hydroquinone developer plates will discourage me from using that formula on negatives that have taken me some trouble to expose, it will not dishearten me from making further experiments. The tenderness of film can be obviated by care and the use of alum, and I have hopes that a substance or treatment will yet be discovered to cure the yellowness.

Although I have not had the time to work this point out, Mr. Glen, photographer at the Engineers' Department of the Midland Railway, has communicated to me the result of his experience with hydroquinone, and has kindly consented to exhibit some negatives developed with it. You will notice that he has got rid of the yellowness by using (he tells me) a bath of chrome alum and citric acid after fixing. This objection being thus cleared away, I doubt not that a mode of "leatherifying" the film to the same extent that pyro does will soon follow, and that we and our lady friends may be able to keep our fingers and clothes unstained.

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PHOTO-LITHOGRAPHY AND PHOTO-ZINCOGRAPHY.

BY MAJOR J. WATERHOUSE, B.S.C.,
Assistant Surveyor-General of India.

Chapter XVIII.—Photo-Lithography in Half-Tones.*

A somewhat similar method, by which a printing negative may be obtained at once, is to coat a glass plate with a solution of asphaltum in turpentine, and while still tacky to dust it over with finely powdered and well-dried salt; when the varnish is quite dry, the salt can be dissolved out, and will be found to have broken up the asphaltum surface into a series of grains or pits. A metal plate so treated could be etched so as to be capable of giving transfer impressions of the grain.

The grain given by the reticulation of a carbon print might also be availed of in various ways to produce grained negatives in the camera, or by contact printing. Grained images can also be produced on stone or zinc by coating them with sensitive asphaltum, and when dry developing a negative reticulated carbon print on the asphaltum surface. The latter is then exposed to light, the carbon print is washed away, and the image developed in the usual way with turpentine. The grain of a reticulated carbon print is, however, generally too fine for photo-lithography.

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* Continued from p. 413.

IV. We now come to the methods under the fourth heading, in which a grained image is obtained by the collotype process, and transferred to stone or zinc.

It is curious that this most recent development of photo-lithography should, in its main features, be identical with one of the earliest collo-chromatic photo-lithographic processes, namely, Pretsch's, published some thirty years ago. While working out this photo-galvanographic process, Pretsch discovered the fact that, if the swollen chrome gelatine films used in that process, in which the vermicular wrinkled grain was a distinguishing feature, were inked up with a roller charged with greasy ink, the ink would only take upon the parts acted on by light, and impressions from such films could be transferred to stone or zinc, and be printed from in the usual way. Pretsch does not seem to have practically followed up this method of working, the photo-lithographs published by him being obtained by transfers from his photo-galvanographic plates.

Pretsch obtained his grain by the addition of a proportion of nitrate of silver and iodide of potassium to the mixture of gelatine and bichromate. Herr Leipold, who has worked the Pretsch photo-galvanographic process very successfully, gives the following formula (*Correspondenz*, 1874, 180):—

1. Fifteen grammes glue (best Cologne) dissolved in 3 ounces of water.
2. Two grammes of bichromate of potash dissolved in 1½ ounces of water.
3. One gramme of nitrate of silver dissolved in 1½ ounces of water.
4. Half a gramme of iodide of potassium dissolved in 1 ounce of water.
5. Eight drops of glacial acetic acid.

The glue is left to soak for an hour in the quantity of water noted, and then dissolved with gentle heat; also 2, 3, and 4, to each of which 1 part of the warm solution of glue will be added; 2 and 3 are then mixed with constant stirring, the resulting mixture acquiring a deep red colour. By adding 4, iodide of silver is formed, and the dark colour changes into a lighter one. The acetic acid is then added, and the whole filtered through doubled linen.

The filtered solution is applied on glass plates, which should be laid perfectly level in a drying-box. The glass should be slightly warm, and the solution spread with a glass rod.

The addition of the glacial acetic acid will cause the solution to be more easily spread, and the subsequent formation of the grain will be somewhat finer and softer.

The heat in the drying-box should not be too great; an even warmth of about 98° F. is sufficient to dry the plates in about three and a-half to four hours.

The dried sensitive film should not be exposed to light under the transparent positive immediately after being taken from the drying-box. The plate, which is very sensitive to daylight, should be placed away in a dark place for about an hour, in order to allow the oxygen of the air to act on it, whereby an oxidation of the glue takes place, which has a great influence on the formation of grain in the subsequent development of the picture.

The idea of transferring the beautiful collotype image to stone, as might have been expected, has been brought forward in various ways by Mr. J. R. Sawyer and other workers in collotype; but these methods are not successful unless the collotype image has a much stronger grain than is necessary for printing by the collotype process; but, as we have already noticed, in producing such a grain, the delicacy of the image is liable to be impaired.

The best known method of this kind is the ink-photo process of Messrs. Sprague, already noticed. The details of it have not been published.

In the News for June 29th, 1883, an account is given of an improved method of obtaining grained collotypic transfers discovered by Mr. J. W. Swan.

When a transfer from an ordinary collotype plate is made to stone, it is found that the details soon clog up, owing to the collotype grain not being clear and sharply defined, in consequence of a light shade of fatty matter surrounding each granule of ink; and this shade, gradually taking up ink, the granules enlarge and coalesce.

Mr. Swan inks up the collotype plate before soaking it in water, and as the gelatine softens in parts, the ink is removed by dabbing or sponging. By this means the ink breaks up into a clearly defined grain, free from the above defect.

In the same volume of the News, Mr. W. T. Wilkinson has described a method of obtaining similar transfers. He uses as negative a very thin or flat copy from a print thoroughly well exposed and full of detail in lights and shadows, but not at all intense in the lights. From this negative a print is made upon a collotype plate, which, after development, is reticulated by immersion in warm water containing about 10 drops of liquor ammonia to the pint of water for a fine grain, increasing the ammonia if a coarser grain is required. The stronger the ammonia the quicker the action. Too much ammonia should not, however, be added, and it is better to use the ammonia weak, and raise the temperature of the mixture until the desired result is obtained. The plate is then inked, and the transfer made to stone or zinc in the usual way.

The cause of the formation of this wrinkled grain in gelatine films, and the various conditions affecting it, do not appear to have been thoroughly investigated or explained.

It appears to be primarily due to unequal tension between the outer and inner surfaces of the film when swollen with water or other fluid, caused by the contraction of a skin formed over the outer surface of the gelatine while drying. It is increased by conditions which tend to the formation of the skin, and *vice versa*.

Thus the use of soft or poor gelatines that do not readily set, or the addition to good gelatine of deliquescent salts or other chemical substances which impede its setting and drying at a high temperature, tend to produce grained films; while films made of hard, quick-setting gelatines, dried at a low temperature, are almost grainless.

Films dried upon a rigid surface have a greater tendency to grain than similar films dried upon paper or other elastic or absorbent surfaces.

The thickness of the film also exerts a most important influence, the grain being larger as the film is thicker.

In sensitised collotype films the tendency to grain is lessened or destroyed by influences tending to render the gelatine hard and insoluble, such as long keeping, exposure to light, or the introduction into such films of substances which, like glucose, glycerine, tannin, &c., have a decomposing effect on the bichromate.

M. Placet, who has given a good deal of attention to this subject in connection with his process of heliogravure, lays down the following principles as controlling the formation of this kind of grain. Any animal or vegetable substance plunged first into a liquid capable of dissolving it, and then into another possessing the property of tanning or contracting it, becomes covered all over with a grain, resulting from this contraction. The size, form, and depth of the grain differ according to the substances and liquids employed, the length of the immersion, and the temperature and degree of concentration of the liquids.

Thus a sheet of gelatine, plunged first into a saturated solution of bichromate of potash, and then into a solution of—

Phosphate of iron	40 parts
Acetic acid	10 ,,
Water	100 ,,

will, in a few moments, be covered with a beautiful and remarkably regular grain.

He also gives the following way of working to produce grained plates.

A level surface is coated with the following mixture:—

Gelatine...	10 parts
Metagelatine*	1 to 2 ,,
Sugar	1 to 2 ,,
Bichromate	1 to 2 ,,
Water	100 ,,

Sometimes a little acid is added, such as citric, acetic, or other acids.

After exposure the plate is washed in pure water, or in a solution of borax. The image develops and becomes grained at once.

To stop the action of this liquid, the plate is rapidly plunged into a bath composed of—

Water	100 parts
Alcohol	20 to 30 ,,
Ammonia	2 to 4 ,,

This solution is blotted off with blotting-paper, and the plate left to dry in the dark. It is then immersed in the solution of sulphate of iron given above. The grain is formed anew, and, when completely developed, is plunged into pure or slightly acid water. It is then dried, and the grained image is definitely fixed and finished.

The grain may be modified by solutions containing different proportions of sulphate of iron and acid. The development is begun with the weakest, and the stronger are used as required.

Further information on this subject will be found in the specification of M. Placet's patent, published in *Anthony's Bulletin*, 1877.

Transfers, from collotype plates, with a good clear grain, are better made to a polished stone, so as not to break up the grain. In some cases, however, grained transfers succeed better on grained stone.

Much remains to be worked out in this direction, but considering the attention that is now being paid to the subject, and the progress that has been made in the last year or two, there is little doubt that, before very long, satisfactory half-tone processes for lithographic and letter-press machine printing will be available and in common use.

Photo-lithography is capable of being usefully adapted in many ways for colour printing, as shown by the excellent series of photo-chromo-lithographs of Indian fabrics and art ware, published by Mr. W. Griggs, of Peckham.

As the operations of obtaining and printing the colour stones from the photographic keystone are much the same as in ordinary chromo-lithography, and require a good deal of skilled handwork, it seems unnecessary to enter further into the subject, which will be found fully explained in Richmond's Grammar and other works on Lithography.

We may, however, remark that most photo-lithographs, especially those in half-tones, are greatly improved by being printed on a tint, or worked up in tint to give light half-tones and high-lights, according to the subject.

We have now come to the conclusion of this series of papers, which has extended much further than was originally intended, in the endeavour to make it a fairly complete epitome of the subject.

Correspondence.

THE INTERNATIONAL EXCHANGE.

Dear Sir,—You will be interested in knowing that I have now quite filled up the list of members for this interesting exchange, and have, in fact, got two or three more than I really wanted, and there is therefore the prospect of being able to carry out the matter to a very satisfactory issue. Members who have joined are requested to send their plates to me as early as they can, the 20th of September being the very latest date for the plates being sent in.

From latest advices I believe that Mr. Beach has been equally successful on his side of the water; and we may therefore hope to have the opportunity of securing copies of some 250 modern American views of places of interest, and I venture to think that there are few lanternists on this side who do not feel the utmost interest in slides showing American scenery and places of note in the States. Every plate will be closely scanned by experts, so as to ensure that none but good ones go forward, and this will be carefully attended to on both sides.

I will take opportunities of letting you see some of our more noticeable exchanges, and cannot conclude without thanking you for your kind assistance in getting up the Exchange. The members will, of course, strive to produce views of striking interest; and as I have members from all parts of England, Scotland, Wales, and Ireland, we are sure to turn out plates of an extremely interesting character in the aggregate.—Yours faithfully,

River Cottage, Hornsey, N., 9th July. Henry Smith.

SENSITOMETER READING.

Sir,—In your last impression you publish a very interesting letter from A. G. Brophy concerning "sensitometer readings." I am at a loss to know why some plate makers still adhere to the misleading practice of quoting the speed of plates as compared with wet collodion. My experience tells me that wet collodion is as variable as gelatine plates. Some few years ago Mr. Warnerke got 10 on his sensitometer with my bath developer, and Mawson and Swan's collodion; these chemicals were working in the ordinary way, *i. e.*, not specially prepared for speed. Experiments were made with other photographers' chemicals; the results varying so much that in one instance no reading was obtained. I merely mention these facts to show that good sensitive collodion is made in England, and that the secret of rapid wet plates is not altogether due to collodion, but to a harmonious combination. My knowledge of what governs speed in gelatino-bromide leads me to think that I could now work collodion quicker than ever. I cannot see my way clear to answer your correspondent's query "about the equivalent of sun or candle light to one inch of magnesium ribbon," these lights being as variable as gelatine plates, and more or less variable according to the changes of colour of the light, and they vary from day to day.—Yours truly,

A. L. Henderson.

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Proceedings of Societies.

London and Provincial Photographic Association.

The annual dinner of the above Association took place at the Mason's Hall Tavern on Thursday last, the 2nd inst., Mr. A. L. Henderson presiding.

Besides the usual loyal toast put from the chair, the following were given:—"The London and Provincial Photographic Association," replied to by Mr. A. Haddon, Curator; "The Fraternity, Amateurs and Professionals," proposed by Mr. W. H. Harrison, and responded to by Dr. H. Chartres White and the Vice-Chairman; "The Officers," proposed by W. M. Ashman, Messrs. Briginshaw, Prestwich, Burton, and Haddon, responding; "The Visitors," proposed by Counsellor Franklin (Blackburn), and replied to by Messrs. Cowan, Jun., and H. Gray; "The Chairman," proposed by Mr. W. Acklaud; "The Vice-Chairman," proposed by Mr. A. L. Henderson; "The Photographic Press," proposed by Mr. W. E. Debenham, and responded to by Messrs. W. H. Harrison and W. M. Ashman.

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* Formed by over-boiling gelatine, or treating it with dilute acids.

During the evening the company were entertained with some excellent music, vocal and instrumental, by Messrs. Arthur Weston, H. Gray, J. J. Briginshaw, H. Chartres White, W. E Debenham, E. Richards, and H. S. Starnes, the latter gentleman also acting as accompanist. Recitations were also given by Messrs. W. Cobb, A. Cowan, and A. Cowan, Jun.

The proceedings, which lasted until midnight, were eminently satisfactory.

Derby Photographic Society.

The July meeting was held at the Mechanics' Institute, Mr. J. **Merry** occupying the chair.

After the usual business, a paper on "The Hydroquinone Developer" (see page 443) was read by Mr. H. Bolden, who showed some interesting negatives, the results of his experiments on this developer. A cordial vote of thanks was passed to Mr. Bolden.

The **Hon. Secretary** read an invitation from the North Stafford Amateur Photographic Association, asking the Derby Society to meet them at Tutbury. It was decided to do so on Saturday, July 18th.

Messrs. C. C. Bowring, Joseph Deau, and J. S. Huson were elected members of the Society.

St. Helen's Association for the Pursuit of Science, Literature, and Art.

Photographic Section.

A meeting of this Section was held on the 17th ult., at the Association Rooms, 4, Salisbury Street, Mr. **Heather** in the chair.

The **Chairman**, in reply to a question, gave the following formula for an alum reducing bath:—

Sat. sol. of alum	5 ounces
Water	5 "
Bleaching powder	2 drachms

Mix and filter before using. This, Mr. Heather said, he could recommend.

The following photographs were then shown:—Mr. Crooks—The presentation prints of the Liverpool Photographic Association; Mr. Loader—"Drop shutter" views of the Thames Valley Yachting Club Regatta, and other views on the Thames; The Hon. Secretary—Thirty Australian views; Mr. Brook—Series of views in North Wales, and two copies of paintings in the National Gallery, by Messrs. Braun and Co.; Dr. Gartou—a drop shutter view of Market Place at Ashbourne, and views in neighbourhood.

While examining the drop shutter views, the **Chairman** remarked that he preferred a thickly-coated plate for shutter work; the majority of the plates in the market are far too thinly coated.

Mr. **Brook** was decidedly of the same opinion.

The first out-door meeting of the Section this season took place in Knowsley Park on Whit Monday, under the leadership of Mr. R. G. Brook. Favoured by fine weather, some highly satisfactory pictures were obtained of the hall, boathouse, swans, and other objects of interest. Messrs. R. G. Brook, D. Thomason, W. Gaudy, T. Sherlock, and Dr. Garton, showed the views they obtained on this occasion.

The meeting then closed.

Photographic Society of Ireland.

The annual outdoor meeting took place on Thursday last, 25th inst., the locality chosen being the Vale of Clara, Glendalough, and the Seven Churches, co. Wicklow. The day was extremely fine, the only drawback being a fresh breeze, which, while very pleasant, kept the foliage in motion as to produce effects anything but desirable in landscape photography.

The party mustered at Bray, whence they proceeded to Rathdrum, where a waggonette and car were in readiness. The first halt was at Clara Bridge, which afforded several picturesque bits. After a brief delay a move was made for Larah, where a considerable number of views were obtained; while some hastened on to the Seven Churches, to be followed at more leisure by the rest. Here the party scattered in various directions; till at 5 p.m. all re-assembled for dinner. The return journey was commenced at 6.30 p.m., reaching Dublin about 10 p.m.

A statistical return showed eighteen operators whose cameras (nineteen in number) ranged from 14 by 12 to $4\frac{1}{4}$ by $3\frac{1}{4}$ in size. 150 fine exposures were made, two of the number working wholly or in part on paper negatives. There was thus an average of nearly nine pictures a head. All seemed pleased with their day's outing.

Manchester Photographic Society.

The fifth out-door meeting of the present season was held on Saturday, July 4th, under the leadership of the Hon. Secretary, Mr. W. J. Chadwick.

Tabley Park had been selected as the place to which an excursion should be made on this particular day, and apparently satisfactory arrangements had been made for access to the grounds of that place, when it was found, at the last moment, that all the admission orders for the month of July (of which there only appear to be a limited number issued) had been previously promised. Under these circumstances, the party met at the station, and at once accepted the alternative proposition of an excursion to Marple, the service of trains to which place being unexceptionally good. The upper part of the valley of the Goyt—namely, that portion lying between Marple Bridge and Strines—having been pretty well "thrashed out" on previous occasions by most of the gentlemen present, it was decided to take a westerly course, and go by way of Marple Hall into Chadkirk Vale.

The first subject of sufficient interest for the unpacking of cameras was a group of picturesque cottages of the magpie style, near Rosehill Station, and the greater number of the party remained to expose a few plates, while the other portion pushed on to Marple Hall to seek admission to the grounds. The mansion is an Elizabethan structure of the old baronial type, and is of considerable historical interest as having been the residence of the family of the notorious Judge Bradshaw in the troublous times of Charles the First, and it is not less interesting in a pictorial point of view as a subject for the camera, both south and north fronts being partially covered with luxuriant ivy. Several plates were exposed on the south front, and also on the picturesque stables. On the north side there is a terrace, which, being on the edge of an escarpment, necessitates the view being taken considerably in perspective, and with rather a wide-angle lens.

From Marple Hall through the dell (a pleasant walk of about fifteen minutes) the party made their way to Otterspool (locally called Ottersco') Bridge, in the Chadkirk Valley. The bridge, although a very handsome structure, is apt, with the cascade below, to carry the eye too much in parallel lines across the plate; but the foreground, consisting of turbulent water, pebble beds, and the massy leaves of the butter burr (which grows here in rich perfusion) is a charming one, and by judicious planting of the camera, the objectionable parallelism of the picture may be largely counteracted. On the return journey some exquisite peeps were found in the woods behind Marple Hall.

The party returned to Manchester in good time, and by no means dissatisfied with the afternoon excursion.

The next out-door meeting will be held at Alderley, on Saturday, July 18th, 12.50 train from London Road, and the route will be by way of the Old Mill, the Church, and Capesthorne Hall, to which place access has been obtained. The drive will be through the best scenery of the locality, and those intending to join will please send their names to Mr. J. Schofield, Rose Cottage, Heaton, Mersey, the leader of the trip.

Bristol and West of England Amateur Photographic Association.

The June out-door meeting was held on Monday, June 15, the members of the Association proceeding by various trains to Fishponds, where conveyances were waiting to convey the party to "Chasefield," the country residence of the Honorary Secretary, Mr. H. A. Hood Daniel, who had kindly invited the members to be entertained and piloted by him to the picturesque banks of the Froom and the surrounding country.

On arriving at "Chasefield," Mr. Daniel led the way to the river Froom. Arriving, after a short and pleasant drive, at Wickham Bridge, cameras and stands were quickly unpacked, and preparations made for work. Some of the most picturesque points of view were soon occupied; but no sooner were the cameras in position than a rustling of the leaves gave indications of a windy day. Some of the younger hands were soon eagerly exposing plates, in spite of the wind; but the majority, seeing how useless it was to attempt work, strolled about to select some of the best points of view for a more favourable day.

After waiting in vain for a lull in the wind, a move was made to a bend of the river above the bridge, which, being more sheltered, allowed a few negatives to be taken, after which the party remounted and returned to Chasefield, and were then escorted by Mr. Daniel to his lawn, where, under the pleasant shade of the trees, a cold luncheon awaited the members. Having done justice to the good things provided, and cameras and stands being safely packed, it was decided to drive to the Old Mill at Moorend. On arriving at the mill, rejoicings were general at finding the mill-wheel at rest; but no sooner was a camera in position than the artful miller started the wheel. A consultation with the miller led to the discovery that a piece of silver was the only certain means of stopping the mill. The "Queen's shilling" soon had the desired effect, and plates were quickly exposed.

The weir up the stream was next the scene of operations, but finding this a very windy spot, only only one or two plates were exposed; and it was then decided that a return should be made to Wickham Bridge, in the vain hope of securing pictures of the many picturesque spots visited in the morning, but with no better prospects of getting anything good. A few of the members made a move towards the Old Snuff Mill, where pretty pictures are to be found. About 5·30 p.m., those members who had finished made a move for Mr. Daniel's house, where, after being joined by the others from the Snuff Mill, the wind gradually increasing in force, no further work was attempted, and the party again returned to Chasefield, when, after inspecting Mr. Daniel's dark room, and his arrangements for coating, levelling, and drying plates, the party were again entertained by Mr. Daniel, this time to high tea.

Mr. Daniel, in reply to hearty thanks for his hospitality, said that it had given him great pleasure to entertain such an unusually large meeting, and hoped that the pictures taken would turn out successfully; regretting also that he had been unable to regulate the weather.

Shortly after 7·30 the carriages conveyed the members to the station for their various destinations, all having thoroughly enjoyed a very pleasant day.

Talk in the Studio.

Balloon Adventure in Hyde Park.—Shortly after four o'clock on Monday afternoon a balloon appeared over Hyde Park, travelling from the south-west, and descending so rapidly as to occasion apprehension, and it tore its way through the trees on the bank of the Serpentine, and, descending with great velocity, fell into the water near the east bridge. Ultimately it drifted to the north end of the bridge, rolled along the north bank for about sixty yards, and finally left the water, when it was caught by the crowd. Their hold, however, proved ineffectual, and for a few moments the position of the occupants was extremely perilous. It transpired that the ascent was made from Lillie Bridge Grounds at a quarter-past four, the occupants being Mr. William Dale, of Plaistow, and Mr. C. V. Shadbolt, of Chislchurst. Mr. Shadbolt tells us that he and Mr. Dale fared well, and escaped quite uninjured, and that the cool waters of the Serpentine formed a pleasant and refreshing ending to an eventful trip of only a few minutes' duration. The apparatus got a little injured by water, but the damage is easily reparable. Any amateurs who may be in the neighbourhood of the Alexandra Palace on Saturday (to-morrow) should avail themselves of the chance of a few stray shots at balloons, as several, including the "Monarch," will ascend on that day.

Gibson *v.* Bassano.—This was an action on July 8th by Joseph Vincent Gibson, artist, against Alexandro Bassano, photographer, Old Bond Street, for breach of contract in relation to a pictorial representation of the Four-in-Hand Club in Hyde Park. The defendant undertook to supply photographs of members of the club and their friends, and the plaintiff was to introduce them in a picture, and to charge £1 for each portrait. There were other stipulations in the contract, but ultimately, owing to want of patronage for the picture, which was to contain from 250 to 260 portraits, but for which only five members of the club and their friends consented to sit, the painting was never completed Before Mr. Justice Stephen and a special jury the plaintiff recovered £80 damages; but a rule was obtained to enter judgment. for the defendant on the ground that the verdict was against the evidence, and the learned judge had misdirected the jury as to the liability of the defendant under the contract. On the conclusion of the arguments the Lord Chief Justice said that on all the grounds on which the rule had been obtained the judgment of the Court below must be affirmed, and the rule would therefore be discharged with costs.

Photographic Club.—The subject for discussion on July 15th will be "Copying Oil Paintings and Engravings." The Saturday outdoor meeting will be held at Edgware; trains from King's Cross, suburban, at 2.7 p.m.

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To Correspondents.

*** We cannot undertake to return rejected communications.

Opal.—

1.	Nitrate of silver	35 grains
	Water (distilled)	1 ounce
2.	Protosulphate of iron	20 grains
	Glacial acetic acid	20 minims
	Alum	40 grains
	Water	1 ounce

Register.—1. They cost one penny each. 2. It is not absolutely necessary to use a separate copy for each; but it is advisable to do so. 3. Yes; for each picture in all cases.

G. W. H.—They are of great interest, and are referred to in another column. If any commercial use is to be made of them they must be registered to secure the copyright. We do not know who would be likely to publish them, but you might try Marion, 22, Soho Square.

Vero C. Driffield.—Thank you. We shall be glad to have particulars when you are ready.

Non-Chemist.—1. It is quite: in comparison with modern methods it is totally unsatisfactory—a mere relic of the past. No, never uniodised in the first instance. 2. It is quite practicable and suitable for portraiture, but involves more trouble. 3. Yellow light is quite satisfactory. Obtain Abney's "Instruction in Photography," published by Piper and Carter, price 3s. 6d.

Henry Geary.—We can only assume that some mistake has been made in supplying you the materials. There should certainly be no scum or deposit.

W. A. W.—It is very good of you to correct the error, and we will write to our correspondent on the subject. Will you favour us with a paper on the subject?

E. S. D.—1. It is a defect incidental to the thickness of the film. 2. Not one of them; our preference being for those not so highly glazed. 3. Yes, and we have found them good.

Pin.—1. Before we can answer this question, we must know exactly what process you have followed. 2. Not very good; how did you make it? 3. No, it is too much clogged up in the shadows. 4. No. 2 prints more easily because you have lost all the more delicate gradations. 5 They have been inked too much; the quantity actually required for transfer is very small. 6. You should do it by using less ink. 7, 8, and 9. Ink a Woodbury relief, and take an impression from it on the grained paper; this impression is the transfer.

Nitrate.—For such work there is much to be said in favour of using the old-fashioned box-camera, as its rigidity and strength are far greater than those of the modern portable camera.

C. Semour.—Add more ammonia; perhaps double the amount.

Printer.—Mr. Ashman recommends the following. Dissolve 50 grains of ozokerite in one ounce of hot benzoline spirit, and then add 10 ounces of the same solvent.

George L. K——.—1. No covering is more suitable than oilcloth, as it does not harbour the dust. 2. Either will answer, but we prefer the latter.

Caoutchouc.—Obtain what is known as fine cut unvulcanised sheet, and put it in a bottle with 20 times its weight of benzole (the so-called benzoline will not answer). At the end of some days thoroughly stir the mixture so as to make it quite uniform.

*** Several correspondents will be answered in our next.

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THE PHOTOGRAPHIC NEWS.

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THE EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The next Exhibition of this Society will be held in the Gallery of the Royal Society of Painters in Water Colours, 5a, Pall Mall East, London, S.W., and will be inaugurated by a conversazione, open to members and their friends, at 8 p.m., on Saturday evening, the 3rd of October.

The Exhibition will remain open daily (Sundays excepted), from Monday, the 5th of October, until Saturday, 14th of November. It will also be open every Monday, Wednesday, and Saturday evening.

Medals will be placed at the disposal of the judges for artistic, scientific, and technical excellence; and the judges may award three medals for portrait or figure subjects, and one for lantern transparencies.

The judges will consist of the following gentlemen:—James Glaisher (President), T. Sebastian Davis, Joseph Paget, John Spiller, G. L. Addenbrooke, E. Dunmore, and J. Gale.

Packing cases containing exhibits must be sent (carriage paid) addressed to the Photographic Society of Great Britain, care of Mr. James Bourlet, 17, Nassau Street, Middlesex Hospital, London; and must arrive *not later* than Thursday, September 24th. Pictures by hand will be received at the Gallery, 5a, Pall Mall East, on Thursday, September 24th, until 9 p.m. Apparatus and appliances must also be delivered at the Gallery, on Thursday, September 24th.

Lantern transparencies sent in competition for the medal—not less than twelve, fitted (removable) in a frame, to stand upon the table—must be delivered on Thursday, September 24th, and will only be eligible for award when both negatives and slides are the work of the exhibitor.

Photographic transparencies will be shown with the Society's optical lantern on Monday evenings during the Exhibition. Slides are invited to be sent for this purpose; they must not exceed 3¼ inches in height, and should be delivered at the Gallery not less than a week before the Monday of Exhibition, to enable the Committee to select and arrange them.

Each exhibitor must send a letter of advice containing a description of each picture, as also a statement of process, and any further detail, to be inserted in the catalogue, to be addressed to the Hon. Secretary, Photographic Society of Great Britain, 5a, Pall Mall East, London, S.W. It is suggested that when any work shown is taken by a special process, prepared and made by the exhibitor, information as to particulars should be communicated.

At the back of each frame must be written the name and address of the exhibitor, with the title or description of the picture, and the number (if there be more than one) to which it refers in his letter of advice. Each frame or picture may have the exhibitor's name and subject neatly inscribed, but no address or anything in the shape of an advertisement will be permitted. Each piece of apparatus must have a card attached (removable) containing the name and address of the exhibitor, and a description of the exhibit for insertion in the catalogue. The Hanging Committee are instructed to refuse apparatus that has no novelty of design or application. Pictures in Oxford frames, and pictures previously exhibited in London, will not be admitted.

No charge will be made to members of the Society for exhibiting their pictures, but to non-members a charge of one shilling per square foot will be made for wall space, the minimum charge being five shillings; but no charge for wall space will be made to foreign exhibitors, or to those exhibitors who may become members of the Society at the November meeting.

It is proposed to lay on the table a catalogue containing the price of pictures and apparatus to be disposed of; those who wish to avail themselves of this proposal must state the price of their exhibits in their letter of advice.

All exhibits received in packing cases will be re-packed and despatched after the close of the Exhibition; and notice will be sent to exhibitors when to fetch away those works which are left at the Gallery by hand; but should any exhibitor not be able to send to the Gallery, he can, by giving notice to the Assistant-Secretary, and paying the cost, have his pictures packed in a case and returned by carrier.

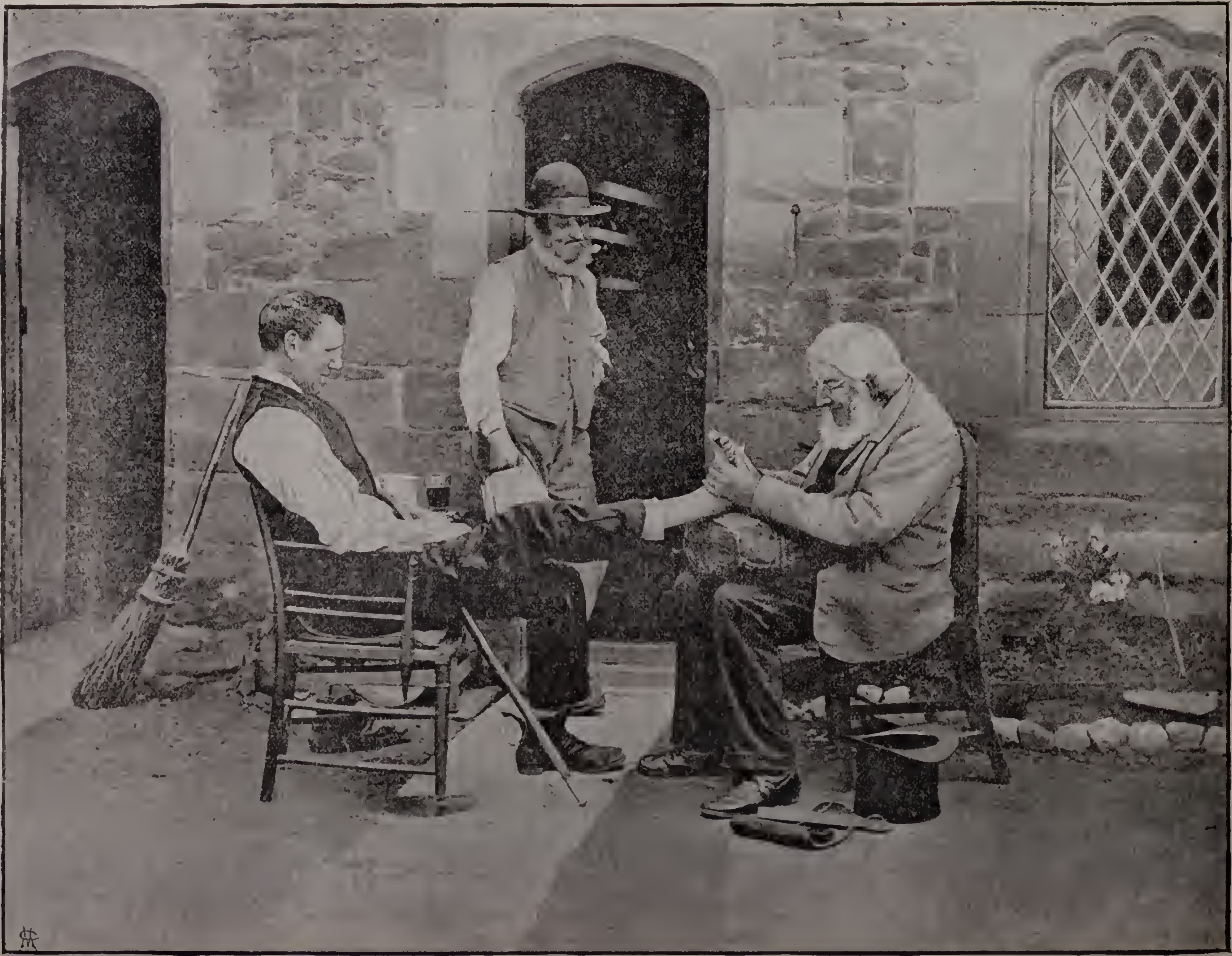
It is to be distinctly understood that the sending of exhibits signifies acceptance upon the part of the exhibitor of the appropriation of the awards made by the appointed judges, and the decision of the Council upon all matters connected with the Exhibition, as absolute and final.

Any further information respecting the Exhibition can be obtained from the Assistant-Secretary, Edwin Cocking, 57, Queen's Road, Peckham, S.E.; or the Hon. Secretary, W. F. Donkin, Malvern Lodge, Upper Tulse Hill, S.W.

THE "CORN DOCTOR," BY F. S. SEED.

Few among photographers have been successful in making anything like pictorial compositions by photography; in fact, to make anything of this kind which is presentable, demands much natural tact as regards the management of the models, and considerable artistic perception. Indeed, the absence of these often not only renders attempts at representing ideas by photographed groups futile, but makes them ludicrous.

Mr. Seed's Corn Doctor, which we reproduce this week, is a striking example of success in the art of grouping for photography, so that a picture is obtained which tells a



THE VILLAGE CORN DOCTOR. F. S. SEED, HEREFORD, COPYRIGHT.

tale. The expression on each face is just what one might expect if the models were unconscious of being photographed, and the result is a harmonious picture.

Mr. Seed, in referring to his work, says:—

> If you would be successful in this class of picture, you must be constantly on the look-out for "subjects;" the work is sure to be more or less a failure if you try to manufacture, as it were. Having found the said "subject," with the help of your art knowledge (I wish all photographers were artists), add any little necessary details, then up camera and fire away if the time is favourable; if not, make a note or two in your pocket-book for future use.
>
> My pet lens for this work is the rapid rectilinear; with that and a moderately rapid plate, I always feel that any failure must be my own fault.
>
> For development—after going the round of nearly all—I prefer pyro and ammonia, building up the image very slowly by small additions of ammonia. I would add, I consider Mr. Brightman's formula a very good one for slow development.
>
> As to my "subjects," the "Doctor" to the right of picture is a grand old veteran of ninety-four, with whom it is my privilege to have many a pleasant chat and smoke; he, as well as the two others, are inmates of an ancient hospital or almshouse situate in the grounds of the Blackfriars Monastery next to my own house. He "practices" for the benefit of the other inmates, and I believe very satisfactorily. I was present at one of his painless extractions, when the idea of this picture occurred to me.

◆

ON SAVING SILVER IN SENSITIZING ALBUMENIZED PAPER.

We were talking some time ago with a well-known portrait photographer, and came on the subject of residues. He did not, he said, make any attempt to recover silver from his plates, but from his albumenized paper he did. He had converted a cellar of his establishment into a huge tank or cesspool, and into this he allowed his washing waters and old fixing baths to run. The silver was continuously precipitated, whilst the water was allowed to overflow. Some time since he had kept the whole precipitate from a summer's work, and had employed his time during a portion of the winter in reducing this, with the result that he ultimately found himself in possession of a lump of metallic silver weighing only a few ounces short of 60 lbs.!

This is an example of the saving that can be accomplished by a little care.

In using albumenized paper for printing, all the silver beyond what actually goes to form the image may theoretically be recovered by preserving the washing waters and the toning and fixing baths. As the amount of silver which forms the image is exceedingly small, and as it varies to an almost unappreciable amount with the richness of the silver in the unexposed paper, it would be of no consequence, as regards expense, how strongly the paper is salted, and how strong a bath we used to sensitize it, were we able in practice to preserve all the silver which is removed from the print during the various manipulations which take place between the actual printing and the final washing.

That a very large proportion of the silver can be recovered is, of course, known to all; but that there is always a considerable percentage of loss is equally well known. Very careful experiments made some twenty years ago showed the largest percentage of recovery of silver possible in practice to be between 70 and 80 per cent.; whilst with the amount of care which is usual even in well-regulated photographic establishments, probably not more than about one-half the silver used in sensitizing is ever recovered. For this reason it is in reality a saving to reduce the amount of silver which is used in sensitizing the paper. Indeed, the tendency to the use of weak silver baths shows that there is a desire to use as little silver as possible in sensitizing. We do not ourselves believe in weak baths—that is to say, in the excessively weak baths which are now very frequently recommended. We have, as the result of a series of experiments performed on all the brands of albumenized paper on which we could lay our hands, come to the conclusion that the best results of which the paper is capable are in no case to be had with a bath weaker than 45 grains to the ounce, seldom with one weaker than 55 grains; whilst 60 grains may be taken as an all-round standard strength.

We consider it the very worst policy to sacrifice a single iota of quality to saving of silver, and therefore can by no means recommend the use of a weak bath; but there are various ways of economizing the amount of silver which is taken up from a strong bath, without sacrificing any of the advantages due to the strong solution. The very minimum of silver which the paper can absorb is of course that which goes to form the actual sensitive chloride and albumenate of silver. The quantity of this is, as a rule, beyond the control of the photographer, as he purchases his paper albumenized. With most brands of paper it amounts to less than half the silver which is in the ordinary way of working taken up in sensitizing. It is quite unnecessary that the paper should contain this large excess of silver in the form of free nitrate. The advantage derived from the use of a strong bath lies in sensitized compounds produced, not in the large amount of free silver nitrate which adheres to the surface of the paper. The function of the free silver nitrate, so far as is known, is to absorb the chlorine given off when the chloride of silver is reduced. In the manufacture of certain so-called "ready sensitized" papers—that is to say, albumenized papers which can be preserved in the dark for a considerable time without discolouring—the free silver nitrate is entirely washed out, and is replaced by some other chlorine absorbent. None of these in our opinion act so satisfactorily as silver nitrate. It does not follow from this, however, that the large quantity of free silver nitrate usually present in sensitized albumenized paper is necessary to act as a sensitizer. In fact, we have fully persuaded ourselves that a comparatively minute portion of silver nitrate is sufficient.

We sensitized paper in the usual way, washed out all the free silver nitrate, and re-sensitized by floating on baths of various strengths. We found no perceptible falling off in quality of the paper from that of sheets not washed at all, till our re-sensitizing baths fell as low as two grains to the ounce.

In practice it is very easy to wash and re-sensitize paper, and the advantages of so doing are very considerable.

There is a great saving of silver—or rather, we should say, a great recovery in a very convenient form; the paper will keep four or five times as long as paper treated in the usual manner, and it will print somewhat more quickly, because with the silver nitrate there is washed out the other soluble nitrate or nitrates which act as restrainers.

The following is the manner in which, in practice, we wash and sensitize paper. The paper is floated in the usual manner, but a trifle longer than usual, because the sensitizing action will not have the opportunity of continuing during drying, as is the case when all the free silver nitrate is left on the surface. The sheet is transferred from the sensitizing bath to one containing ordinary tap water; here it is allowed to float for a few minutes, when it is transferred to a second water bath, and hence to a very weak bath of nitrate of silver. This latter may be as weak as two grains to the ounce, but it is advisable to keep it up to three or four grains for safety.

There is no great loss of time in performing this operation, because at the end of each four or five minutes each sheet is simply moved on a stage. When the first water bath reaches the strength of about ten grains to the ounce, it is put on one side to be treated with salt, the second bath takes its place, and a bath of clean water takes the place of the second bath.

The salt precipitates the silver in the form of fairly pure chloride, which is readily reduceable to metallic silver. At least one ounce of silver nitrate should result from the washing of a quire of paper. This ounce recovered in the first washing bath is replaced by about thirty grains in the re-sensitizing bath.

Without going the length of actual washing of the paper, a very considerable saving can be brought about simply by care in manipulation. All know how great a saving can be ensured merely by the exertion of patience in removing the paper from the solution. We pointed out some time ago that there is a very considerable saving insured by making the paper as damp as possible before floating. A still further saving arises from blotting off the surface of the paper immediately that it is removed from the bath.

ACTION OF COLOURED SUBSTANCES UPON THE COLOUR SENSITIVENESS OF BROMIDE OF SILVER IN GELATINE.

BY DR. J. M. EDER.*

Comparison between Abnormal Dispersion of a Dye-Stuff and its Sensitizing Action upon Silver Bromide.

Of those dye-stuffs which have a marked sensitizing action upon bromide of silver, this action is, for the most part, indicated by their abnormal dispersion. Dr. E. Albert says:—"Bromide of silver is chiefly affected by dyes of short wave length (blue and violet). By abnormal dispersion the waves of shorter wave length are brought to the red end of the spectrum. Thus," says Albert, "the shifting of the maximum towards the red end may, without violence, be explained." He spoke, however, from theoretical considerations alone, and not from experimental researches.

In the explanation of my views I will employ fig. 14, from Schellen's "Spectrum Analysis," 1883. In the normal spectrum (1) the rays succeed each other from left to right in the order of their diminished wave lengths In the abnormal spectrum of a concentrated solution of roseaniline the absorption band is close to E, and on either side appears the half of the normal spectrum. On the right lie the rays of greater wave length (red, orange, yellow, and yellow-green); and to the left of the absorption band are those of shorter wave length (violet to blue-green). In fact, in the abnormal spectrum of fuchsine the rays from C to D½E have just the same wave lengths as are possessed in the normal spectrum by the rays from G to H, which are the most powerful in their action on silver salts.

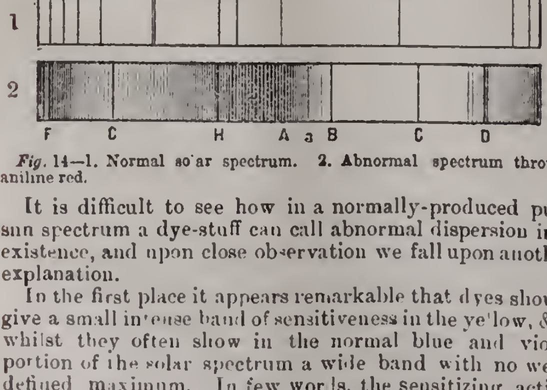


Fig. 14—1. Normal solar spectrum. 2. Abnormal spectrum through aniline red.

It is difficult to see how in a normally-produced pure sun spectrum a dye-stuff can call abnormal dispersion into existence, and upon close observation we fall upon another explanation.

In the first place it appears remarkable that dyes should give a small intense band of sensitiveness in the yellow, &c. whilst they often show in the normal blue and violet portion of the solar spectrum a wide band with no well defined maximum. In few words, the sensitizing action must produce, in the yellow or red, a similar image to that in the blue. It should therefore produce in iodo-bromide or iodo-chloride of silver in gelatine—which have *two maxima* of action in the normal spectrum—two maxima of sensitiveness at the yellow end with the abnormal spectrum. This I have never found to be the case when the dye itself only displays one absorption band.

In the next place, it would be necessary, when the dye would generate a band of small wave rays at a given place in the spectrum, that the maximum of sensitizing effect should with that dye be different for bromide of silver and chloride of silver, because chloride of silver suffers the greatest amount of decomposition near H, and bromide of silver from near G to F. Consequently, the maximum sensitizing effect with chloride of silver should lie essentially further from the red than with bromide of silver. Experiments with eosine and cyanine, however, gave me negative results; the maximum of normal action in the blue portion of the spectrum is, with dyed chloride, bromide, iodide, iodo-bromide, and iodo-chloride of silver, narrowed according to the nature of the silver salt; but the maximum of sensitiveness due to the dye towards the red end is constant.*

Abnormal dispersion, therefore, does not suffice for the explanation of the sensitizing effect of dyes upon the bromides, &c., of silver.

Upon the *fluorescence of the dye* the sensitising effect is, according to the writings of other enquirers, not dependent, and I can confirm this view from my own researches. There are, for example, dye-stuffs (naphthaline red) which fluoresce red and sensitise similarly to others which fluoresce yellow (certain eosine dyes) or green. On the other hand, there are many more fluorescent dyes (cyanine aniline red) which sensitize; in fact, there is in this direction no conformity to rule.

Comparison between the Chemical and Physical Properties of Substances, and their Sensitiveness to Light.

All dye-stuffs do not in the same degree increase the relative sensitiveness of the silver to the less refrangible rays—many, indeed, have no essential influence. I have experimented upon 140 dye-stuffs, each in two or three different grades of concentration, and with at least three different lengths of exposure to light (varying from 100 to 300 times), and could only discover sensitizing power with a fraction of them, and even when a list of those which I have found to sensitize is given, only a small portion of these has a powerful action.

Within very narrow limits, those having a similar chemical constitution show also similar absorption spectra and sensitizing effect; for example, iodide, chloride, sulphate, and nitrate cyanine, the different rosaniline salts, &c. This, however, does not say much. The property referred to more commonly accompanies the derivatives of fluorescine. Fluorescine and benzyl-fluorescine (chrysoline) sensitize for green; bromised, chlorised, and iodised fluorescine (eosine) for yellow-green as far as the yellow; on the other hand, this conformity to rule is disturbed by the almost imperceptible action of nitro-derivatives.

Since fluorescine is a phtalacid derivative—that is to say, resorcinphtaline—I tried phenolphtaline (with alkaline red) and orcinephtaline (red), as well as the bromo and nitro products of the latter, without obtaining any noteworthy result.

Rosaniline salts sensitize for yellow and orange, but rosaniline sulphite does not; against this, sulphate of bitter-almond-oil-green, that is, bitter-almond-oil-green, itself does sensitize. Trimethyl-rosaniline, as well as triethyl-rosaniline salts (Hofmann's violet, &c.), sensitize for orange as far as red; phenyl-rosaniline and its sulphate (aniline blue) do not noticeably do so.

I could discover no connection in conformity to any rule between the chemical constitution of a dye-stuff and its sensitizing action.

More success was met with in tracing this conformity between the position of the maximum of absorption of coloured light of a dye, and its sensitizing action upon bromide of silver in gelatine. From the former the latter may be inferred, and it may thus be foretold whether the dye will sensitize silver bromide in the green, in the yellow, or in the red. The absorption spectrum of a sheet of gelatine stained with the dye is observed, and the before-mentioned shifting of the sensitizing band towards the red is noted. This succeeds with all dyes *which are sensitizers for bromide of silver in gelatine.*

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* Concluded from page 421.

* I disregard, in this, slight irregular contractions, which I attribute to the influence of the atmosphere upon the quality of the light.

The question now forces itself upon us: What dye-stuffs are sensitizers? I know of no other sure means of obtaining a reply than that of applying the photographic experiment. According to my observations, dye-stuffs which sensitize the silver haloids must fulfil the following requirements:—

1. They must dye the granules of silver bromide. Dyes which sensitize powerfully are all so-called "substantive dyes."

2. They must, when in the dry state, and even in a low state of concentration, show with the stained gelatine—or, more correctly, with dyed silver bromide—an intense bend in the absorption spectrum, that is if they are to show an intense blackening with silver bromide. A narrow absorption band gives a similar one in sensitizing.

I have before mentioned that neither fluorescence nor abnormal dispersion of dyestuffs explains their sensitizing action upon bromide of silver for the less refrangible rays.

The proposition that in the place of the absorption band the molecules of dye are set swinging energetically, and with them the neighbouring bromide of silver, is untenable, as Dr. E. Albert shows. Except as regards abnormal dispersion, the dye molecules do not swing at the place of absorption, but, on the contrary, vibration is annihilated, and in its place either heat or chemical decomposition is generated.

A chemical decomposition of the dye might be assumed, the decomposition products of which act secondarily as reducers upon silver bromide:[*] This view, however, has been recognized by Professor H. W. Vogel as not of general applicability.[†]

According to my view, the mutual action of the dye-stuffs and bromide of silver upon each other is of far more importance, and certainly quite independent of any sensitiveness to light of the dye-stuff itself.

Bromide of silver combines with dye through molecular attraction[‡] and becomes stained. The associated dye-stuff vigorously absorbs light at the place of the absorption band, and for the greater part conversion into heat, but to a smaller extent chemical action, takes place. The destruction of light I propose to call in the first case "photo-thermic extinction," and in the second, "photo-chemical extinction."[§] Bromide of silver, intimately mixed or combined with a suitable dye-stuff, acts thus: a great part of the light absorbed under these conditions becomes transformed into chemical work, whereby the silver bromide is drawn into the process. The tendency of the dye-stuff itself to oxidise in the light is strengthened by the property of silver bromide to yield deoxidizing bromine in the light.

When a coloured substance with strong elective absorption adds to its power of transforming light into heat (yet a photo-chemical process) there come into action with the latter, rays of that wave-length which are caused by the former. The place of the absorption band remains unchanged; homogeneous rays of light are transformed sometimes more into heat, sometimes more into chemical action; absorption must then become changed, in quantitative comparison, because photo-chemical extinction must be added to photo-thermic extinction, as Bunsen with a mixture of chlorine and hydrogen (chemical and optical extinction), and Marchand with chloride of iron and oxalic acid, have shown. In all these cases the maximum of photo-chemical decomposition in the spectrum takes place principally in accordance with the position of the absorption band of the colouring element.

From the facts which have been cited, I think I am entitled to formulate the following law for photo-chemical decomposition.

When the mixture (or compound) of a colouring body of strong elective absorption power, with another, is decomposed in the light, rays of that particular wave-length are called into action which are absorbed with photo-thermic extinction by the first, whereby a maximum of photo-chemical decomposition in the spectrum is determined by the colouring body. When the substance of less elective absorption power possesses itself considerable sensitiveness to light, decomposition takes place more or less characteristically along with that called forth by the absorbing dye.

By the addition of dye to certain silver salts (especially bromide and chloride), their sensitiveness to the less refrangible rays, corresponding to Vogel's observations, becomes increased, so that the mixture is more sensitive to these rays than the single components are, by which means the maximum of action of the dyeing mixture follows the above-mentioned law.

APPLICATION OF DYED GELATINE PLATES AND ORTHO-CHROMATIC PLATES.

Bromide of silver gelatine plates, which, by the addition of the above-mentioned dye-stuffs, are sensitized for any one part of the spectrum, may be applied to many purposes. The study of the spectrum itself, which, until now, has only been able to be photographed upon bromide of silver in gelatine, from the ultra-violet to the green, can now be photographed with ease to beyond C in the red (for example, with cyanine or iodine green); we can thus work with incomparably greater certainty than with the so-called "sensitive to red collodion emulsion."

In the next place paintings, tapestry, embroidering, may be reproduced with the proper light-value for blue and violet on the one hand, and yellow and red on the other, without the first-named coming out too light, or the others too dark, the great failing hitherto in the accustomed photographic preparations. Such results I have aimed at with bromide of silver gelatine plates dyed with eosine, cyanine, benzol rose, aniline, violet, and naphthaline red, where, however, I have certainly used a yellow glass before the lens to weaken the blue rays.

Such orthochromatic plates I have already exhibited in August, 1884, without being acquainted with the—as yet unknown by demonstration—azaline plates of Professor Vogel. On September 11, 1884, at the foundation fête of the Photographic Society in Frankfort, à M., I exhibited a collection of photographs of very difficult subjects, water-colours, embroideries, and especially of some old oil paintings, which had previously presented almost insuperable difficulties. Their first application to the study of absorption spectra is set forth in this work.

I wish to express my thanks to those gentlemen who have assisted me with samples of dye-stuffs, especially to Professor Pohl, Dr. Benedikt, and Herr Hecht in Vienna, Dr. König in Höchst à M., and Dr. Schuchardt in Görlitz, as well as to Dr. E. Hornig in Vienna, whose assistance has lightened my labour in many ways.

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[*] This view was expressed by Abney, supported by his experiments with cyanine. Cyanine is decomposed in the yellow. A glass plate is coated with plain collodion coloured with cyanine, and exposed to the spectrum, then coated with silver bromide in collodion, and developed *without further exposure to light*. An image is produced at the place which had received the yellow rays where cyanine blue shows an absorption band. Direct addition of the dye and subsequent exposure gave the same result.

[†] *Photographie Mittheilungen*, Bd. 15, page 91.

[‡] If it is accepted that the dyeing of fabric (wool, &c.) takes place by chemical combination with the dyestuff, the same may be supposed here; in the other case, molecular attraction.

[§] To these may be added "photo-electric extinction." This division appears to me to be more generally applicable and precise than Bunsen's "optical" and chemical extinction.

MARTYRS TO PHOTOGRAPHY.

A DOMESTIC DRAMA OF TO-DAY.

(SCENE—*The Drawing-Room of the Pyros. Enter Mr. Pyro with camera.*)

MRS. PYRO. My dear Henry, what *are* you going to do with that camera? Not use it in the drawing-room, surely!

MR. PYRO. Well, yes, if you don't mind, Matilda. I'm rather tired of landscapes, and would like to try a little portraiture. Have you got five minutes to spare?

MRS. PYRO. Oh, Henry, I *can't* sit now, in this shabby old dress.

MR. PYRO. The dress doesn't matter a bit. Photographers always say that people take very much better in their old clothes. Besides, I'm only going to try a few plates just for practice. Want to get hold of the right lighting of the head, and all that, you know.

MRS. PYRO. Well, if you're sure you won't be more than five minutes—

MR. PYRO. Oh, certain. I think this is about the spot (*places chair.*) Just sit here, Matilda, please. (*Mrs. Pyro sits down, and Mr. Pyro gazee at her fixedly for a minute and a-half.*) I don't quite like that lighting. I can't see the line down the nose.

MRS. PYRO (*indignantly*). A line down my nose, Henry! I'm sure I've nothing of the kind.

MR. PYRO. I mean a line of light. Just move about eighteen inches from the window. Yes, that's better. Now look at—at—at—ah!—at that vase on the what-not; no, that's too low. Try the corner of the picture of your father. No, that won't do; it's too high.

MRS. PYRO. Don't keep me long, Henry, I'm so afraid the new girl will drop the baby and let it get hold of the scissors or something.

MR. PYRO (*confidently*). Oh! the baby's all right. Here, fix your eye on the brass candlestick on the piano (*murmurs to himself*). There seem to be two spots in the eye.

MRS. PYRO. Two spots in my eye, Henry!

MR. PYRO. Spots of light, my dear. There ought only to be one. Would you mind moving your head half-an-inch to the right? Oh! that's a great deal too much; half-an-inch, I said.

MRS. PYRO (*pettishly*). Yes, I know you did. But how can one tell what is half-an-inch without measuring.

MR. PYRO (*stepping up to Mrs. P. and attempting to arrange her head*). There, that's the position I want, looking at the work-basket, you know. Very good indeed. It'll do capitally.

MRS. PYRO (*rising*). I'm very glad, for I was becoming awfully tired.

MR. PYRO. For gracious sake, Matilda, don't get up and spoil that pose.

MRS. PYRO. Oh, I thought you'd finished.

MR. PYRO. Not at all; only just begun. Do oblige me by sitting down again.

MRS. PYRO. Well, but do make haste (*sits down resignedly*).

MR. PYRO (*thoughtfully*). H'm. Pose not so good as the other, but I suppose it must do.

(*Moves camera into position. Mrs. Pyro screams.*)

MR. PYRO. Good Heavens, my dear, whatever is the matter?

MRS. PYRO (*gaspingly*). The lace curtains!

MR. PYRO. Eh! What! Are they on fire?

MRS. PYRO. On fire? Of course not. Can't you see you've put that nasty spiky thing through them? And they only came home from the cleaners yesterday! It's too bad, Henry!

MR. PYRO. What a fuss over a little hole. There, I've pushed them back.

MRS. PYRO. Yes, and put them all out of shape. What are you doing now?

MR. PYRO (*spreading some sheets of white paper on the ground*). Your face is a little dark on the shadowed side, and this paper will throw up a reflection.

MRS. PYRO (*reproachfully*). Why do you take the worst side of my face, Henry?

MR. PYRO. My dear, I can't help it. The situation of the window won't let me take it on the other side. There, sit quite still while I focus you. (*After some difficulty Mr. P. gets the camera legs arranged. As he is using a six feet landscape tripod, the furniture has to be moved to allow the legs to be stretched sufficiently wide.*) About the height, I fancy (*buries his head under the focussing cloth*).

MRS. PYRO. Hark! I thought I heard baby crying. Do let me go, Henry.

MR. PYRO (*from under the focussing cloth*). Just one moment. Can't get the camera low enough so as to have your head on the plate (*moves the tripod a little wider, and, not noticing he has placed one leg on the smooth tiles of the fire-place, when he removes his hand the leg slips, the camera falls to the ground, and he remains enveloped in the focussing cloth*).

MRS. PYRO (*without a shade of sympathy*). There, Henry, do put it away for to-day. I suppose you've smashed it?

MR. PYRO. (*Somewhat ruffled*). No, luckily it's all right. I must use something instead of the tripod. Ah! that music-stool will do with some books upon it. (*Piles up a Staunton's Shakespeare, and six volumes of "All the Year Round" on the music-stool, and plants the camera upon them*).

MRS. PYRO. I'm sure baby's crying.

MR. PYRO (*Under the focussing cloth*). Nonsense; *I* can't hear him. Wish I had something to tilt up the camera a little in front. Perhaps this penholder will answer the purpose; yes, capital. Remember, keep looking at the work basket.

MRS. PYRO. I thought you said I was to look at the candlestick.

MR. PYRO. No, no, never mind the candlestick. Now then, I'm going to put in the dark slide.

MRS. PYRO (*Uneasily*). What *is* that girl walking about so overhead for? I feel sure she's left baby to himself.

MR. PYRO. I tell you he's all right, though I wish she wouldn't walk; the least noise sets these books and camera vibrating. Now then, the exposure won't be long (*takes the cap off and intends to count ten. At eight a bump is heard upstairs, followed by a squall.*)

MRS. PYRO (*agitated*). There, I told you something would happen to that darling child. (*Rushes out of the room.*)

MR. PYRO.—(*Well, it doesn't matter what Mr. Pyro said.*)

[*A quarter of an hour later. Mrs. Pyro has returned to the drawing-room with the baby. Mr. Pyro has come back from his dark room.*]

MR. PYRO. Well, is he hurt?

MRS. PYRO. No, thank goodness; but if he had broken his back I should put it down to your horrid photography. I suppose I look a fright in the photograph you've taken?

MR. PYRO. Well, not exactly, my dear. The fact is, you don't appear at all. *I forgot to pull out the shutter of the dark slide!* (Tableau.)

Patent Intelligence.

Applications for Letters Patent.

8313. JOHN BAILEY HOLROYD, Waterhouse Chambers, Crossley Street, Halifax, for "Improvements in camera slides, dispensing with the use of glass plates, and in substitution thereof."—9th July, 1885.

8381. JOHN MONTGOMERY CHARLES GROVE, Castle Grove, Letterkenny, Ireland, for "An improved device for supporting, raising, lowering, levelling, and directing photographic cameras, and for other purposes."—11th July, 1885.

8367. FRANK BISHOP, 53, Chancery Lane, London, for "An improved stand for exhibiting photographic and other pictures, and show and other cards."—(J. F. Knipp and Co., Gcmany.) —10th July, 1885.

Patent Sealed.

7792. William Heath, 24, George Street, Plymouth, Optician and Mathematical Instrument Maker, for "An instantaneous shutter for use in obtaining photographic pictures."—Dated 16th May, 1884.

Specifications Published during the Week.

15,887. William Middlemiss, of Holmefield Mill, Thornton Road, Bradford, in the county of York, Camera Maker, for "Improvements in photographic cameras."—Dated May 14th, 1885.

A camera with multiple adjustments, the claims being—

1. The two brass angle plates, and the method of fastening the supports of camera front to these angle plates.
2. The method of sliding the camera front and its supports from one end of moveable frame to the other, so as to obtain long or short focus.
3. The combined arrangement of parts, as before described, of camera front, wood or metal frame, strutts and brass angle plates, whereby the camera front and its supports may be folded into bottom of camera, from the back end of camera bottom without detaching any part.
4. The brass plate to which the camera back or body is hinged.
5. The method of fastening the back and brass strutts to this brass plate so as to move the camera body horizontally.
6. The method of sliding the brass plate, camera back, and brass strutts combined, from one end of the camera bottom to the other without detaching any part.
7. The base-board and the use of it as tripod top and as a protection to glass focus screen.

Patents Granted in America.

321,139. Thomas Samuels, Hadley-Monken, County of Middlesex, England, assignor of one-half to Alexander Melville Clark and William Clark, "Photographic camera." Filed September 17, 1884. (No Model.) Patented in England May 3, 1884, No. 7,201; in France September 1, 1884, No. 164,039; in Belgium September 2, 1884, No. 66,194; and in Germany September 9, 1884, No. 31,170.

321,244. Ludwig H. Philippi, Hamburg, Germany, "Method of producing photo-relievos." Filed January 8, 1883. (No specimens.) Patented in Italy October 4, 1882, No. 16/14, 636; and in Belgium October 16, 1882, No. 59,109.

Claim.—1. The process of producing photo-relievo engravings having depressions of equal depth upon their surface, which consists of covering a plate of non-corrosible material with a uniform layer of corrosible material, forming the design upon the said corrosible material in non-corrosible varnish, and etching away the exposed portions of the corrosible material down to the non-corrosible plate, substantially as set forth.

2. A photo-relievo engraving as produced by the hereinbefore-described process, consisting of a uniform layer of corrosible material in combination with a non-corrosible base-plate, so that the depressions etched through the said corrosible material are of equal depth all over the plate, substantially as set forth.

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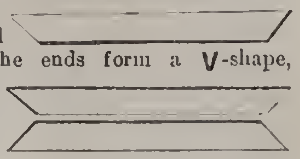
CAMERA BELLOWS MAKING FOR AMATEURS.

BY T. G. WHAITE.

A few weeks ago, at one of the monthly meetings of the Edinburgh Photographic Society, I gave a demonstration on making camera bellows, these being so much required by amateurs for experimental work, enlarging, microscopic, and lantern slide making. Since then I have received many applications for particulars, both from professional and amateur photographers. The report of the proceedings merely stating that such had taken place, the subjoined short description and few diagrams will, I hope, make matters clear, and be of some use to our co-workers.

There are two methods of making bellows; the first I will call the old-fashioned, and the second the modern. The first, though making a rather heavy bellows, may still be found the best for fixed or studio work. The second makes a much lighter affair.

First procure four pieces of wood that will form a box, the size and shape of the bellows required, either a square or a cone shape; tie them together by winding cotton-thread round, or lightly tack them together, so that when finished the box or mould may be pulled easily asunder and removed from inside the bellows: wrap or cover this box with newspaper or thin paper to prevent any extraneous glue going through canvas and fastening the bellows to the box, then cover it with black calico, gluing it over at the joint in the centre of what will eventually be the bottom of bellows. Then take strips of thin cardboard, cut into strips the width of each fold, say an inch with the ends cut to an angle of 45°; glue these at intervals and all round the box, letting the ends form a V-shape, by placing the two shorter sides opposite each other, and then the two longer sides, leaving a gap between each piece a little more than double the thickness of the cardboard and calico, or about three times thickness of the cardboard.



When the whole of the sides of the box are covered, glue another piece of calico over all these, again making the junction at the bottom. Now, with a paper-knife, score between the cardboard, and let set a *little*, pull out the box a little way, and commence folding the bellows into form; when all folded, place under pressure till dry. Care must be taken that the strips of cardboard are sufficiently wide apart, or a "hinge" cannot be formed, to allow the angles to close up entirely. Of course, thin leather may be used, if wished, for the outer covering, and expense be no object.

The Improved Method for Cloth Bellows.—Procure two pieces of calico of equal size; glue between these (a mixture of shoemaker's paste and glue is best) a sheet of brown paper, and, as soon as glued, score either with a paper-knife or back of a knife blade, the four corners on the *inside*, as at fig. 1; then, with a guage piece of wood, the width of folds required (say an inch) score as at fig. 2, first one "score" inside, then one outside, so that they will fold as at fig. 3; fold whilst the glue is still soft, and press well up; then lay the calico out *flat* again, and make your joint as at fig. 4, by gluing the two ends of calico at bottom of bellows. When dry enough, begin bending the corners into position, and place under pressure to dry.

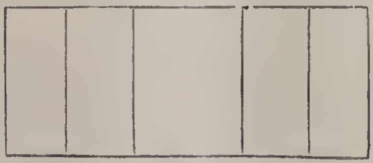


Fig. 1.

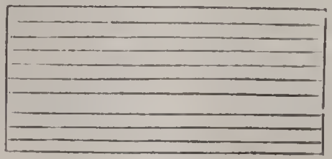


Fig. 2.

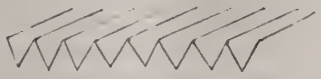


Fig. 3.

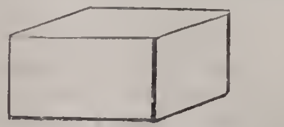


Fig. 4.

As an experiment it is worth the little trouble to try and make one of about four folds on an ordinary match-box. To show how simple the matter is, by adopting this plan, there will be no occasion to constantly refer to this article when making the bellows.

Notes.

The London Photographic Exhibition will open to the public on Monday, October 5th, and exhibits must be in, on or before September 24th. Further information on page 449.

It is to be hoped that much more care will be taken as regards the admission of apparatus than was the case last year; in fact, that nothing will be admitted unless it is a novelty of the year.

Strange it is that once more there should be appended to the Photographic Society's Exhibition conditions, a special notice in coloured ink to the effect that the rules and regulations are to be adhered to. Here is the notice.

"*Special Notice.*—By order of the Council.—The Rules and Regulations respecting the Exhibition are to be strictly adhered to, therefore no Picture or Apparatus will be received after Nine o'clock, p.m., on Thursday, September 24th."

To make rules, and then issue a notice that they will be observed, is ludicrous enough; but it is still more so to make this notice "Special." The notice purports to be by Order of the Council; this is perhaps a mistake—lay the blame on the printer, is the usual thing.

We have seen during the past week an election address in which the political tenets of the candidates are duly arranged round his vignette portrait; his excuse for thus obtruding himself being that a personal canvass of the constituency was impossible. But is the said candidate quite sure that his distribution of his photograph is not an offence under the new and most stringent Corrupt Practices Act? By that measure candidates are peremptorily forbidden to pay for *vehicles* of any kind for use during the election. How, then, can the one referred to defend his outlay on the *cartes* he is sending round?

Incandescent lamps consisting of refractory substances heated by a gas or blow-pipe flame have never come into very general use—unless we make a partial qualification in the case of limelight, so much employed in the optical lantern; but if the performance of M. Fahnehjelmes new incandescent lamp approaches the promise, we may have an exception to this rule.

A group of thin rods of magnesia or other similar refractory material is placed immediately over a "water gas" flame, and these rods become so hot as to give a white tolerably actinic light, very like an ordinary limelight, but much larger.

The so-called "water gas" is a mixture of hydrogen and carbon monoxide, and it is obtained by passing steam over white hot coke. It gives an intensely hot flame, but its use involves serious dangers. In the first place, it is extremely poisonous, even if inhaled in a small quantity; and in the second place, there is no smell to warn people of its escape. Hence poisonings and explosions are very likely to happen.

Now that Sir Edward Lee, the Manager of the Albert Palace at Battersea, has suggested the offering of prizes to itinerant musicians so as to raise the tone of street minstrelsy, perhaps someone interested in photography will take the hint, and offer a prize to raise the standard of the work turned out by the peripatetic photographer. What the latter has most to contend against is the ungrateful character of his surroundings. How can a man be expected to take an artistic photograph when he has to use a chalk cliff as a background, or a sea wall over which somebody often contrives to dangle his legs at the critical moment, and the unlucky man gets, in consequence, a picture of a lady with a pair of boots on her shoulders! Despite, too, of the utmost care in the selection of a shady spot, what is to prevent the light shining in the eyes of the sitter, and entirely obliterating his or her optics? We fear until the police and the parochial authorities allow photographers to carry about with them some kind of portable studio, so as to furnish a background and get rid of top light, the street photographer will not have much chance of showing what he can do in the way of good pictures.

The low rate, too, at which the itinerant photographer is compelled to work is against him. Threepence is all he can hope to get in some neighbourhoods, though, to do him justice, he always tries to get more. We happened a short time ago to be in the vicinity of Wanstead Flats, and a boy who had been looking enviously at the specimens on a photographer's dark box asked the price. "Nine-pence," promptly replied the operator. "I've only got four-pence," said the boy, and was going on, when the photographer called him back, and offered to take him for that sum. Now it so happened that the boy had ideas of his own, and, to begin with, decidedly objected to be photographed against a horse-trough in front of a public house, just because the camera happened to be placed there, and quite ten minutes were spent in selecting a spot to the sitter's mind. When the photograph was taken, there was a defect, and the "partner"—the itinerant photographers always work in couples—whispered to his "principal" that it didn't matter, as the sitter was only a boy. Unluckily, the boy overheard the whisper, and resolutely refused to have the picture; and it is only fair to say that the principal at once took him again. But from first to last the transaction took half-an-hour, and all for four-pence, to say nothing of the cost of materials. Not very profitable, surely!

As an example of Child Portraiture, that issued as our supplement this week—the Marguerite of J. E. Mayall—will be thoroughly appreciated by our readers.

This picture was one of the attractions of the last exhibition at Pall Mall, but Mr. Mayall could take no award, as he was one of the judges.

The series of instantaneous photographs of Henley Regatta, taken by Messrs. Marsh Brothers this summer, and referred to in our issue of last week, is perhaps more complete than ever, comprising nearly a dozen pictures of surprisingly uniform excellence. As photographs of active life, they may interest anyone. Possibly the boating man (and woman too, for a matter of that) will be much edified in the technology of the boating craft by a study of these photographs; but an outsider will merely wonder what the mystic titles mean, and admire the pictures.

A self-registering photometer is one of the latest American inventions, but it is only a photometer in a very partial sense; in fact, it measures the radiant heat of a gas flame, and it is assumed that this radiant heat is proportioned to the light.

A differential thermometer, having mercury in the syphon tube, is balanced so that the blackened bulb is tolerably close to the gas flame of which the variations are to be recorded. An increase or diminution of heat shifts in mercury and disturbs the balance of the thermometer. The record is taken by a needle, which is connected with the tilting thermometer, being driven through a card at stated intervals, a clock-work motor being used for this purpose.

The lot of the painter who has to design such a picture as "The Meet of the Coaching Club," which occupied the attention of the Law Courts last week, is not a happy one. Thus Mr. Gibson, the plaintiff in the action, was to paint "the heads, head-dresses, and hands only," and he was to be very particular with the portrait of the Princess of Wales, who was "to keep her eye fixed on the drag of the Duke of Beaufort." On the other hand, Mr. Bassano, the defendant, was cautioned by Mr. Gibson that "if you associate the wrong people together you will give mortal offence to somebody." What a volume of anxieties this ominous reminder suggests! Imagine Brown's agonies on discovering himself hobnobbing with Jones, with whom he is not on speaking terms; or Robinson's disgust because White has been placed next the Duke, when everybody knows that he (Robinson) is one of his Grace's dearest friends! Then everybody who had to figure in the picture was to have his photograph taken, and as this meant the photographing of some 160 people, what with inducing persons to sit, the inability in a large number of cases to keep engagements, and the inevitable large percentage of failures requiring re-sittings, the task, would appear to be an interminable one. As a matter of fact, only fifteen out of the number consented to have their portraits taken. But whether this reluctance arose from the "wrong people" being associated we are not told. Anyway, both Mr. Bassano and Mr. Gibson must have been heartily sick of the affair, and ought to congratulate themselves upon the idea being abandoned. Tiresome and vexatious as the preparations for such a picture must have been, a law-suit is infinitely worse.

That the copyright in photographs will soon be protected in Italy is probable, as a measure on the subject is now before the Parliament.

The photographs taken by Mr. Villiers, the special artist of the *Illustrated London News* in the Soudan, are in one sense very disappointing. All those exhibited in the shop windows might have been done in any suburban back garden. Who cares about portraits of Lord Wolseley and his staff, or of a number of officers sitting at mess in a tent? What one would like to have would be pictures of the Arab soldiery; pictures of the battle-field after the contest—ghastly mementoes, no doubt, but undeniably interesting and valuable; "bits" of native characteristics, no matter how trivial; and, above all, if possible, photographs of actual fighting. But this stage of perfection, though often talked about, has not yet been reached.

A photograph of the Horticultural Hall, New Orleans Exhibition, and taken by the electric light, is issued with the current number of the *Philadelphia Photographer*. The view includes eight arc lamps, the result being curiously illustrative of reversed and re-reversed action of light.

In each case the central spot or image of the arc itself is black in the print, while immediately round the arc is a light circle, then a darker circle, and beyond this a light halo graduating off into nothing.

By a happy chance, photography has been the means of adding a valuable historical picture to the National Portrait Gallery. In the *Athenæum* of December 6th appeared an account of the discovery of a picture in the Belvédère Palace at Vienna, representing the House of Commons in 1793, with Mr. Pitt addressing the House. Consequent upon the discovery, the picture was photographed, and a copy presented to the National Portrait Gallery. So much attention was drawn to the subject by means of the photograph, that the Emperor of Austria has presented the original to the British nation. The picture was painted in London by C. Anton Hickel, and is of a very large size. It is expected to arrive in London in a few days.

A favourite photographic design for birthday, Christmas, or New Year's card is a hand holding a bunch of flowers. We have nothing to say against the design as a design, but would suggest that a good shaped *human* hand be always employed as a model. We saw some cards the other day where a plaster cast was used, and the mathematically ruled lines in the knuckles and joints were as unlike human nature as they possibly could be. Are well-formed hands so scarce that a badly-modelled plaster cast must be substituted?

The Darwin Medal—given by the Midland Union of Scientific Societies for the encouragement of original research—has been awarded for the current year to W. J. Harrison, F.G.S., who is Vice-President of the Birmingham Photographic Society, and Science Demonstrator at the Birmingham Board Schools.

Mr. Jan Van Beers, whose collection of pictures in Bond Street took fashionable London by storm a few months ago, knows well the value of photography. He has had a number of his works at the Salon Parisien photographed, and sells the copies for a trifling sum. As the subjects chosen by Mr. Van Beers, and his treatment of them, are essentially "taking," the photographs will doubtless have a large sale. We do not see why this practice should not be generally adopted. Many people would be glad to have mementoes of celebrated pictures, especially if the pictures have a religious tendency. The enormous sale of copies of Mr. Holman Hunt's "The Light of the World" is a case in point. There is a large section of the public who regard seeing certain pictures as they regard hearing oratorios, not as amusements, but in some way as religious observances. A visit to the Doré Gallery, for instance, reminds one very much of going to church. The visitors talk in whispers, move about noiselessly, and assume—unconsciously, no doubt—semi-reverential attitudes. In fact, this demeanour has become so recognised that the managers of the Bond Street Gallery, where a Biblical subject painted by Mr. E. Long is now exhibited, openly announce that silence must be observed.

The latest importation of Western civilisation into Japan is the institution of a Patent law; but it is so framed as to be of little value to any but Japanese subjects.

The proposed Amateur Photographic Club (see page 335) appears to have fallen through in its original form, and an attempt is to be made to form a general club, including both professionals and amateur—several of the former having place on the committee. It is, in fact, to be something very similar to the existing Photographic Club.

A DAY WITH THE TRICYCLE AND CAMERA IN SWITZERLAND.

BY C. RAY WOODS.

In taking train from Lausanne to Visp, and going round by the Lake of Geneva and then up the Rhone Valley, it was impossible to avoid remarking the smoothness and cleanliness of the roads. The Swiss carriage roads are all good, and it is not to be wondered at, therefore, that here and there one meets a traveller, or party of travellers, making their way on the bicycle or tricycle. These travellers are usually English, and their machines embrace almost every pattern, from the small safety bicycle to the "Sociable" tricycle, one seat of the latter being frequently, as in England, occupied by a lady. Being a tricyclist myself—though not, perhaps, a very enthusiastic one—my thoughts naturally recurred to this mode of progression when I found myself returning from the mountains, and on my arrival at Montreux, where I had arranged to meet three friends, whose acquaintance I had made at the Riffel, I looked about for a tricycle as a means of working off a little of the superfluous energy that I had been accumulating in the mountain air. There were plenty of machines to be obtained at Vevey, six or seven miles away, but the only one to be obtained in Montreux belonged to the "chef" of the hotel at which I stopped. His machine was a new one, and he was not easily persuaded to hire it out to me, but on being assured that I was in the habit of riding, we soon came to terms.

Tricycling photographers usually have some special arrangement for carrying their apparatus; I had to make shift as best I could. My 7½ by 5 camera and six double slides I placed in its heavy leather case instead of in the two light satchels I usually take with me when walking, and this case I suspended by the strap to the axle of the "Royal Salvo," it being prevented from swinging by the seat rod, which pressed tightly against it; this was almost as handy as having it in a basket, for I could take it out of the case without detaching the latter from the machine. The camera legs I strapped to the rod, which prevents the machine (a front-steerer) from falling backwards. So far, all was simple enough; but I found on mounting that my heels came in contact with the case at every stroke; this difficulty I got over by putting my feet more forward on the treadles than is customary, and in a short time felt little or no inconvenience by so doing.

The point from which I started was just at the foot of the new railway that ascends the hill of Glion. The railway goes up the hill-side at an angle of about forty degrees, two cars being connected by a long chain, so that as the one descends it helps to pull the other up. On this railway, with the little station in the foreground, I exposed my first plate, then putting my apparatus back into the case, I commenced, at half-past nine o'clock, to ascend the road which leads up to the Castle of Chillon. The first quarter-mile was the hardest part of the road, but that accomplished, a run of a little over a mile brought me to the Castle. The sun shining at this time on the opposite side of the Castle, to attempt to photograph it would have been to waste a plate, so leaving my machine and apparatus in the care of a polite gend'arme, I entered the Castle and took a brief glance at the interior, more particularly at the dungeon where the prisoner, *not* Byron's, was confined. Here they show the visitor the place where his chain rubbed away the rock, and though I would not for a moment doubt that his chain did rub out that much, yet it is impossible to refrain from asking why the prisoner did not rub out his chain at the same time and walk out, for I only saw the one gend'arme to guard the place. On the pillars of the dungeon are inscribed the names of Byron, Eugene Sue, and a thousand other celebrities, said celebrities, mostly English, consisting of every Smith, Jones, and Robinson who possessed a good memory, for the attendant. Seeing that a gentleman of the name of Wood had left his mark there, I prefixed my initials and affixed the letter S, then rode away with that glow within my breast which one always feels after doing a generous and noble deed. Mr. Wood—without the S—may now experience the satisfaction of feeling that he has not laboured in vain. This sort of thing appears to be fashionable, for the initials to most ordinary names showed repeated manglings.

At a little distance from the Castle, on the south side, I alighted, set up my camera, and exposed a plate. One thing only would I have liked omitted from the picture, and that was, the arms of the Canton Vaud, which some patriotic numskulls have painted very large on one of the walls, together with the words "Liberté et Patrie." They have also painted the word "Chillon" in very large letters on the roof of the central tower. I was very glad of this, for while everybody believes it to be Chillon directly it appears in sight, it is nice to have one's impressions confirmed by the sight of a nice label on such an object of interest. One thing only is wanted now, and I humbly commend the suggestion for the consideration of the Swiss authorities—that is, to neatly encircle the whole castle with the words—"Visitors are particularly requested not to touch," in three or four languages.

Between Chillon and Villeneuve, at the eastern end of the lake, there is little of any interest, except a very small islet on which, about a hundred years ago, a lady tastefully planted three elms. It is a pretty and graceful feature in the landscape, but owing to its distance from the shore, and the difficulty of finding any suitable subject to harmonize with it, I was forced to ride on without securing it upon my plates. As I approached Villeneuve, a mile and a half beyond Chillon, "an ancient and fish-like smell" apprised me of the fact that here was a fishing station. A few barges, a number of nets spread out on poles, and many piles of paving stones and logs of wood, apprised me of the nature of the various pursuits of the inhabitants; but with none of the "accessories" mentioned did it seem possible to form a picture. The road through the town was far from inviting, and had I had the hardihood to ride through it, I should doubtless have received a severe bumping in passing over the smooth round stones that formed its paving; so, keeping round by the Lake till I got into the high road again, I made my way with all speed up the Rhone Valley for three or four miles without having occasion to take out my camera, till I came to a pretty little village called La Roche. Here some houses and cottages very characteristic of this part of Switzerland arrested my attention, and turning out of the main road, I drew up under some trees and set up the apparatus. My appearance created some sensation, for before I was quite ready, I found myself an object of wondering attention of half the juvenile population, whom I with difficulty persuaded to watch my operations from behind or from one side, instead of from the front. A fine tree overshadowing the roadway occupied a considerable portion of the right hand side of my first picture; on the left hand side appeared a portion of a well-built stone cottage with a neat balcony and gabled roof. Partially hidden by the tree was a larger house at the corner of a lane, the other corner being occupied by an old cottage with steps outside leading to the upper storey. Behind all appeared the slope of the hills clothed with trees and shrubs. Turning my camera round, and taking up another position, I secured a very picturesque little cottage, in front of which stood the village pump; the roadway, flanked with a row of poplars, and the faint outline of the distant mountains, completed the picture. A little farther down the village another subject arrested my attention—two cottages close to the hill side, and faced with a fine willow tree. Thinking that later on in the day the sun would give a more effective appearance to the tree, my apparatus was once more taken down and put on the tricycle, to the no small disappointment of the children and one fond mother.

I wheeled out of the place, followed by the hurrahing family, which, I may mention, I did not take, for they were a very ordinary lot which might be matched anywhere; finding, however, that they appeared too desirous of getting entangled with the wheels, and thinking, moreover, that such an enthusiastic following made me appear rather ostentatious, I quickened speed and left them behind. After a run of a few more miles I came in sight of Yvorne, a little town or village standing on the hill side, about half a mile from the road. As soon as I came to the branch road that leads up to the town, I paused awhile to consider. The wine of Yvorne is accounted good—shall I, or shall I not? A road so steep to ride is bold, and when I'm there I may be sold; to lunch at Aigle is my aim, the wine they'll have will be the same; for uphill work the weather's hot, the grapes are sour and—no I'll not. So keeping straight on for a short distance along the main road till I found a suitable point of view, out came the camera again and number six plate. It was a neat little place—from a distance—and with the rows of grape vines in the foreground, and the hills in the rear, made a very fair subject.

From Yvorne to Aigle was not more than a mile and a half, and ere long a perspiring and dust-begrimed 'cyclist was to be seen bumping as gently as he could over the stony road of the town, looking for a promising house of entertainment. The iron horse was soon stabled, and a meal ordered; then, taking my belongings from the machine and placing them over the shoulders of a boy, I took a walk round about the town. Plate number seven was spoiled by the boy in his eagerness to help kicking against the legs of the camera, so the less said about that the better. The next subject was the great Castle of Aigle, which made a very good show on the screen. Number eight plate was then exposed—Botheration! That's the exposed plate I left in the slide last night because it would not fit into the grooved box. Number nine had to be used if I did not wish to lose the Castle, and used it was accordingly. Turning back towards the town, I noticed a side lane with some tumble-down houses at one end of it, a large wine barrel with funnel and ladder complete on one side of the road, and in the centre a woman who had been cutting chaff was standing with arm outstretched scolding a child sitting in the shade of a wall. The camera was placed in position and the slide exposed in as short a time as it takes to write it, like pointing and firing a gun. This left me only two plates; one for that street in La Roche, and the other for the north side of the Castle of Chillon. Back, then, I went to the town to get my meal and console myself, for the loss of two plates and a picture, with the produce of the vintage of Yvorne.

At half-past two I thought it was time to leave Aigle, if I wanted to get back in comfortable time to catch the 5.40 train from Montreux to Lausanne, and book thence to London; but, somehow or other, I missed the road, and did not find it again till close to Yvorne. Soon after passing that place, a native vehicle tried to race past me, and if I wanted an additional incentive to make up for lost time, here it was. Away I went, and did not check my mad career till I got back to La Roche. During that spin I worked off some of the "superfluous energy" I brought down with me from the mountains. So I say; but my friends say it was the "Yvorne." I know better. Yvorne wine is said to be conducive to paralysis, and I felt no symptoms of that whatever.

I got my view in La Roche, but found to my disgust that all the shutters of one house were folded over the windows to keep out the sun, and I had no time to ask them to open them. My second view of Chillon was secured to my satisfaction. Then, trundling gently along till I came to the steep part of the road, I placed my feet on the rests, and did not stop till a too vigorous application of the brake almost threw me out in front of the "Hotel des Alpes." I had just half-an-hour to settle with the owner of the machine, finish packing up, and catch my train.

I have developed the plate on which two views were exposed, and I got a good negative. One view was the Castle of Aigle, the other was a view of Montreux and the Lake of Geneva, with a steam-boat stopping at the end of the pier. The result I regard as my master-piece; but my friends say—No! I say that it would have got a medal at the Pall Mall Exhibition as a "composition" picture; but my friends say that it would not even have been admitted. They say that houses do not grow out of castle walls, even if trees sprout from the battlements; that brick walls do not give reflections of steamer-funnels, and that whatever I may think of dwellings under water, they prefer to keep out of them. Thus do those we call our friends spread wet blankets over our most worthy deeds and highest aspirations!

But to speak seriously—to "point a moral and adorn a tale." It is frequently remarked that the photographer, like the painter, is apt to work in a groove; that his work will generally show a certain style and certain mannerisms. Never did I realize this so forcibly as on looking at the above-mentioned "dissolving view." Two simple representations of totally different subjects—two pictures that are not pictures, inasmuch as they embody no idea, and carry no stamp of the producer save in the choice of point of view—are so alike in style, that many of the most prominent features of each coincide.

METEOROLOGY FOR PHOTOGRAPHERS.

BY J. VINCENT ELSDEN, B.SC. (LOND.), F.C.S.

Chapter III.—Solar Radiation—Sunshine Recorders—Distribution of Sunshine in Britain—Practical Applications—Terrestrial Radiation—Sunshine in Photographs.

Although geological investigations have proved that the interior of the earth is far warmer than the external crust, this internal heat has but little effect in raising the temperature of the surface, compared with the enormous quantity of heat received from the sun. Thus, while the annual solar heat would melt a layer of ice forty-six feet in thickness, enveloping the whole earth, the internal heat of the earth would not melt a shell of ice of greater thickness than a quarter of an inch in the same time, owing to the non-conductivity of the substances composing the crust, and, consequently, the extreme slowness with which this internal heat reaches the surface. In the absence of the sun, therefore, the earth's surface would be so intensely cold as to be absolutely uninhabitable. It has been estimated that every square yard of the surface of the sun gives off as much heat per hour as would be generated by burning 13,000 lbs. of coal, and the whole heat emitted annually would be equal to the combustion of a layer of coal 17 miles deep, spread over the whole solar surface. Yet of this heat the earth only receives the two-hundred and thirty millionth part.

Let us now trace the influence of those heat rays which the earth receives from the sun. In the first place, we must remember that only those substances which absorb heat rays can have their temperature raised by the passage through them of radiant heat. In the regions of space there are no such heat-absorbing substances, so that notwithstanding the continual, unrestricted passage of the sun's rays, the temperature is intensely cold. Pouillet, indeed, has fixed the temperature of space as low as—115° C., and possibly even as low as —175° C. Even when the sun's rays enter our atmosphere, absorption takes place but slowly, owing to the absence of water vapour in the upper regions. On an average, not more than one-quarter of the heat is lost before it arrives at the sea-level. The presence of water vapour, however, enormously increases the absorption of heat in the atmosphere. Perfectly clear and dry air is almost as transparent to heat—or, as it is technically called, *diathermanous*—as space itself; but water vapour is *athermanous*, and its presence, although invisible to the eye, stops a considerable quantity of the sun's heat. The proportion of heat thus absorbed varies with the thickness of the atmospheric layer traversed by the rays. Thus at morning and evening, when the beams are nearly horizontal, as C D, they traverse the greatest possible thickness of atmosphere, and nearly the whole of their heat is absorbed. But at mid-day, when the rays enter the atmosphere vertically, as A B, not more than 20 per cent. of the heat is stopped. For a similar reason, at high elevations, where the air is dry, the sun's rays have greater power, although at the same time the shade temperature of the air may be very low. Scoresby noticed a similar fact in the dry climate of the Arctic regions, where the pitch on the ship's side was melted by the heat of the sun, while at the same time ice was forming in the shade close by.

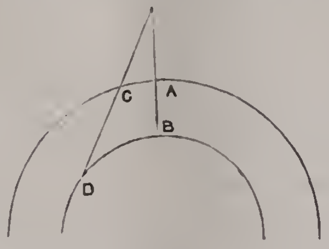


Fig. 5.

Vertical rays have more power than oblique rays, for the following reason also. In the accompanying diagram, let A B C D represent a columnar beam of noon-day sunshine, falling perpendicularly upon the earth's surface at C D. Let E F represent the surface covered by the same column of sunshine, when the sun is rising or setting. Now it is evident that in the latter case the heat is diffused over a larger area, and is therefore less intense than in the former case. We have thus a two-fold reason for the increase in the heat of the sun's rays in proportion to his altitude above the horizon.

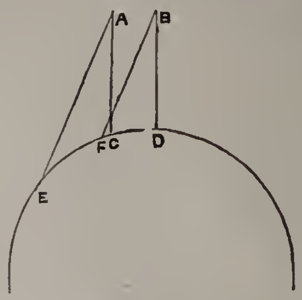


Fig. 6.

An ordinary thermometer cannot be employed for the measurement of direct solar radiation, since the bright bulb would not absorb the whole of the heat falling upon it, unless it were enclosed in a box, blackened both inside and outside. This method, with modifications, was adopted in the actinometers of Herschel and Balfour Stewart, but the instrument usually employed for this purpose is the black bulb thermometer *in vacuo* (fig. 7), first suggested by Sir John Herschell. It consists of a sensitive maximum thermometer, having its bulb and an inch of the stem coated with dull lamp-black, and the whole enclosed in an exhausted glass tube, as in the figure. It is important that the vacuum should be as perfect as possible. The instrument is placed horizontally at the same level as the shade thermometers, and must be exposed to the full rays of the sun, but away from any objects which might reflect heat to it. To take an observation, the maximum shade temperature is subtracted from the maximum temperature registered by the black bulb thermometer, and the difference represents the maximum solar radiation during the day; but as the total effect of the sun's heat during the day is not registered by this means, the observations are not of much use for meteorological purposes.

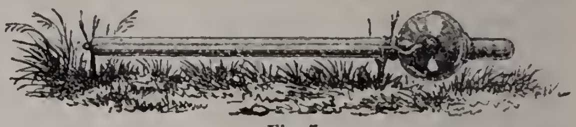


Fig. 7.

(*To be continued*).

PHOTOGRAPHY IN NEW YORK.

The topic that interests the fraternity to-day is price. Consequently, we made inquiries while in New York, and found that cabinet photographs range all the way from $14 per dozen down to 75 cents. The lowest price for any kind of a thing called a portrait by its manufacturer or producer in New York is ten cents. That sum includes the so-called portrait—a tintype—and a glass of beer.

The highest priced man in New York for cabinets is Mora, the well-known Cuban photographer. We had an interview with the gentleman, whom we have had the pleasure of knowing for some years. His work of course is up to its usual standard, namely, first-class. Mr. Mora superintends his operating rooms himself. He says he uses both dry plates and the collodion and bath. Collodion is still a great favourite with him. He has a very large establishment, but as he had a number of sitters we did not detain him.

Sarony—the only Sarony. We had a very pleasant chat with this little gentleman, who is an artist, every inch of him. The very moment you put your foot into his magnificent reception room, which is an art-museum, you feel that you are in the establishment of a man of genius, taste, and art. Besides being an artist of great merit, Sarony is a connoisseur in *objets de luxe*, bric-a-brac, and everything pertaining to art.

It is a veritable treat to have a half-hour's interview with this entertaining artist-photographer. What a pity there are not more Saronys in our profession. He truly is the Napoleon of photographers in the United States.

Sarony's reception-room must be visited to be appreciated. We will not attempt a description of it for fear of not doing it the justice it merits. Mr. Sarony conducted us through his various studios in his vast establishment. He has private studios for his artists who work up large portraits. His own private studio, which he calls his "den," is truly a bijou. The walls are covered with old tapestries, sketches, and studies, and in every nook and corner is the room filled with a busy artist's unique collection of his works done at spare moments, when not at work on commissions from his various *clientèle*.

After a visit through his art studios, Mr. Sarony turned us over to Lieut. Richardson, his chief aide in the skylight room.

There is no particular secret about Mr. Sarony's operating room, it being just like a great many others. The usual paraphernalia is to be found there which is to be met with in most well-regulated operating rooms.

Mr. Sarony's success is due to his skill as an artist, and to his own genius. He uses, and has used, the same materials that we can all purchase. Dry plates are used here altogether, the brand in use now being the Stanley. Sarony's *chef de la chambre noire* used the ferrous oxalate developer entirely. We were shown some very fine negatives that were produced with this developer.

Sarony has recently reduced his prices for cabinets to $10 per dozen. We suppose that "the times" and competition in prices in New York, as well as all over the country, are the cause It is not everyone who can see the value for $14 in the counterpart of his own physiognomy. The great majority of the public value it only at a very few dollars, and photographers are doing all they can to make them think it is not worth much.

Not very far from Sarony's is the establishment of one of the fathers of photography in this country, Abraham Bogardus. This worthy disciple of Daguerre has a true patriarchal appearance. Old Father Time deals very gently with many of the followers of what used to be termed "the black art." We came across many a veteran in the profession in New York. They are still boys, and it is truly wonderful to see what calm expressions these old veterans have after following this most trying of all the vexatious professions it is possible for a man to follow. It is astonishing that these faces do not become full of furrows and deep lines. Uncle Abraham does not look a day older than he did when he presided at a metting held in Chicago about thirteen years ago, which was the last one that ever was held of the N. P. A.

Mr. Bogardus does his own operating. He uses dry plates. and makes good portraits. He is still a great favourite with many of his old clients, whom he retains. Bogardus has had the honour of photographing many of the leading men of this country. We saw some excellent portraits of General Grant and many other prominent men. Six dollars per dozen is the price at this establishment. Mr. Bogardus says business is good with him, notwithstanding the numerous establishments that surround in the adjacent avenues and streets that have cut the prices.

An establishment that interested us is the studio of a Mexican Senor Moreno, who is one of the new-comers among the photographers of New York, and we think he will make his mark, as he undoubtedly has genius and originality.

Senor Moreno occupies the studio formerly carried on by Cavalho, of yellow paint fame, and you have to climb up four or five flights of stairs to his operating room. He labours under difficulties that by many would be considered almost insurmountable for the establishing of one's self in a strange country; that is, he does not speak a word of English, and he is deaf. It requires an interpreter to make him understand your requirements; but as we understand his language, Spanish, we managed to get along passably well with him. He is from Vera Cruz, Mexico, and from boyhood has interested himself in photography, which he has a love for. Being a hard worker and an assiduous student, his chances for success in New York are in his favour. We were here shown some life-size heads that will attract attention at the Convention. They were made on an Inglis plate, with a rapid rectilinear Dallmeyer, which is his favourite lens, with an exposure of five second thirds stop.

When Moreno gets a subject that fascinates him, he makes the negative, develops it, retouches and prints and mounts it himself. His prices are curious. He has a system which we think ought to be condemned, as having a tendency to bring down prices. In fact, it is this system of two prices to customers all over the country that has done more to break up good prices than anything else. His scale is $5 per dozen for cabinets, but for a club of ten, $30. A notice to this effect is at his door—for his life-size heads he charges $30; duplicates, $8 each.

In and around Union Square there are several galleries. Rockwood's price is $5 per dozen for cabinets; Hugh O'Neill's, $6; Marc Gambier's, $4; Naegeli's $3. We cannot go into a description of all the galleries we visited, but must content ourselves with mentioning only a few of the names of the many galleries that are to be found in New York.—*The Eye.*

Correspondence.

THE GALTON COMPOSITES IN THEIR RELATION TO THE DETERMINATION OF IDENTITY.

Sir,—The achievement of consolidating into a single representative photograph the portraits of six or seven separate persons has naturally awakened curiosity. Other and more remarkable operations will probably follow. Little by little the field of inquiry will extend itself. In the natural course of evolution, possibilities will loom into view that are, thus far, not within the scope and purpose of the experimentalist.

One of the more inevitable of these approaching developments falls so entirely within the pathway of procedure, that its investigation cannot be much longer postponed. In this very novel portraiture of the "composite order," there are some attendant phenomena that are of a nature at once to challenge observation, and to lead in the direction indicated. At the very threshold, it becomes apparent that due attention has not been yet conferred upon the conjointure—certainly under less exacting conditions—of an arranged series of the photographs of the self-same sitter. Of such composites, it is obvious that their superstructure should be constituted of portraits taken at definite and well-separated epochs.

The changes which ensue from youth to maturity, and from maturity to decadence, are clearly amenable to certain physiological limitations. These, by this time, photography might have definitively elucidated. The "seven ages" of the dramatist display, we may rest assured, various "points in common," which the photographer, as well as the psychologist, might now-a-day detect and investigate. That "the boy is father to the man" is admitted. But what a portrait will that be in which the boy, the lover, the soldier, and the justice are conjoined into one harmonious photograph! That will be a "modern instance" worthy of the age.

In the Galton composites it has been noticed that in those that are the most successful, the final outcome is in some particulars more effective and life-like than are the separate portraits of the members of the group. If the question be here mooted, tentatively, whence comes this curious and unexpected consequence? It is hoped that it may not be deemed waste effort.

It should be recognised that the picture assumes in some degree the aspect of being in relief. The appearance might be fitly styled "medalesque." How happens this? In reply, it may be pointed out that, in a kindred branch of art—in all such engravings as are designed to assume the appearance of medallion work, or *basso-relievo*—the artist adopts a given expedient which is readily appreciable. Along the margins between the half-tones and the darker outlines of the engraved work, there is always interposed a zone of absolute white, representative of the play of light upon the illuminated edges of the design. Similarly, it will always occur that, in the case of superposed portraits—and, *a fortiori*, in those in which the outlines are the more perfectly conformable—a broken zone of lighter tinge will skirt the outer shadows just where the "points in common" the most manifestly approximate.

Here, then, we obtain a glimpse of the conditions under which this effect shall become the most markedly pronounced in its degree. And, in this connection, it must be regarded as already experimentally ascertained that, in the instance of an individual who has reached maturity, the typical form of the face will thenceforward be maintained without manifest or appreciable departure.* It is clear that under such circumstances the fiducial lines remain in unison, and there will arise no difficulties in effecting the absolute superimposition of the portraits.

Meantime, it may be regarded as inevitable that in the interval between two or more sittings, the sitter has become more plump or more attenuated. Whichever event has happened, the superimposition will be attended with an identical issue. Interposed between the half-tones of the facial areas and the exterior marginal shadows, there will appear narrow belts of lighter tinge by which the coupled images will be differentiated.

From this vantage ground, therefore, we betoken the assured attainment of a novel and artistic result in photographic portraiture. This it is for the ingenious to develop. More to the present purpose is the consideration that medical jurisprudence may find here the adjunct of a new and indubitable test of personal identification. Here, if anywhere, we may catch sight of "that function which science asks of photography, and which medical jurisprudence is entitled to ask of both."

Need it be added that this presumed *terra incognita* has been already practically, if but partially, explored; and that it now awaits only that formal annexation to the ever-extending realms of science which, sooner or later, must inevitably take effect.—Yours, &c.,

Wm. Mathews.

PHOTOGRAPHS ON PAPER.

Sir,—Having been an ardent photographer for the past thirty years, and having, during that period, taken views in many countries by most of the known processes, I became firmly convinced that for the purposes of travel, there is no substance that equals paper in the facilities it affords for obtaining pictures, and for general convenience. Glass, with all its advantages, has the great drawbacks of being brittle, weighty, and the subject of exceeding anxiety during transport. I consequently have, for a long time, endeavoured to overcome these obstacles, and find some mode whereby paper could be used in the place of glass, and this I think I have at last succeeded in doing.

I would, in the first place, point out that, when you take a sheet of paper and coat it with the emulsion you would use for glass plate, the result is, on exposure, you get your picture on identically the same sensitive surface as you would if you used the glass plate for its support. The picture, we all know, is on the gelatino-bromide film, and not either in the glass or the paper, and it can be readily washed off either, leaving both clear. The result is, you get your picture in the same way, and with the same exposure, on either support. Now, most people, when they examine a negative supported on paper, object to it for three reasons. First, because it is not so attractive to the eye as those seen on glass, and it is condemned as not being able to give a good print; and, secondly, because most paper negatives, when taken, are supported against a sheet of glass, which interposes between the film and the lens, and this causes a disturbance of the image, and results in want of sharpness of definition; and, thirdly, it is objected that the prints cannot be as good when light has to pass through the supporting paper as though it were glass.

Taking the last objection first, I can only say that it is quite fallacious, as a trial will show; nay, there are times when it is a positive advantage to have paper instead of glass to print through. After many trials and failures, I overcame the second objection, thus. I took a thin sheet of ferrotype iron, or, by preference, of veneer, covered with glazed black linen (this latter substance I found on trial more convenient to manipulate), and attaching to the surface a sheet of gelatino-bromide paper, by means of Le Page's fish glue (a most convenient article, and always ready for use, though gum will do as well), I placed the tablet so prepared in the dark slide, in the same way as I should a glass plate, and then exposed it for a picture, the result being that I got negatives giving prints equal in every way to those obtained when a glass plate is used, and cannot be distinguished. We should always remember that the print is what we strive to obtain; the negative is but the means to the end. To satisfy you on this point, I send you a print taken from a paper negative of my house, from which you can judge for yourself of the accuracy of my statement; and I would particularly call your attention to the sharpness of the definition of the fallen flowers of the rhododendrons on the lawn. I have, however, gone further; I have devised a slide in which I can place a number (say, a dozen) of these tablets, and they being impervious to light, and being coated on each side with the gelatino-bromide paper, by simply being turned round you are enabled to take two separate pictures on each tablet, and this I effect by drawing a bag made of light-proof material over this slide, and in which I am able to insert both hands with which to manipulate. When one tablet is exposed, all I have to do is to remove it to the rear of those superimposed on it, and repeat the operation till all are exhausted, thus obtaining twenty-four pictures, and the weight of the whole does not exceed that of an ordinary double slide of the same size with its pair of glass plates.

J. B. Holroyde.

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Proceedings of Societies.

London and Provincial Photographic Association.

The usual weekly meeting was held on Thursday last, the 9th inst., Mr. W. H. **Prestwich** occupying the chair.

Mr. A. L. **Henderson** exhibited a photograph of some members of the Edinburgh Photographic Club taken by artificial light by Mr. S. Tamkins, the source of illumination being a mitrailleuse lamp and the gaselier; a 3D lens; second largest stop, with an exposure of thirty-five seconds—it not being wished to tax the sitters beyond this. As was expected, the negative proved very much under-exposed, but by a little dodging, a very fair print was obtained, a transparency being made by contact; the density in this caused by the gaselier was then reduced by rubbing with methylated spirit. It was then carefully adjusted with the glass side of the negative, and placed in the frame with the paper upon it; the paper, being fastened at two corners to the negative with gum paper, admitted of the transparency being slipped away when the high-lights were a little printed up, and the printing was then completed.

A question from the box was read:—"What is known about the properties of pure iodide of silver, without bromide or chloride in dry plates?"

Mr. J. B. **Wellington** had once made a pure iodide plate from accident by taking down the wrong bottle; the plate would neither develop nor fix.

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* In the conjointure of a photograph of Mr. Gladstone, of thirty years *ante*, with one of the present date, this effect is strikingly illlustrated. In such case, each portrait receives its due modicum of exposure.

Mr. A. L. **Henderson** had succeeded in fixing a plate made from a pure iodide emulsion, using ammonia-nitrate of silver; the exposure given to the plate was ten seconds in a fairly good light.

Another question was read from the box: "What are the best means of getting rid of stains in dry plates that have been caused by insufficient washing—the stains are in portions of the negative?"

Mr. F. **York** thought defective fixation was the cause of the stains. He suggested soaking the plates in a solution of bichloride of mercury.

Mr. W. E. **Debenham** advocated the use of a fresh hypo bath, and the plate left in some time after it was apparently fixed.

Mr. F. **York**, in reference to fixing baths, mentioned an instance of a friend staying at his place having fixed a plate in an old disused bath, a purple negative being the result. His friend subsequently wrote asking for the bath to be given him, as the printing qualities of the negative fixed in it had proved so excellent.

Birkenhead Photographic Association.

The seventh ordinary meeting was held on the 9th July, at the Free Public Library, Mr. H. Norwood **Atkins** in the chair.

Mr. H. A. Davies was elected a member of the Association.

Prints and negatives were brought to the meeting by Mr. Carruthers, H. S. Ellerbeck, Griffiths, Whalley, Williams, and Lange, the latter enhancing the interest of his exhibit very considerably by placing his pictures at a convenient distance opposite a large concave mirror, thereby producing a most surprisingly real and stereoscopic effect.

Mr. **Williams** called attention to a negative he had brought with him which was developed (as were all of his plates) by aid of a lamp which he placed upon the table, the light being filtered through a sheet of "cathedral green" glass and a piece of canary yellow paper, thus affording ample illumination, with an entire absence of the objectionable and trying ruby colour generally considered to be an essential in photographic operations. The negative he exhibited was of excellent quality, and appeared to be quite free from all trace of fog.

Mr. **Atkins** also exhibited a bottle of "pelletone," consisting of small solid pellets of pyrogallic acid, each pellet containing exactly two grains. He called attention to the serious error in the recipe which accompanied the bottle, the word sulph*a*te being substituted for sulph*i*te, and which, if adhered to, would, he feared, be the cause of a considerable number of failures. He then proceeded to develop a few platinotype prints before the members, remarking that the simplicity of the process was its charm, and that a very slight washing as a finish was all that was required—a great boon as compared with silver; he also stated that negatives of a rather dense, "plucky" character were best suited to the process, that the printing was about three times quicker than silver, and that the results were absolutely permanent, so far as was known.

Sheffield Photographic Society.

The monthly meeting was held in the Masonic Hall, Surrey Street, on Tuesday, the 7th inst., Mr. W. B. **Hatfield** presiding.

After the usual business of the Society, and some talk of the last trip to Lathkill Dale, the pictures for the subject competition were brought forward, which were found to be more numerous, and better in quality, than at any of the previous competitions. The subject was "Manor, Abbey, or Castle," and was won by Mr. T. Turner, of Owlerton, with a splendid picture of "Kirkstall Abbey," Mr. T. G. Hibbert taking second with a well-chosen and beautifully-executed picture from the same place.

Much discussion was excited by the variety of mounts for the competition pictures, but it was decided that no picture should be allowed to contest in the future unless mounted according to rule.

The subject of the next contest is "Cattle," for which the President offers a special prize.

The next trip is to take place on Monday next, the 20th, to Bolton Abbey and woods, *via* Skipton.

It was decided, after some talk, to do our best with the Liverpool and other Societies to get the railway companies to allow similar advantages to photographic societies for travelling to those allowed to fishing clubs.

The meeting then closed.

Talk in the Studio.

London and Provincial Photographic Association.—An out-door meeting will take place on Saturday, the 18th inst., at Eynesford; members to meet at the Holborn Viaduct Station at 2.30.

The Process of Tanning with Bichromate.—W. Y. Dent, of the Chemical Department, Woolwich Arsenal, gives the following interesting particulars, and it is scarcely necessary to remark that in this case the action of the bichromate is quite analogous to its action in carbon printing. Many attempts have been made to find some substitute for tannin in the manufacture of heavy sole leather, which have been for the most part based upon the fact that certain salts, such as alum and iron sulphate, form insoluble compounds with gelatine, but have been attended with little success, with the exception of what is known as the chromate process. The hides, after being prepared in the usual manner, are placed in a pit containing a weak solution of potassium dichromate, alum, and sodium chloride, and are afterwards transferred to other pits containing stronger liquors. The astringent action of strong liquors, if applied at once to the hides, would, as in the case with tanning liquors, cause the surface of the hides to be drawn or wrinkled. After removal from the pits, they are immersed in a solution of barium chloride, in order to neutralize the action of any potassium dichromate that may be remaining in the hide; they are then passed through clean water and dried. The action is very rapid; heavy hides for sole leathers are finished in three or four weeks, instead of requiring from six to eight months, as is the case with ordinary tanned leather. They are then treated with paraffin, wax, and resin, which are introduced in such a manner as to secure the penetration of these substances through every portion of the hide. Leather is made by this process on a considerable scale in Glasgow, which is reported to be of excellent quality, and produced at a less cost than by the ordinary tanning process.

Patent-Office Report.—The Comptroller-General of patents, designs, and trade marks, has issued, in the form of a Porliamentary paper, his report, the second since the passing of the Act of 1883. That the new Act has worked well in the interest of inventors may be seen from the fact that the number of applications for patents, which had risen, with some variations, almost constantly in the course of thirty years, from 1,211 in the year 1852, to 6,241 in 1882, leaped with a bound to 17,110 in 1884. There was a slight depression in 1883, possibly on account of the change of the law, which makes last year's numbers the more remarkable. The increase is in fact, as between the years 1883 and 1884, no less than 195 per cent. The report claims an increase of about 280 per cent. for this year, on the average of 1882-83. This must be a misprint for 180 per cent., for the increase claimed is not borne out by the figures, which are for 1882, as has already been said, 6,241, and for 1883, if the report be correct, 5,993, or an average for the two years of 6,117. This represents an increase of 189 per cent. on the average of the two years. Seventy-nine per cent. of the applications were made by persons resident in the United Kingdom, namely 12,356 being residents in England and Wales, 901 in Scotland, and 254 in Ireland. Of the rest, the largest numbers were from the United States, 1,181, from Germany 890, and from France 788. Residents from 27 other countries also made application to the office, 13 such countries being British possessions, from which 175 applications were made, and three, it may be added, were made from Egypt. Only three appeals were made in the course of the year against the decision of the Comptroller, so that it may be taken that his decision is almost invariably satisfactory to applicants. The greatest number of applications made in any month was in January, 2,499; the smallest in August, 992. The greatest number made in any single day was, as might be supposed, on January 1, 266. The total number of patents sealed upon the 17,110 applications will not be known before next year. The number of readers who frequented the Free Library of the Patent Office in 1884, was 39,508, as against 32,748 in the previous year. Sets of the publications of the office have been sent to forty-six towns, to a large number of public offices, and seats of learning in the United Kingdom; to nine British colonies, and to nine foreign States. Complete series of abridged specifications have also been sent to nearly 280 mechanics' literary and scientific institutes in various part of the United Kingdom and United States. The number of designs registered in 1884 was 19,515, as compared with 17,166 in 1883;

and the number of trade-marks applied for was 7,104, to 4,105 in 1883. The receipts of this office amounted to £103,827, of which £88,996 was for patents' fees, £3,477 for designs' fees and stamps, £7,014 for trade-marks' fees, and more than £4,000 for the sale of publications. The chief payments made were £36,226 for salaries—all of which are set forth in detail in the report—and £17,000 to Messrs. Eyre and Spottiswoode for printing. There was a surplus income of nearly £40,000. Tables are added showing the different classes of designs and trade-marks, with the fees paid for each.—*The Times.*

FESTIVAL DINNER.—The extensive staff of Messrs. A. and G. Taylor dined together on the 10th instant at Reigate, and the proceedings were indicative of extreme good feeling between employed and employers.

PRESENCE OF CHLORINE IN POTASSIUM BROMIDE. By T. WEIGLE.—Certain samples of potassium bromide which had been heated to redness to expel moisture, were found to precipitate more silver solution than portions of the same samples only heated to 100°. Investigation showed the presence of potassium chlorate in the original samples.—*Journal of the Chemical Society.*

CHEMICAL AND PHYSIOLOGICAL ACTION OF LIGHT ON CHLOROPHYLL.—BY C. TIMIRIAZEFF.—In order to avoid errors due to the unequal dispersion of a prism, the author has adopted the method of decomposing portions of the previously dispersed light. By means of the cylindrical lens and prism of small angle used in experiments on complementary colours, two images, complementary in colour, were thrown at the same time either on two *eprouvettes* containing a 30 per cent. solution of carbonic anhydride in which was placed a small branch of *ellodea*, or on a plate coated with collodion containing a small quantity of chlorophyll. When the spectrum was divided into two equal parts with respect to the normal spectrum, the two images were of course respectively yellow and blue. The maximum chemical and physiological effect was exerted by the yellow, whilst the effect of the blue rays was scarcely appreciable. The blue-violet portion of the spectrum being cut off by a screen, the less refrangible portion was divided into two equal parts, red and greenish-yellow. The maximum chemical and physiological effect was exerted by the red. By placing the prism in the greenish-yellow part of the spectrum, a greenish-yellow and a violet image were obtained. The latter contained all the rays absorbed by chlorophyll, whilst the former contained only the green, which is reflected by vegetation. In this case the maximum effects were exerted by the violet. It follows from these results that chlorophyll acts as a true sensitiser, undergoing decomposition itself, and promoting the decomposition of carbonic anhydride in those parts of the spectrum which it absorbs. The different rays absorbed by chlorophyll produce decomposition in very different degrees, the maximum decomposition coinciding in a remarkable manner with the maximum energy in the normal spectrum as measured by Langley and Abney. It would seem, therefore, that it is the amplitude rather than the period of the vibrations which brings about that disturbance of the carbonic anhydride molecule which finally results in its dissociation. The chemical action of light on the photographic plate seems to be strictly analogous to its physiological action on the living plant, provided that, as in the case of chlorophyll, the absorption phenomena are identical in both cases.—*Journal of the Chemical Society.*

ACTION OF LIGHT ON NITROCUMIC ACID. BY P. ALEXEEFF.—Paternò and Fileti found nitrocumic acid to be converted by light into a bright red substance insoluble in benzene, but soluble in alkaline solutions. The author states that by reducing the red compound with zinc-dust and potash, or with sodium amalgam, a colourless solution is obtained, which, on treatment with acids, yields a white amorphous precipitate, rapidly becoming red in contact with air, and then exhibiting a close resemblance to the original red compound. Hence nitrocumic acid gives, under the influence of light, a true colouring matter. Presuming that the process under consideration might be analogous to the action of sulphuric acid on some nitro-compounds, and consist in an oxidation of the tertiary hydrogen of the isopropyl at the expense of the nitro-group, and subsequent condensation of the nitro-product formed (Abstr., 1884—Lifschutz, 1187, and Brunner Krämer, 1354), the author intends studying the behaviour of different nitro-compounds towards light. Thus far he has been able to observe that light acts in much the same manner as on nitrocumic acid, on its aldehyde, nitrocumol, and its ethyl ether, the latter yielding a compound apparently identical with that formed by passing hydrogen chloride through an alcoholic solution of the red product from nitrocumic acid. Nitrohydroxycumic acid, containing hydroxyl in the place of the tertiary hydrogen of nitrocumic acid, is not acted on by light.—*Chemical Society's Reports.*

PHOTOGRAPHIC CLUB.—The subject for discussion on July 22 will be "The Soda and Potash Developers." Saturday outdoor meeting at Eynesford; trains from Holborn Viaduct at 2.30. p.m.

To Correspondents.

⁂ We cannot undertake to return rejected communications.

EMULSION.—You will find full directions in Eder's "Modern Dry Plates," published at our office, price 3s.

LUCIDA.—Thank you for your offer, but at present we have more than we require.

A. R.—It pleases us to have the print, and we should be glad to have a little more information as to the original. Whether we can make use of it as a supplement depends partly on these particulars.

C. W. D. P. (Malvern.)—You are wrong in supposing that we are acquainted with the form of the agreement, but we should imagine that you or anybody else would do very foolishly in being bound to directly or indirectly pay any royalty after the patent has run out. Unless your account of the affair is in some way incorrect, the whole thing requires enquiry. Can you send us the document?

SAMUEL C. RILEY.—The "grain" film is excellent, and we should be glad if you would write a short account of the method of making them.

M. CAPPELLI.—Your letter has been sent on to Captain Abney, and he will probably throw some light upon your difficulty.

THOMAS STOW.—We have used the portable symmetrical having an equivalent focus of three inches, and think this will be very suitable for the purpose.

J. FLOYD.—A solution of gum dammar in benzole, about 60 grains to the ounce. Size the prints first with a hot solution of gelatine—one part in twelve of water.

B. F.—You can get lessons at the Polytechnic Institute, 309, Regent Street, London; but, considering that you have had some experience, perhaps it would be better to seek an appointment as an assistant. Possibly you might get what you require by means of an advertisement.

J. H F.—1. Much misplaced ingenuity has been devoted to the subject, and many of the latest instruments will adjust in almost every possible direction; but when one wishes to set them square and true, the real difficulty sets in. Hesitate before you go in for any complication which is not an absolute essential. 2. The rising front is certainly desirable.

F. BLAIR.—It is not very easy to reply to such a question as "where can I get a good lens at a low price?" If you can gain access to a large batch of cheap lenses—say several gross—it may be possible to select a few good ones; but this pre-supposes that you have sufficient optical knowledge to select a good one without trying it, and that the owner of the stock is willing to have his goods overhauled for the trifling profit he will make out of the transaction. 2. The very best makers make bad lenses, but they smash them up with a hammer instead of sending them out. So when you buy a good lens you have to pay something for the loss on the bad ones.

JOHN BRONTHORNE.—It is used to a considerable extent in Germany, but we do not remember to have seen it in this country. Write to P. Liesegang, Dusseldorf, or Romain Talbot, August-Strasse, Berlin.

F. YOUNG.—Glass is to be preferred, as most of the so-called porcelain dishes are made of absorbent material.

C. C. S.—1. We have tried, but it is too much—we really cannot believe it. 2. Send it to the publication you name.

LUX.—Sensitise the carbon tissue in the following solution:—

Bichromate of potash	1¼ ounce
Methylated spirit	4 ounces
Ammonia	1 drachm
Water	30 ounces

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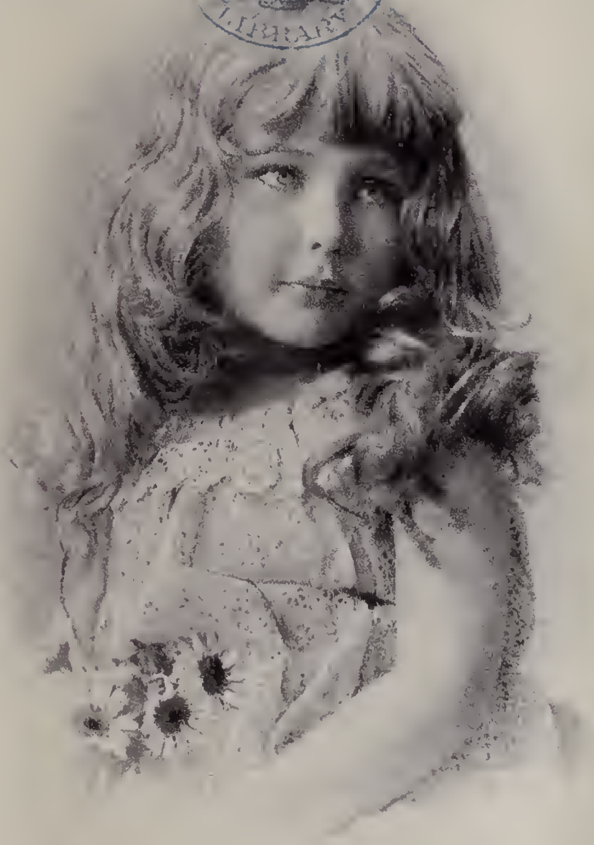

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SOME EASY WAYS OF MAKING GRAIN PLATES OR SURFACES FOR PHOTO-MECHANICAL PROCESSES.

The various methods of using grain or stipple plates in carrying out photo-mechanical processes have been often referred to in the Photographic News, but one may, perhaps, preface some remarks on a few of the most ready and convenient methods of making grain surfaces, by a brief indication of some of the methods in which they may be used by the photographic worker, as aids in breaking up the half-tones of a photograph into a grain suited for the needs of the lithographer, the typographer, or the intaglio-plate printer.

First of all should be mentioned the method initiated by Fred E. Ives, in which an inked Woodbury relief, or its equivalent, is pressed against a more or less yielding surface, which is worked up into a series of projections, pimples, or grains, something like bookbinder's cloth, the face of a cross-cut file, or the surface of a nutmeg grater. Either the relief or the grain surface is inked with a printer's ink, or a transfer ink, and when the un-inked surface and the inked surface are pressed together, the projections are crushed down, more or less, according to the height of the relief, and the result is an ink picture in stipple on the surface originally un-inked, this picture being formed of dots, gradating from minute touches where the relief is lowest, to solid blacks, formed by the running together of the dots where the relief is highest. Nothing need here be said as to the various means of transferring the grained image to stone for lithographic printing, or to zinc for etching into typographic form.

Next in order come the various processes in which a grain photograph is obtained by impressing a grain over the picture, whether by super-imposing a grain negative and the photographing both together, or by successively exposing a plate to the grain negative and the photograph, or by lithographing a grain over a positive print. Methods of the above character are very numerous, and it would seem as if every possible variation had been suggested.

There are also methods in which a photo-lithographic paper, prepared in one of the usual methods, is grained by pressure against a rough surface, this graining being best done after the paper has been sensitized and dried; when such mechanically grained paper is exposed under a negative, inked, and developed in the usual way, it is found that the image often breaks up into a grain well suited for lithography or zinc etching.

The above notes having served to indicate the kind of way in which grained surfaces may be used for breaking up the half-tones of the photographic image into a stipple, so we pass on without further preface to a consideration of means of making grained surfaces or plates.

In a recent number of the *Photographisches Archiv*, F. W. Geldmacher describes a simple method of making a random grain of any required fineness, with emery. A piece of six-sheet cardboard is uniformly brushed over with clear hot glue, and while the glue is still soft, emery of the required degree of fineness is sifted over it. When the card is quite dry, the loose emery is shaken off, and the rough surface is sized with a weak solution of glue, to which a small proportion of chrome alum has been added. When this is dry, the emery card may be freely handled, and used as indicated below. We have found the following to answer well as the final sizing preparation:—

Coignet's gold medal gelatine	... 1 part
Water	... 12 parts
Bichromate of potassium ...	... ½ part

The gelatine should be dissolved in the water at a moderate heat, after which the bichromate is stirred in, and the liquid is strained through fine muslin. Next allow the liquid to cool to nearly the gelatinising point, and rapidly draw the sheet of emery card through the liquid, after which hang the card up to dry. It is much better to use bichromate of potassium than to employ chrome alum, as the former does not make the gelatine solution viscous, and it penetrates and insolublises the under layer of glue. In order to facilitate the action of bichromate, one would naturally hang the emery sheet in a light place to dry.

Let us now indicate some of the numerous ways in which the emery card may be used as a means of making grain surfaces. If one lays over it a piece of ordinary lithographic transfer paper, and passes both together through the press, a grained paper will be obtained suitable for certain forms of the Ives' process, such as those in which the relief is inked; and the grain on the paper will be different, according to whether the prepared face, or the back, was placed next to the emery surface. In a similar way tinfoil may be grained and used as a medium in the Ives' method; while the emery card may also be employed as a means of graining an ordinary sensitive photo-lithographic paper for the use already indicated.

If a grained block of soft metal be required, it is easy to obtain it by pressing or rolling a plate of the metal against the emery card; or if, on the other hand, a grained surface of hard metal is wanted—let us suppose steel—all that is necessary is to coat the steel with an etching ground, and then to press it against the emery card, using the hydraulic press or the rolling press; after which the plate is etched with a solution of perchloride of iron, this mordant acting through the fissures made in the etching ground by the grains of emery.

In case of a grain being required on a lithographic stone, or in the form of a typographic block, it is easy to ink the emery card, and to take an impression on lithographic stone or on zinc; the former being used for direct printing, or the latter for etching into relief by the chemigraphic method.

All the above may be performed, but in a far less satisfactory way, with commercial emery paper or cloth, as by taking ordinary care it is easy to turn out something far more uniform and satisfactory than the best emery paper of commerce.

In the above process it is sometimes advantageous to use fine sand instead of emery, and in this case closely-packed round dots are obtained. It is, however, very important to obtain sand free from dust, and of an approximately uniform degree of fineness; this being ensured by screening out all that will pass through a sieve one degree finer than that first used.

It is a very rare thing to find a commercial sample of fine wire gauze sufficiently uniform to be used in the origination of a grain for printing, as the divisions are generally unequal, and oftentimes there are considerable intervals through which the wires are more or less closely packed than the average, this giving a lined and stringy appearance to prints grained by wire gauze. Wire gnaze may be used in the same way as the emery card.

There are several comparatively coarse materials occurring in commerce which are tolerably uniform, and which, when reduced by the camera, make excellently grained negatives; among these may be mentioned some samples of coarse wire gauze, the fine perforated zinc which is used for meat safes, and certain woven materials, as the net used for women's veils, and a material sold in the draper's shops as *leno.* Any one of these may be stretched on a frame, and a reduced copy made in the camera, and from the negative first obtained a positive may be made by contact printing. Between negative and positive the most important difference is generally the relative proportion of the opaque to the transparent parts. It is scarcely necessary to point out when it is required to grain a plate which has already been exposed to the pictorial original; consideration of convenience must determine whether to make a second exposure in the camera on the coarse stretched fabric or perforated zinc referred to, or to use a reproduction and adopt the contact printing method.

Other methods of making grain plates or surface may be the subject of another article.

POSITIVES ON GELATINO-CHLORIDE OF SILVER.

BY W. M. ASHMAN AND R. OFFORD.

Sixth Article.

Almost any of the formulæ we have before given will answer for spreading upon paper, though they are somewhat too heavily charged with silver; but we are inclined to give the preference to one or other of the following. As before, we prepare a plain chloride emulsion, the special haloid employed not being of much importance. The troublesome phenomena of crystallization and deliquescence in the dried film do not interfere with us when paper is the basis on which it rests. Indeed, the latter characteristic seems to help the printing, as it is certainly more rapid and vigorous when just perceptibly damp.

We take—

Gelatine	28 grammes
One-third soft, two-thirds hard.	
Ammonia chloride	3.5 „
Distilled water	360 c.c's

Dissolve gently, as before, and add gradually, with vigorous stirring, a warm solution of—

Silver nitrate	10 grammes
Water	20 c.c.

Allow the emulsion to set hard, pass through mosquito net into water, wash in three or four changes of five minutes each, and well drain. For one such quantity of chloride emulsion we make a tartrate emulsion somewhat as described on page 294. In 90 c.c. of distilled water we dissolve 2·5 grammes of tartaric acid; carefully neutralize this with sodium bi-carbonate (about 1·8 grammes), and afterwards render it just acid. We then add 6·5 grammes of hard gelatine; soak, and dissolve as before. In 10 c.c.'s of distilled water we dissolve 3 grammes of silver nitrate, heat it, and add it very gradually to the above with violent stirring, continuing the same when we have transferred the vessel containing the emulsion to a basin of cold water. This is then set, washed, and drained in the same manner as the chloride before descibed, and the two emulsions are melted and mixed. We then add 1 gramme of citric acid, dissolved in a small quantity of water. If required to be kept, we take a piece of thymol the size of a small pea, dissolve it in 10 c.c.'s of alcohol, and adding it gradually with constant agitation to ensure perfect mixture; then filter. Paper should not be coated immediately after this last addition, but allowed to rest a little time in a fluid state, with occasional stirring, or otherwise pits will be formed on the surface when dry.

Perhaps better colours are obtainable by the other formulæ we will now refer to; at any rate, the pictures printed therefrom have a somewhat softer appearance.

To a batch of plain chloride emulsion, prepared in the quantity and manner described above, we add a citrate emulsion as follows:—In 90 c.c.'s of distilled water we soak and dissolve 6·5 of hard gelatine; in 10 c.c.'s of distilled water we dissolve 2 grammes of sodium citrate; warm, and add gradually, with stirring, to the above. In 10 c.c.'s of distilled water we dissolve 3 grammes of silver nitrate and 5 grammes of acid citric. This must be very carefully dropped into the gelatine and citrate solution, and well stirred for some minutes. Setting it rapidly, we wash as in previous cases, only in one more water, as a protection against coagulation, a characteristic of this emulsion. It is then, after well draining, ready for mixing with the chloride, and receiving the addition of 1 gramme of acid citric in a little water, and filtering. Alcohol and thymol can be added if desired, with the precautions just indicated. This compound emulsion will print more quickly than albumenized paper; and, if it can be kept a week or so without coagulating, will be found a great deal quicker. The compound tartrate emulsion, before described, will keep for weeks with a mere trace of antiseptic in it, or sometimes with a little alcohol only. The formulæ given on page 295 can be used, if preferred, in the place of either of these; but it would be rendered more suited to the purpose if the quantities of water and gelatine were nearly doubled.

Paper or plates ought to be coated, set, and dried in an apartment free from dust; the air currents, which pass in by the ventilators, should be filtered: a sheet of wadding or Canton flannel (renewable) between two pieces of perforated zinc, answers this purpose. The surface of the paper should be lightly rubbed with a silk handkerchief before going into the coating room; but notwithstanding these precautions, dust will occasionally become attached to the surface. Yellow light is harmless, so may be used with impunity; daylight filtered through "golden fabric" is the most luminous and safest medium with which we are acquainted, and may be relied upon for retaining its colour. Screens which have been exposed to a south light for the last twelve months have not changed. A screen of this material, suspended in front of a fish-tail burner, gives a splendid light for evening work.

Prepared paper, when thoroughly dry, may be kept for several weeks or months without deterioration, according to which silver compounds are employed, there being only a slight yellowing in some cases, which disappears in the fixing.

These are used precisely as albumenized papers, printing being carried, in most cases, very little, if any, further than it is desired that the prints should appear when finished. Exceptions to this rule we will point out in our next.

Owing to the rapidity with which these papers darken in the light, more care is requisite when examining the proofs; this is especially the case with vignettes, when it is desired that the margins should remain white. Some of these emulsions are so rapid that the paper receives a deep blush the moment it is exposed to daylight. The action is not continuous, however, so that should this accidentally occur, a remedy is found by tinting the whole of the margins, thus producing an effective print.

As stated, keeping the emulsion for some time before coating increases the speed materially. We lately coated and printed the remainder of a batch made with others described on page 149, which had been mixed more than six months without becoming discoloured. Tested against freshly silvered and fumed albumenized paper, the emulsion paper proved to be exactly seven times quicker than the other. This applies more particularly to some compounds in a greater degree than to others.

Hitherto we have dealt almost exclusively with a certain silver haloid judiciously mixed with organic compounds of silver, and we trust that our record of the outcome of a large number of experiments which have been conducted by us have at least proved interesting to our readers. We should hesitate to assert, or even for a moment assume, that the immediate result of our labours will be to cast such an old friend as albumen at once into oblivion; neither do any of our unpublished observations lead us to a similar conclusion, since the transitory stage of a complete change in the mode of producing positives or negatives is not held in high esteem by the every-day worker, as instanced a few years ago in the change from wet collodion to gelatine dry plates. When, however, those amateurs and experimentalists (for whom this series are more especially intended) have been induced to adopt or improve upon any of the methods we have brought (or may yet bring) under their notice, then we may look upon albumenized paper as a thing of the past.

We now introduce to our readers a modification which has a very important bearing upon the operation of toning almost any of the films we have been dealing with, as the new property conferred is that of quickening the toning process very considerably. We may fairly assume that another point has been gained in favour of gelatine. This is brought about by the introduction of a minute proportion of auric chloride into the emulsion. We have long known the peculiar properties conferred by this addition, but not until the last few months have we been able to make a practical use of the fact, and have decided that the following conditions must be complied with in order to gain the desired advantage.

If it be attempted to add even a small quantity of strong gold solution at once to an emulsion, then coagulation ensues, and the whole batch is rendered useless; a similar result is brought about by the slightest addition beyond the required quantity. Another effect that invariably indicates the presence of too much gold is a considerable weakening of or diminution in the vigour of the image. We prefer dissolving an ordinary 15-grain tube of gold tri-chloride in 150 cubic centimeters of water, and taking 1 cubic centimeter of this solution for every gramme of silver used, adding the same very gradually to the warm emulsion, with constant stirring. We only give this as a minimum quantity, but some emulsions may require more to effect our object of hastening the speed of toning. In the present instance we are not seeking an emulsion for keeping in bulk beyond a few hours, as the presence of gold therein tends to spoil the colour and consistence. Moreover, certain silver compounds are less amenable to this influence than others; those which we have formulated may be so treated, and will then tone rapidly in the ordinary acetate or other toning baths, without the addition of chloride of lime referred to on page 295. When gold is not introduced into the emulsion, and the image is difficult to tone, the action may be stimulated by mixing one or two drops of a saturated solution of chloride of lime with the toning bath; a small quantity of borax or other restrainer—preferably an alkali—should also be added, in order to prevent that bleaching of the image which would otherwise result upon the introduction of chlorine in this form.

In the action of toning these gelatine prints, which may occupy a period ranging from a few seconds to many minutes, according to the kind of emulsion employed, and the proportion of gold incorporated therewith, the noble metal becomes reduced, and in so doing liberates chlorine, a powerful bleaching agent, which makes its presence known by rapidly attacking the coloured image, especially at the edges of the print, much in the same manner and to a similar extent observable in the case of albumen prints toned with gold minus alkaline or neutral salts; hence, in making use of chloride of lime to start toning action, it must be borne in mind that a larger proportion of a chlorine absorbent is also requisite, notwithstanding its restraining properties.

A salt may be used in compounding the emulsion which will assist the printing considerably, and lend still further aid in the process of toning, by restraining the action of freshly-liberated chlorine at any point upon or within the gelatinous layer, and thereby combining with it to form a harmless salt. Some of the sodium salts will do this, and it is likely that the citrate of soda would be of the greatest value in that respect. Whether the added salt be a citrate, tartrate, phosphate, silicate, acetate, tungstate, or any of the less known organic acids in combination with an alkali, their value will very much depend upon the removal by washing of the nitrate salts formed in the first instance by the decomposition of silver nitrate in making the emulsion, since the presence of these nitrate salts checks toning very much, without yielding any corresponding advantages, either in speed or vigour of printing. Of course no washing can be of use where easily soluble organic salts of silver are employed.

When dealing with paper prepared in the foregoing manner, preliminary washing before toning is not of much importance; in fact, thorough washing would, in a great measure, defeat the object. Therefore we recommend that the prints be passed into one vessel of water, and thence direct into the toning solution, turned therein two or three times, the solution being kept in motion by rocking the dish. They may then be examined by looking through them towards a strong light, such as may be obtained from a fish-tail gas burner or a good paraffin lamp. When the colour by transmitted light commences to change, the prints should be removed to a vessel of cold water, and after a couple of changes be transferred into a dilute fixing solution 1—9, when redness quickly gives way to a rich tone. Should the action of the gold bath be carried beyond that which is here recommended, the resulting prints will be too cold and flat to suit many tastes, owing to the fact that the fixing bath exercises a great change in the colour of an image produced in this way, than it does with ordinary sensitized paper or the emulsions wherein no gold is present.

We shall have more to say on this subject next time, and hope to point out some other methods of employing gelatino-chloride of silver for positive printing.

HOW TO SUCCEED IN TAKING GOOD PICTURES ON GELATINE PLATES.—No. III.

BY S. R. BOTTONE.

Returning to our dark-room with our exposed plate, we carefully close the door, and look around to assure ourselves that no white light is entering at any unsuspected cranny. This being satisfactorily ascertained, and remedied if it occur, we proceed to pour out in the developing dish 6 drachms of the saturate solution of potassic oxalate, to which we then add 2 drachms of the saturate solution of ferrous sulphate. (Among many other reasons why I advocate the employment of ferrous oxalate as a developer, especially for beginners, is because the colour of the solution is such, that when once the plates are fairly under it, ordinary light has no effect upon them.) Opening the dark frame, we place our exposed plate in the developing solution, gelatine surface uppermost. We then immediately commence to rock the dish, so as to ensure evenness of development. Rocking by exposing the plate to fresh, unused portions of developer, is conducive to brilliancy and contrast; while allowing the solution to remain still favours softness.

It will be found that those portions of the plate which have received the longest exposures will flash out almost immediately, and will soon *grey* all over; whilst other portions will be slower in coming out. Perhaps some will not come out at all. At any rate, it will be well to leave the plate in the developer for at least ten minutes, agitating from time to time. The plate may then be removed from the solution, placed in a dish of clean water to wash off the adhering ferrous oxalate, then plunged in the fixing solution (1 part of sodium thiosulphite to 4 of water), whence it must remain until all the milky-looking bromide has been removed, and then transferred to a bath containing—

Chrome alum	5 grains
Water	2 ounces

After soaking in this bath for five minutes, to harden the film, the plate may be brought out to daylight, and well washed in a stream of running water.

Not all plates require treatment with chrome alum, as some have the alum added during manufacture; these are in general somewhat less sensitive than the others, but these latter tend to frill in warm weather. The use of the alum bath is never injurious, and often saves a good plate, coming from unknown source. It must be particularly noted, that while the plates are fixing—*id est*, while they are in the fixing bath, or moistened with it—they should *not be exposed to strong light.* Light and "hypo" together reduce the strength of the image in a very marked degree.

Our picture being washed and dried, we can examine it at our leisure. That portion which has received the correct exposure will present the following characteristics. 1st. The high-lights, viewed by transmitted light, will appear black, almost opaque. The deep shadows will show as clear glass without any veil or mistiness; the delicate gradations of half-tone will be clearly visible at all points except in the very deepest shadows.

If none out of the ten divisions show these characters, then none of the exposures have been right, and the plate shows either one or the other of the following appearances.

1st. Every portion is more or less veiled over; no part of the image is dense enough to give a print with a fair amount of contrast. Or,

2nd. The high-lights alone have impressed themselves, and these stand out very black and dense, while the shadows and half-lights are clear glass.

In case 1, the exposures have all been too long. In case 2, the contrary defect prevails, and the exposures have all been too short.

It is not likely, under the circumstances presupposed, that this latter defect will show itself; it will more probably be found that the portions marked 10, 9, 8, 7, 6, 5, 4, will be over-exposed (the former very considerably), while 3, 2, and 1 will be nearer the mark. If all these should show veiled shadows and thin images, it will be well to try a second plate, using a stop on the lens of only half the aperture (which requires four times the exposure).

Although an experienced eye can judge pretty fairly of the printing qualities of a negative by mere inspection, yet, before deciding on which exposure has given the best result, it will be well to print from the negative, in full sunlight, using ordinary albumenized paper, and giving about five minutes' sunning. A negative requiring more than that exposure will be generally found too hard and too slow to give satisfaction, while one that prints in less than three minutes will generally be found wanting in contrast.

Having thus found which portion of the plate gives the desired image, we have only to refer to the numbers on the slide to know which exposure this corresponds to, and this exposure will be a guide to our future work with that particular lens, and that particular make of plates. Having once obtained fair results with any particular make of plates, the amateur should adhere to them until he has conquered every difficulty, and knows every peculiarity connected with them. He would also do well to keep to one developer, and indeed to one set of receipts, until he has perfect control over his work; then he may launch out into experimenting with other plates and other developers, &c., with the certainty of learning something useful.

My next paper will contain directions as to the mode of controlling (within certain limits) the development of plates which have been unduly exposed.

METEOROLOGY FOR PHOTOGRAPHERS.

BY J. VINCENT ELSDEN, B.SC. (LOND.), F.C.S.

Chapter III.—Solar Radiation—Sunshine Recorders—Distribution of Sunshine in Britain—Practical Applications—Terrestrial Radiation—Sunshine in Photographs.*

The actual duration of sunshine is of far greater importance to photographers than the maximum radiation at any given time. Several instruments are now in use for this purpose, one of the simplest of which is that known as Campbell's Sunshine Recorder, the form of which, as modified by Professor Stokes, is shown in fig. 8. This consists of a sphere of glass, acting as a lens to focus the image of the sun upon a strip of mill-board, in which a hole is burnt as long as the sun continues to shine.

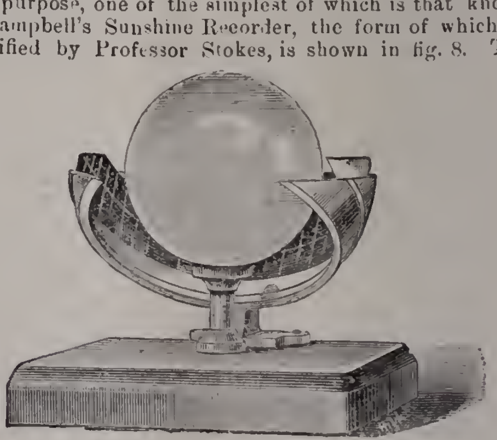

Fig. 8.

Another method, suggested by Captain Abney, is extremely simple for photographers. It consists of a semi-cylindrical box (fig. 9), with a hole in the centre of the lid, of one tenth of an inch in diameter. A strip of sensitive paper is slipped along the curve of the cylinder, and the instrument is exposed to the sun, so that the length of the lid lies due east and west. The box is hinged to the stand, so that it may be inclined so as to intercept the sun's rays perpendicularly, and a tracing is then got on the sensitive paper of the track made by the image of the hole during sunshine.

The Whipple-Casella instrument (fig. 10) is somewhat more elaborate than Campbell's, which has the defect of not being movable from one locality to another. This has an arrangement for adjusting the polar axis (B C) of the sphere to the altitude of the pole at the place of observation—that is, the latitude of the place—as well as a graduated circle, D, for completing the adjustment. It has, also, the advantage of having several movable card-holders, K, and a pointer to indicate the sun's place for any date; whereas, in the Campbell instrument, cards have to be cut to different shapes at different seasons of the year, since the sun's image describes a smaller path round the glass sphere at the solstices than at the equinoxes.

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* Continued from page 460.

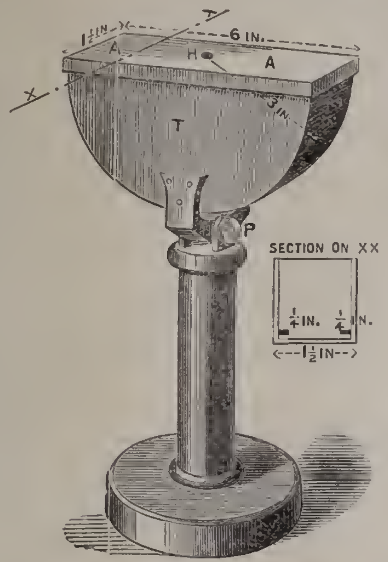

Fig. 9.

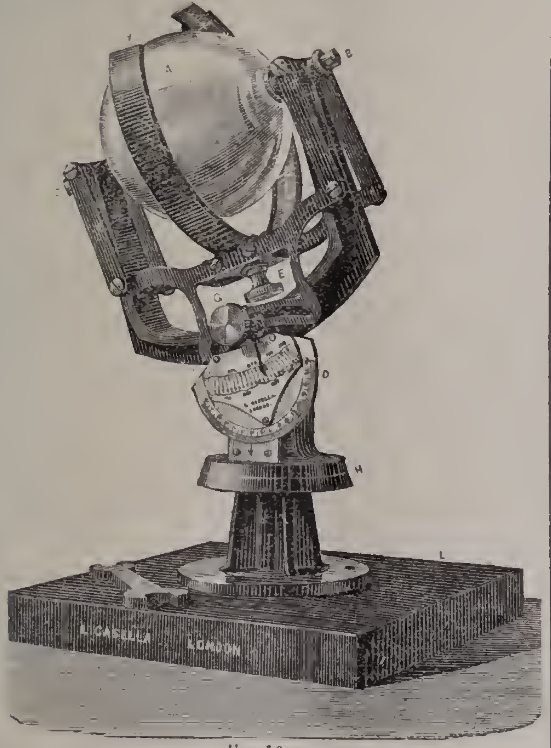

Fig. 10.

In the Year-Book for 1883 Mr. Whipple gives some interesting details as to the distribution of sunshine over the British Isles. Taking the average for the previous year, he found that the British Isles received about 32 percent. of the possible duration of sunshine—that is, about one clear day to two dull ones. He also found that the sunniest part of the British Isles, during the same year, was the South West of England, comprising Somerset, Devon, Cornwall, and South Wales; while the dullest part was the North West, including Cumberland, Westmoreland, Lancashire, and North Wales, where the amount of sunshine was nearly a fortnight below the average of the whole country. South Ireland, in spite of its rainy character, enjoyed 34 per cent. of the possible duration of sunshine, and it ranked highest in the kingdom in May, with a percentage of 54. Even in January, when London only received 10 per cent., this district received 23 per cent. of the possible duration of sunshine. All over the kingdom May was the finest month in the year. The following table gives the chief results:—

District.	Percentage of Possible Duration.
1 Scotland, E ...	 33
2 England, N.E. ...	 31
3 England, E. ...	 34
4 Midland Counties	 31
5 England, S. ...	 32
6 Scotland, W. ...	 29
7 England, N.W. ...	 28
8 England, S.W. ...	 37
9 Ireland, N.W. ...	 31
10 Ireland, S. ...	 34

Before leaving the question of solar radiation, we may allude to the practical utilisation of the sun's rays for heating and other purposes. A paper was read in 1883 before the American Association for the Advancement of Science, in which Mr. E. S. Morse described a case in which a slate slab measuring 3ft. by 8 ft., standing vertically on a wall, was connected with flues to conduct the warmed air inside a house. When the sun was shining it was found that the temperature of the air passing through the flues was raised 30°, and a volume of 3,206 cubic feet of warm air was discharged into the house every hour. The reader will also remember the description of Ericsson's sun steam engine, given in the Photographic News for Jan. 11, 1884. A short time ago, also, a small French newspaper was printed entirely by the action of a sun-motor.

The question of terrestrial radiation will be more fully treated in another chapter. The escape of heat from the earth into space is constantly going on, and may be measured by placing a minimum thermometer on greensward with its bulb on a level with the top of the grass. Generally speaking, the temperature here will be found several degrees below the reading of the ordinary shade thermometer. In India advantage is taken of nocturnal radiation to procure ice. Even when the temperature of the air is as much as 20° above freezing point, large quantities of ice are procured by exposing water in shallow pans, resting on a non-conducting layer of rice-straw. Ice does not form, however, unless the air is still and dry.

We will conclude the present chapter with a few words upon the effect of sunshine on a photograph. Very few subjects can be taken successfully with the lens facing or just off the sun, although, in some cases, the effect would probably be improved by so doing. This is especially the case, says Mr. W. D. Valentine, with cloud effects, and some sea pieces, as well as single-tree studies.

In all cases it is necessary to the landscape photographer to know the aspect and proper position of the sun, to secure the best effect in every view. Usually this cannot be accomplished without visiting the locality. But if we know the point of the compass at which the sun rises, it is easy to calculate the exact time of the day when he will be in any given position. Tables for this purpose have formerly been published, and it would doubtless be a convenience if they were continued at the present day. Thus, suppose on July 21st we wish to know exactly the hour when the sun will be due S.W. From the tables we find that on that date the sun rises E. 33° N. at 4.9 a.m. Now between E. 33° N. and S.W., there are 168 degrees, and the sun travels 15 degrees in one hour. Therefore, dividing 168 by 15, we get 11 hours 12 minutes, which, added to 4 hours 9 minutes, gives 21 minutes past 3 o'clock in the afternoon as the exact time when the sun will be due south-west.

Respecting the representation of sunlight in a photograph, Mr. H. P. Robinson attributes the failure of this effect to incorrect massing of light and shade. He says: "A quantity of flashes and spots of light scattered over a picture will never suggest anything but spots of light; but if a breadth of sunlight can be contrasted with a breadth of shade, but of unequal quantity, sunlight will be suggested. He recommends the highest light to be opposed to the strongest dark, a method generally adopted by Turner and the Dutch School in their finest effects." The same writer says, in "Pictorial Effect": "Photograph a landscape with the sun shining at the back of the camera, and the effect will be flat, tame, and uninteresting; take the same view with the light coming at the side, and the difference will be evident—the magic of chiaroscuro will be at once felt." The effect of light and shade in photography is of such importance that to secure the best effect the same view should be examined at different times of the day, and under different conditions of light, for, as Mr. Robinson says, "We can make a beautiful picture out of ugly objects if we can throw over them the glamour and witchery of perfect chiaroscuro."

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WASHING GELATINE NEGATIVES, ETC.

BY ROBERT OFFORD.

Since the introduction of gelatine as a vehicle for holding sensitive compounds of silver in suspension for the purposes of commercial photography, a difficulty has arisen which did not trouble us when working with the collodion processes. In the one case a thin film of pyroxyline upon glass presents every facility for the removal of all excess of chemicals applied to it, by simple washing under a tap. In the other case a film of gelatine, a dense colloid substance, is capable of retaining within itself soluble salts in defiance of many such washings. Practical experience and a large variety of tests have proved the great desirability of having some contrivance for eliminating, with certainty, every trace of soda or silver hyposulphite from the finished negative.

Although it may be true, as some assert, that quite an appreciable quantity of the salts may be retained in the film without injury to the image, after keeping for five or six years, yet this is only the case where they have been preserved in a perfectly dry place; and any attempt to subject such plates to further treatment by intensification will meet with signal failure. Unequal action, producing a staining of the film, and irreparable damage to the negative, are among the results of indifferent washing, followed by intensification.

If a properly washed plate be sprinkled with a little of the fixing bath, and after a few minutes rinsed under the tap, and then treated with mercuric chloride, followed by ammonia, or sodic sulphite, the point in question will be very clearly demonstrated, especially if a print be taken when dry.

It has been recommended to apply eliminators, or decomposing agents of various sorts, to assist the action of the water; but, on the whole, while such means may be adopted in exceptional cases, commercially it is better to trust to perfect arrangements for washing, rather than add one or two more to the many processes through which the gelatine has to pass. When it is seen to be imperative to intensify, five minutes' soaking in the simple alum and hydrochloric acid bath, a little while before the washing is completed, will guard against any risk.

Theoretically, the condition of the solution prepared for fixing is an important element in the question.

Again, taking a properly washed plate, immerse half of it in an old fixing bath, and the other half in a freshly mixed solution. Then wash it, but not perfectly, and intensify as before, when I think it will be evident that the old solution required more time for its removal than that freshly mixed, and the density of that half is greater than the other. The use of an old fixing bath has been advocated on the score of improving the brightness of the negative; but this is more than doubtful, as the added opacity, if any, is not confined to the lights of the image, and is not brought about at all with perfect washing in subdued light.

Theory and experiment point to the expediency of using baths, both large and frequently renewed.

The various washing arrangements proposed or offered for sale may be divided into two classes—those in which the plates are vertical, and those in which they are horizontally placed. The first are the most popular, but by no means correct. A series of prolonged trials of various plans, including those well known, and several suggested by the experiments themselves, have led me to this conclusion. That contrivance where, the plates being racked vertically in water, a jet plays upwards from the bottom of the trough, is perhaps the best of that class. The gravity of the liquid is here more strongly equalized, and the consequent escape of the salts rendered more easy.

When the plates in this position are merely soaked in the water, the supply being from above, and the exit an intermittent syphon, the plates are left too long out of water, and gravity, acting on the film itself, leaves the lower portion insufficiently washed. I have often seen half a plate, after intensification, exhibit twice the density of the other half, and traced it to a vertical washing trough.

When no after treatment is necessary it is not evident, except by cutting in half and testing each half by the usual iodine test. The evil was there all the same, condemning the principle.

The chief means whereby elimination is effected, is by a process analogous to that known as dialysis. The method adopted in the production of many laboratory preparations—as, for instance, that by which a pure solution of hydrogen silicate is obtained—presents a simple illustration. The mixture of silicic acid, hydrochloric acid, and impurities, is placed in a wide vessel, the bottom of which is made of parchment paper. After floating in water for some days, all the impurities, &c., have passed into the water, leaving the pure silicic acid behind. The chief condition to be complied with is the presence of plenty of water. It seems to me that the outer surface of a gelatine film acts as the paper membrane in this instance, and if there be the same relative positions maintained, and a constant change of the water touching the membrane, then dialysis and gravity combined will soon effect the elimination desired.

Now the nearest approach to these conditions is offered in the arrangement in which the plates are horizontally placed. The most simple plan I know of is that consisting of a framework of three uprights joined at the top and bottom by triangular pieces. One edge of the plates rests against stops on two of the uprights, and the other edge against the remaining one, at an angle of about 15 degrees. These are very conveniently made of lengths of compo piping, united at each end by equilateral triangles of stout sheet zinc or galvanized iron wire. The plates are supported either by little projections soldered on the pipes one inch apart, or by little ebonite pegs driven into holes. Troughs should be made deep enough to take the whole, and large enough to well clear the plates as they project. It remains only to fill these holders with negatives, and lower the whole together into the water, after which the water should be changed a dozen times during some three or four hours.

The great drawback to this is the trouble in changing the water; otherwise the plan is a good one. Another arrangement is that suggested by Dr. Fol, and illustrated in the Photographic News Year-Book. This is decidedly good, but perhaps more costly than the case really demands.

With the exception of the vertical position of the plates, the most mechanically complete and theoretically correct design is that recently illustrated in this paper (page 628) suggested by Mr. Charles Stortz, and after many experiments, I have adopted a modification of this which seems to meet every necessity. V-shaped troughs are constructed in lengths and numbers to suit the amount of work done. Three feet is a useful size, and they can either be made of stout zinc or of wood. I prefer the latter, well painted outside and in with bitumen varnish or ordinary Brunswick black. The two sides form an angle of 120 degrees, and each is five inches deep inside. This allows for whole, half, and quarter plates to rest on two edges across the bath. At one end the arrangement is similar to that illustrated at page 628; that is, at 2 inches from the end, a V-shaped partition is fixed from the top to within ¾ inch of the bottom, and at the extreme end adjoining the partition an overflow pipe is placed. The troughs do not take up much room, as they can be placed against a wall or under a table or bench, and are stacked one over the other, the partition and overflow of one being arranged over the opposite end of the one under it, and so on alternately. A supply pipe to the top one with tap completed the simple apparatus.

Earthenware would be a good material, but is too expensive and heavy. Wood is cheap and light, and if joints are made with brass screws and white lead, the black varnish will ensure water-tight work. I have had one such trough in use for years without re-blacking. It is made of ¾-inch deal. Lead pipes can be fitted in woodwork easily, either with that common cement known as "Prout's glue," or, perhaps better, with so-called electrical cement, a mixture of resin 5 parts, beeswax 1 part, and red ochre 1 part; the latter thoroughly dried, and sifted through fine muslin before mixing.

Here there is a washing apparatus readily and cheaply constructed, which affords every facility for the rapid elimination of crystalloids from the gelatine film, by dialysis and gravity, with a constant change of water. The plates are easily and quickly placed, or taken out to examine, and loose covers protect from injury. One precaution alone is necessary. In putting the plates, film downward, under water, slant them until submerged, and then let them rest horizontally, otherwise the presence of air-bells is just possible.

In my case, before the water enters the first trough, it is made to perform the duty of turning the table on which the vignetting frames are printing. This is done by means of a water-wheel, consisting of a 12-inch disc of sheet zinc, around which are soldered sixteen little shallow tinplate trays, 1 inch by 1½ inch in size. Two fine jets of water fall on these trays just as they are nearly horizontal, and sufficient speed is obtained on the axis of such wheel to be converted into power by the intervention of a wheel and pulley of 12 inches and 1 inch, and the necessary straps in the shape of stout tape. This has been going daily for months, the water in the troughs being always ready for negatives at any moment.

THE NEW DOUBLE-COATED SENSITIVE NEGATIVE PAPER.

BY LEON WARNERKE.*

The more photography becomes popular, so the more is felt the necessity of some good substitute for glass upon which to take a negative. It will be superfluous to assert that glass, being bulky, heavy, and brittle, is a very inconvenient material for out-door work. A few more or less successful expedients have been proposed and tried for this purpose since collodion made glass the almost exclusive material for negatives. The question of a substitute for glass has received, however, more development since the introduction of the dry plate process, and especially after that of collodion emulsion. I myself have been the originator of one of the systems, in which a collodion film, prepared on paper, was used as a temporary support. The introduction of gelatine emulsion for general use, with its great sensitiveness and different physical properties of the vehicle employed, naturally necessitated a different method; and such was provided, either in the shape of a gelatine film pure and simple, or in the shape of a film temporarily attached to the paper, to be stripped off after development when dry, or in the shape of paper covered with emulsion, the image being developed and treated with hot water, as in my patent process. But the gelatine process has made the practice of photography very popular, and added a great contingent of new adepts. These use ready prepared glass plates, and get their pictures by a very simple process of development and subsequent fixing, and they naturally object to the smallest addition to the number of operations involved in the process of obtaining a negative on any substitute for glass. For such persons ordinary plain paper, covered with sensitive gelatine emulsion, answers the purpose, the number of the operations being the same as when glass plates are used. However, prints from such negatives show the grain of the paper, and the printing is very long.

My new sensitive negative paper, which I have patented, is designed to obviate these imperfections, and to render the quality of the print even superior to one obtained from a glass negative. I take the paper and cover it with gelatine emulsion on both sides. When exposing such double-coated paper in the camera, in the first instance, light will act on the front surface next to the lens, then penetrating the paper, it will act also on the back surface. When this exposed sheet is immersed in the developer, two negatives, one on each side of the paper, will be produced.

But now let us suppose that the paper itself had some spots, both opaque and transparent; these will have no influence on the front image, but the back image will be influenced by the spots, and in the exact ratio of its opacity. In other words, all the imperfections of the paper will be corrected by the back image, rendering the composite negative perfectly smooth, no matter how coarse or imperfect was the texture of the paper employed.

I now pass round for examination a negative produced on this paper bearing some printed matter. The back image had corresponding transparent characters, and very distinct impression of the texture of the paper; but upon looking through the negative all appeared smooth, and such was also the print. Now it will be intelligible that a print from such a negative composed of the two will be also superior as regards roundness and pluck. If the paper used for the purpose be the ordinary photographic paper, Rive or Saxe, the objection to the slow printing remains in full force; but I use instead, paper rendered so transparent by a special preparation, that a print from the image I send round for examination did not occupy more time to print than one from a glass negative of the same density. This special paper offers other advantages. It does not curl when dipped into water, and even after very protracted washing it remains exceptionally strong, bearing an enormous amount of handling, without cracking. It appears as if it was not affected by water at all; in fact, if you examine this wetted negative you will observe that to the touch it does not seem at all like paper, but rather like oil-cloth or leather.

Now as to the details of using it. In single sheets it can be used in ordinary carriers, provided they are fitted with rabbets instead of wire corners. Any rigid plate put behind will press it close to the rabbets, holding it perfectly flat. One thing must be taken into consideration. At the back must be a dead black surface (velvet), otherwise, the paper being transparent, reflections from any light object behind will affect the back sensitive surface. However, the most legitimate use of the paper is in the roller slide. The new improved form I will now explain on this model [here Mr. Warnerke showed and explained the new form of his roller slide]. The development of this paper is precisely like that of ordinary glass plates, preferably with ferrous oxalate, in order to avoid any pyrogallol stain. After fixing and washing, it is advisable to pass the negative through an alum bath, to which has been added a few drops of sulphuric acid. Hydrochloric acid must not be used. This will bleach the paper if it has become discoloured with the iron oxide after long development. The finished negative can be dried on glass previously rubbed with talc, or simply by suspending it; but in this last case it will not be very flat when dry, and it is necessary to damp it again very slightly, and to put it between sheets of blotting paper, and submit it to pressure between the pages of a book. After a very short pressing it will come out quite smooth, and will remain so, if kept dry.

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* Read before the Photographic Society of Great Britain.

Notes.

That the ferrous-oxalate developer should be so much neglected in this country is one of those enigmas that appear insoluble; and, in relation to this matter, all should read a letter which appears on page 477, and is signed with the well-known name, S. Bottone.

Mr. Bottone contends that not only is the oxalate developer economical in use, but if made up in two solutions, it can be kept for years; while for meeting cases of over-exposure or under-exposure, it is especially adapted.

Not so much a talker as a worker is Mr. Bottone, and perhaps someone will accept his challenge and supply him with plates exposed between the normal and ten times the normal. To make the affair more interesting, a champion of pyro should work on similar plates, and perhaps arrangements could be made for the trial of "oxalate *v.* pyro," to come off at the Photographic Club.

Speaking of the Photographic Club (not the proposed new *quasi*-amateur club), it is perhaps not generally known that this Association possesses a convenient meeting place, fitted with dark-room and all conveniences for such casual photographic work as there may be occasion to do on the premises.

It is not always wise to show a negative to a customer Once, in the days of wet plates, a photographer was engaged by the proprietor of a country hotel to photograph a summer-house—or, rather, a series of summer-houses—of which the owner was intensely proud. The peculiarity of the edifice was its roof, which was entirely formed of ivy, so trained that the stems and branches formed natural groins. The place was the outcome of quite a century of loving care, and the landlord thought he would like to have a picture of it. By chance the photographer forgot to take any fixing solution, but he thought little of the omission, as he knew he could fix the plates on arriving home. He took some half-a-dozen negatives, and the landlord, anxious to see how the pride of his establishment "came out," insisted upon looking at the negatives. Greatly disappointed was he when he saw a greenish-yellow film covering the details, and, being one of those very clever people who always pride themselves upon the impossibility of anybody taking them in, he immediately conceived that the photographer was "having" him. The terms were to be cash, but he refused to pay before he saw the print, and this breaking of faith rather nettled the photographer, who, losing his temper, rubbed his finger across the negatives, and vowed he would have nothing more to do with the matter. Nor did he. But he also made another vow—never to show an unfinished negative. This vow he has kept, and with benefit to himself.

Mrs. Weldon, after crying out for scaffolding and balloons to rescue the now celebrated cockatoo, has had recourse to photography. The cost of getting down the bird was £3 5s., and the owner being a poor widow, the indefatigable Mrs. Weldon appeals to the public to make up this sum. "The man who caught the naughty thing," she writes, "is to be photographed with the bird and the ladder: Cabinets, 2s.; cartes, 1s. If people would order them of me, and send me the money for them, and a little more, that sum should go towards the widowed lady's expenses." Any collector of odd out-of-the-way photographs might do worse than invest a few shillings.

The tourist will soon be able to take his balloon ticket, and ascend a mountain by balloon with as little trouble as he now goes up the Righi by railway; at any rate, this will be so unless something prevents the construction of the air-balloon railway on the Gaisberg near Salzburg. The balloon is to be a captive one in a double sense, as the car will run between vertical rails. The camera will doubtless be frequently brought into requisition by the passengers.

Among the more recent inventions of W. B. Woodbury may be mentioned a wonderfully transparent paper, which he proposes to use as a support for the negative film. He has not told us how he makes it, but it does not appear to be prepared with wax, varnish, or other similar preparation. In appearance it recals the thin sheet gelatine used in making bon-bon cases.

The Photographic Club's subject for discussion this week was, as we announced last week, "Soda and Potash Developers." A thirsty correspondent writes to us, *apropos* to this, to state "that the only really effective 'developers' of a 'a soda' or 'a potash' he knows, are whisky and brandy." If this be a fact, what a "spirited" discussion the Photographic Club must have had!

An enterprising Chicago dentist has been turning his patrons, by the aid of photography, to effective advertising account. He has contrived, unknown to his customers, to secure negatives of them as they entered his operating room—or, at any rate, of those of them whose expressions most realistically expressed their sufferings—and has then taken comparison portraits of the same people just before they left his premises, relieved of their pain, and facially beaming in consequence. Pleased with the success of this graphic method of recommending his services, he next essayed to point out to the toothless public the desirability of being fitted with one of his "guinea jaws," by exhibiting comparison cartes of Mr. A and Mrs. B and Miss C, taken before and after their dental deficiencies had been supplied. But to these lasting mementos of a gummy condition they were anxious to bury in oblivion, Mr. A and Mrs. B and Miss C promptly and persistently objected, and the tell-tale photographs had to be withdrawn from circulation.

An out-door photographer who takes with him the very convenient photographic note-book published by R. Keene, of Derby, makes the following remarks, which embody some suggestions which, perhaps, Mr. Keene will take into consideration in issuing a new edition.

"In the first column, headed 'No. I,' always enter the number on the side of the dark slide containing the plate, and at the time of exposure I fill in particulars under the headings 'Size,' 'Subject,' 'Time of Day,' 'Light,' 'Process,' 'Stop,' 'Lens,' and 'Exposure,' generally leaving the column 'Remarks' to be filled in after development. At the time of taking the plate from the slide, however, I always mark a number on the back of the glass with a writing diamond, and this number corresponds to my general series, not to the number on the slide. For this 'permanent number' there is no column in Mr. Keene's book, and I have to rule a special column. Will Mr. Keene take the hint?"

The removal of the National Portrait Gallery to the Bethnal Green Museum, while a fireproof building is being constructed at Kensington, suggests the propriety of the collection being photographed. In one sense, these portraits are more worthy to be treasured than the pictures in the National Gallery, because they possess an historical value which does not belong to mere works of art. Supposing, however, that such a calamity as the destruction of the collection by fire did happen, the loss would be considerably mitigated if copies had been preserved. The essential quality of the National Portrait Gallery is the record it presents of the features of famous persons, and this record would be as well shown by photographs of the pictures, as by the pictures themselves.

To produce several hundred photo-lithographic subjects in the course of a week is no trifling matter, especially in an establishment where the routine has not grown up with the work. A curious illustration is afforded by the non-appearance of the issue of the American Patent Journal for the 7th instant, the subjoined circular having been sent out instead.

"Department of the Interior, United States Patent Office, Washington, July 7th, 1885.—An unavoidable delay in the issue of the Official Gazette of this date has occurred in consequence of the fact that the Patent Office sent the photo-lithographing of this issue away from the regular contractor as an experiment, and the the gentlemen who undertook it have found it impossible to furnish the work in season. The Official Gazette of this date will appear shortly, and will be mailed to subscribers immediately upon its publication. The numbers for July 14th, and all subsequent dates, will issue regularly as heretofore.—M. V. Montgomery, Commissioner of Patents."

The latest use to which photography has been put at Woolwich Arsenal is the detection of flaws in the interior of guns, both during their manufacture, and after firing. Two 8-inch muzzle-loaders were on Saturday tested in this way, the interiors being illuminated by an electric light introduced a short distance from the muzzle and reflected down the bore, the photograph being taken at the breach end.

If we have Sir J. E. Millais at his easel, why not Mr. W. G. Grace at the wicket or fielding point? and Mr. Joseph Roberts making a brilliant winning hazard on a championship table? If, again, we have Mr. Gladstone amongst his blue books and state papers, why not Mr. Toole in his dressing-room (making up for Audrea, say)? Mr. Spurgeon on his Tabernacle platform? and Mr. Justice Hawkins assuming the "black cap" at the Old Bailey? Photographs of celebrities will thus come to possess a double interest. Not only shall we have a carte of Mr. W. Renshaw, but it will be a portrait of him in the act of making one of his world-famed "smashes." The coming photograph of Fred Archer will at once show us the popular features of that sensational jockey, and his mode of "calling on" his mount at the finish; whilst one negative will contain both the portrait of the current "Queen's Prizeman," and of his target at the close of his shooting at 900 yards. One thing is certain: the old conventional backgrounds is over, and the paste-board Corinthian column, the classic curtain, and the property balustrade, will be ere long finally consigned to the limbo of the lumber room.

The hair-brained King Ludwig, of Bavaria, is bankrupt. What has this to do with photographers? some may ask. Well, not very much, save that photography did not ruin him. It is said that, finding he was getting fat, he had his existing photographs altered to suit him, rather than sit again.

A notable feat of journalistic enterprise was lately performed by the *South London Press*. A garden bazaar of some importance being held in the neighbourhood of Dulwich, it was deemed desirable that a picture of the scene should be given in the paper. The drawback was the shortness of time, the bazaar being held on Friday, and the paper going to press the same night. The difficulty was overcome by a photograph being taken early in the morning, of the tents and surroundings, and despatched to the artist, who made his sketch from the negative, and filled in the figures.

A correspondent tells us how he made an assortment of white card letters, an inch or so high, these being exact copies of small engraved letters. Enlarged negatives were taken of the selected letters, and light prints taken on thin good cardboard prepared with the usual cyanotype sensitizer. These were cut out in weak light with knife and scissors, developed in three changes of water, and passed into a five per cent. solution of potassic carbonate, and then, after a good rinsing, they were dried between cloths.

Result: pure white card, letters exact to pattern ready for mounting on coloured ground for notice or advertisement.

We are requested to state that all communications relating to the forthcoming Exhibition of the Photographic Society of Great Britain should be addressed to the Assistant Secretary, Mr. E. Cocking, 57, Queen's Road, Peckham, S.E., and not to the Hon. Secretary as announced last week.

The British and Colonial Printer and Stationer has rashly rushed into photography, and has printed a two-column article, of which it can only be said that it is wonderfully and fearfully made. Here is a curious sentence: "Before he (*i.e.*, the photographer of pastdays) poured the collodion on the plate which had to be so laboriously cleaned, and then dipped it in the mysterious bath and retreated into the dark-room with it, and dipped it again, he generally managed to leave some trace of the operation on his person." What was this strange collodion process in which the plate, after being collodionized, was dipped into a "mysterious bath" before being taken into the dark-room? We confess it is new to us. But this reminiscence pales its ineffectual fire before the astounding discovery that "the dry plates, rendered miraculously sensitive by gelatine mixed with bichromate of potash, have revolutionised the whole art"! Who on earth was the author of this marvellous article? Surely some descendant of Mrs. Malaprop!

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Patent Intelligence.

Applications for Letters Patent.

8514. Charles Day Durnford, 186, Fleet Street, London, E.C., for "Improvements in photographic shutters."—14th July, 1885.

8722. Samuel Dunseith McKellen, 18, Brown Street, Manchester, for "An improved method of exposing sensitive paper, tissue, or films."—20th July, 1885.

Patent which has become Void through Non-payment of the Fourth Year's Renewal Fee.

1517—1881. E. Edwards. "Photographers' head-rests, &c."

1538—1881. H. J. Hadden. *(Hutinet, &c.)* "Treatment of paper for photographic purposes."

1442—1881. G. E. Alder, &c. "Producing artificial lights."

Specifications Published during the Week.

6359. Benjamin Constant Le Moussu, of 94, Boston Street, Manchester, in the County of Lancaster, Civil Engineer, for "An improved process for producing plates for surface printing."—Dated 23rd May, 1885.

My invention relates to the production of plates for surface printing—that is to say, with those parts in relief that are to receive the ink and to impress the paper. A process for the production of such plates was described in the Specification to Letters Patent granted to me jointly with George Moore on the 18th July, 1873, No. 2474. As described in that Specification, a zinc plate was etched, the etched-out hollows were filled with fusible alloy, and then, by a second etching, the parts of the plate other than those presenting the alloy were etched out, leaving the alloy in relief. There were practical difficulties in effecting this process. The drawing of the design on the protected plate was difficult because the dark parts of the design presented themselves light on the plate; and, again, the second etching was difficult because the acid employed tended to eat under the alloy, loosening or detaching it. My present invention consists in a modification of the process referred to, whereby I am enabled to avoid the difficulties mentioned, rendering the process practically available for copying photographs, drawings, or prints.

In the first place, I coat the zinc plate with a varnish which is photographically sensitive; I prefer bitumen as it is usually applied for taking photographic impressions. On the coated plate I place the subject to be copied; it may be a transparent photograph, or a drawing, or print on paper, more or less translucent, or rendered so by applying wax, or the like substance. Exposing this to the light, I obtain on the bitumen an impression which, when developed and washed, presents all the parts corresponding to the darks of the original as exposed parts of the metal, those corresponding to the lights of the original remaining covered by the protective coating of bitumen. I then subject the plate to the etching action of dilute acid, thus hollowing out the exposed parts corresponding to the darks of the original; after cleaning off the bitumen, and washing and drying the plate, I heat it and serve it with molten fusible alloy, composed preferably of lead, tin, and bismuth. I work this into the hollows with a pad of fabric moistened with chloride of zinc solution, and thus the alloy becomes soldered to the plate and into the hollows thereof. After the alloy is set by cooling, I carefully scrape the plate so as to uncover all the zinc surface, and subject it to a second etching, whereby the alloy, not being attacked by the acid, the zinc is hollowed out, leaving the alloy standing in slight relief. I now, with a roller, apply over the plate a fluid varnish, consisting, preferably, of bitumen and suet dissolved in turpentine. This, besides coating the summits of the ridges of alloy, flows also down the sides of these ridges, giving them a protecting coating. I now subject the plate to a third etching, and, if necessary, to a repetition of the rolling with varnish and etching several times, whereby the hollows are deepended, the ridges of alloy being left in good relief, and held securely, as the zinc on which they are based is not eaten away, owing to the protection given by the varnish. The plate is finally subjected to an acid bath without any varnishing, and is thus ready for use as a forme for surface printing.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—

The process for producing plates for surface printing by etching a photographic impression on a zinc plate, serving the etched plate with fusible alloy, and again etching repeatedly until the zinc is hollowed and the fusible metal stands in relief, substantially as herein described.

6368. James Robertson, and Douglass Robertson, both of 109, Keamure Street, East Pollokshields, in the county of Renfrew, Photographers, for "An improved mode of obtaining photographic negatives or positives, and apparatus therefor."—Dated 23rd May, 1885.

This invention relates to the lighting and shading of the surfaces of objects in relief, for obtaining photographic negatives or positives, for producing the corresponding photographic images in relievo or in intaglio by printing from by any of the photographic relief printing processes, such as the bichromate and gelatine process, or similar well-known processes.

The claim is—

First. The mode described of "exposing" or illuminating objects to be photographed, said mode consisting in directing on the object from the front, parallel rays or beams of actinic light, and from the sides rays of coloured light or light of less actinic power, substantially as set forth.

Second. The mode described of obtaining photographic negatives or positives for printing from in relief or in intaglio, said mode consisting in exposing the object to be photographed to illumination by parallel rays of actinic light in front, and by rays of coloured light at the sides or sides and top, such coloured rays being gradually cut off during the exposure of the plate, substantially as set forth.

Third. The arrangement in a photographic studio or operating room of a movable tunnel or screen adapted to transmit parallel rays of light on to an object, and by its movement to gradually cut off from the object the light admitted from the sides and top, substantially as described and illustrated.

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AN IMPROVED SHUTTER.

BY G. L. ADDENBROOKE.*

At the meeting of the Society on 18th April, 1882, I exhibited and described a shutter giving a wide range of exposures, and went pretty fully into the reasons which had led me to have it constructed in the form it took. To what I then said about the principles which had guided me there is little more to add, but naturally further experience and use of the apparatus has suggested many points of details where improvements could usefully be introduced, and these I have embodied in the model now before you, which I will proceed to describe. To make the subject as clear as possible, let us first consider the shutter proper, and afterwards the means of controlling it.

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* Read before the Photographic Society of Great Britain.

As before, the shutter contains two slides (A and B, in fig. 1, which is a vertical section right through the centre), one to open the aperture, the other to close it when the exposure is finished. These slides are entirely independent of each other, and, being very light, derive their motion from two fine piano wire spiral steel springs (E and F), which cannot be over-stretched or lose their power, and should never want replacing. Although the slides move with great rapidity, their lightness and the rubber buffer against which the opening slide (A) impinges prevent appreciable vibration, and the shutter may be used fixed to the camera without any fear of affecting definition.

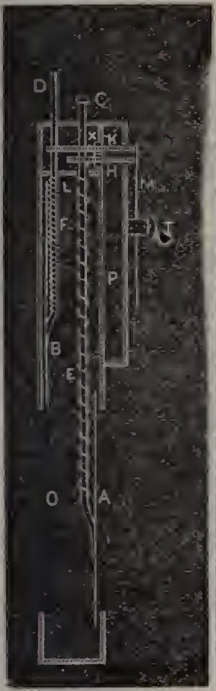

Fig. 1.

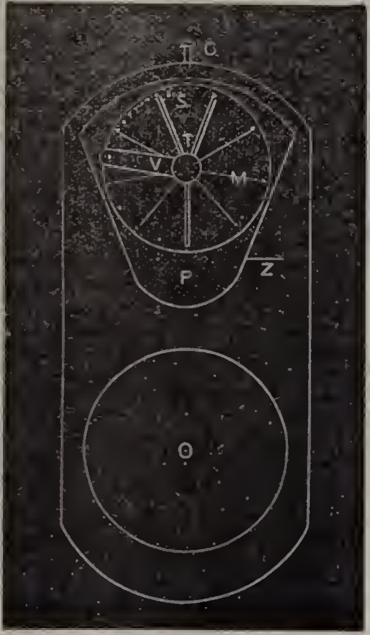

Fig. 2.

Each slide has a very light tubular brass rod attached to it (C and D), passing out of the top of the shutter. These rods serve both to set the slides for exposure, and to release them automatically at the requisite moment; they also act as guides for the spiral sprints, C and F. In fig. 1 the slides are set for exposure, A covering the aperture O, while B is drawn up out of the way. The spring E is now stretched, being attached to the slide and to the cross-piece L, but it is prevented from drawing up the slide by the lever H working on the axis X, which falls into a slot in the rod C. In the case of the slide B, however, the rod D (only part of which is shown) is drawn fully out, and the spring F is consequently compressed, and would propel the slide downwards were it not for the lever K, also working on the axis X, which falls in a slot in the tube D. Thus, both the springs E and F are ready to act in opposite directions, the first to pull up the slide A, the other to force down the slide B, and are only prevented from doing so by the levers H and K. Obviously, therefore, if the opposite ends of the levers H and K are pressed, the slides A and B will instantly rise and fall respectively.

This is the whole of the shutter, the rest of the apparatus merely providing a means whereby the levers H and K can be pressed one after the other at any desired interval. For effecting this control a small train of clockwork is used, contained in the case P, and consisting of a spring, which can be wound up by turning the milled head T, a small train, ending in a fly, and the disc M, which, when the spring is wound up, and the fly released by means of the lever Z, to which a pneumatic attachment is made, revolves at a uniform rate, making one revolution in a little more than two seconds.

The only point whih now remains is to connect this revolving disc with the levers H and K. It will be seen in fig. 1 that the two levers project through the case, and almost touch the disc M. At the point S in the disc (fig. 2) a projecting pin is fixed so that as the disc revolves it catches the lever H and releases the slide A. This pin is fixed, but the disc also carries a movable arm V, with another pin at the end of it, which falls into holes arranged at proper distances round the edge of the disc. This second pin comes into contact with the lever K as the disc revolves, and in its turn releases the slide B. The exposure, therefore, lasts from the time the pin S releases the slide A until the pin on the arm V releases the slide B, and all there is to do to get any exposures we like is to bore the holes round the edge of the disc in the proper places.

In the model the following lengths of exposure are provided for:—$\frac{1}{24}$, $\frac{1}{12}$, $\frac{1}{8}$, $\frac{1}{6}$, $\frac{1}{5}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1, 1¼, 1½, 1¾, 2 seconds; or, reckoned in eighths of a second, perhaps the simpler plan, $\frac{1}{3}$, $\frac{2}{3}$, 1, $1\frac{1}{3}$, $1\frac{3}{5}$, 2, 3, 4, 5, 6, 7, 8, 10, 12, 14, 16, which is a sufficient range to more than meet all ordinary requirements.

Every care has been taken that the exposures shall really be what they are represented, and this is easily managed, as all moving parts work in one plane at right angles to a line drawn through the centre of the shutter.

The dimensions are for a shutter sufficiently large to go in front of what is commonly called a whole-plate rapid rectilinear, or between the lenses of a 12 by 10 similar objective, 6 inches long by 2½ inches broad, and the weight is about 10 ounces. If the shutter is used in the centre of the lens, the theoretically correct place, the stops go between the slides, and are not interfered with. It works equally well in any position, and being made entirely of metal, will not warp with damp or exposure to the sun's rays. There is also this further advantage, that it can be used instead of a cap to give long exposures, for if the movable arm is set about ½-second behind the first pin, and the pneumatic ball is released immediately the first slide has risen, the rotation of the disc will be stopped, and the second slide will not fall until the ball is pressed again.

In working out this "exposer" my aim has been to produce a means whereby the most rapid modern gelatine plates should be as completely under control, without using unnecessarily small stops, as the old wet plates were, so as to place within easy and certain reach of the photographer many beautiful natural effects which at present are only obtained by haphazard, and for longer exposures to avoid the hurried uncapping and capping of the lens, which demands one's whole attention just when it should most carefully be devoted to the picture.

USEFUL FOCUSSING CLOTH.

BY REV. H. J. PALMER.*

The focussing cloth is an adjunct to the impedimenta of the peripatetic amateur photographer with which he would willingly dispense if he could, and which he is compelled to dispense with at times when he finds, on his arrival at the scene of his photographic action, that his cloth has been left at home, or else has been whisked away from his possession by an unfriendly puff of wind.

Some of my photographic acquaintances, in commenting on the numerous yards of velvet, formerly belonging to myself, which have been lost in my photographic expeditions in every direction, both at home and abroad, have remarked, hyperbolically, that I have strewn the surface of Europe with focussing cloths. With the view, therefore, of avoiding similar losses in the future, I have devised a use for this part of our paraphernalia which will, on the one hand, add to the value and usefulness of the focussing cloth, and so render us less careless of its safety, and less liable to leave it behind us on our photographic excursions; and, on the other, will give it a little more substance and stability, without materially increasing its size and weight, and so prevent it from being blown off our heads down a mountain slope or precipice, or into the river or ocean depths, at the critical moment of adjusting the focus to a nicety.

My journeying this year among the peaks, passes, and glaciers of Switzerland promises me an unusual amount of walking and climbing, and as I wish to be independent, as well of porters as of extra double slides and changing boxes, I have turned my focussing cloth to account, and have made it into a most useful changing bag. This enables me to carry on my own shoulders a stereoscopic camera, with one slide and a box or two of Manchester plates in my pocket, to suffice for two or three days' photographic work at a distance from head-quarters. My cloth is made of double black sateen, four feet long by three feet wide. Twenty inches of the length have been folded over and sewn at the corners to the material below, so as to form of the whole an oblong bag, open at the ends, and open also at the lower side, with a few inches of material projecting beyond the bag, as a tail-piece to flip under the opening. The two open ends have next been gathered into short sleeves, each sleeve containing two bracelets of silk elastic, a couple of inches apart. Thus any light which filters through elastic No. 1 is prevented by No. 2 from entering the bag.

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* A communication to the Manchester Amateur Photographic Society.

Nothing could be simpler or more effectual than the mode of using the focussing cloth for the purpose I have named. The bag is laid upon any convenient surface on the way-side, and in it are placed the slide, the box of plates, a folded piece of yellow paper to enclose the two plates removed from the slide, and a brush for the surface of the unexposed films. The tail, so to speak, of the cloth is doubled under the bag to close the opening at the bottom, and render it light-tight. The hands are inserted at the sleeve, and the plates removed from the slide and slipped into their paper case to prevent the possibility of their re-insertion in the slide. These are placed under or by the side of the slide. The unexposed plates are removed from the cardboard box in which they are sold; possible dust particles are brushed from their surfaces, and they are then inserted in the slide. The exposed plates are now put at the bottom of the cardboard case, the unexposed films upon them; the slide and box are carefully closed, and we are ready for a couple more pictures.

I have tested my bag in a bright sun-light, and there is no danger of fogging the sensitive films. Thus, with the expenditure of a few pence, and a little kindly needlework on the part of the photographer's wife or sister, the amateur will find himself in possession of what I venture to call an exceedingly useful focussing cloth.

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THE CRUISE OF THE *CEYLON*, 1885.

A VOYAGE TO THE SPANISH MAIN WITH A CAMERA.

BY NORMAN MAY.*

THE Crescent City, New Orleans, is situated on the east bank of the Mississippi, here from 500 to 1,000 yards in width, 107 miles from its mouth. The depth of the river varies from 60 to 250 feet, enabling the largest vessels to moor to the levèes or wharves. When all the country north of the Tennessee river is locked in ice, its trees leafless, and its houses stormed by fierce Arctic winds, New Orleans smiles through the green of orange and magnolia trees. Five or six miles from the centre of the city is Lake Ponchartrain, and on its banks, approachable by steamcars, are the little waterside resorts of West End and Spanish Fort, each possessing good hotels, restaurants, bathing houses, and places of amusement.

"New Orleans is specially interesting among the cities of the United States," remarks the *British Encyclopedia*, "from the picturesqueness of its older sections, and languages, tastes, and customs of a large portion of its people. Its history is as sombre and unique as the dark red cypress forest, draped in long pendant Spanish moss, which once occupied its site, and still encircles its horizon."

At the present time New Orleans rejoices in the possession of the worst roads of any city of the Union. Owing to its position some feet below the level of the Mississippi, drainage is difficult, uncovered gutters by the sides of the streets, in which the dirty sluggish water stands, taking the place of the English underground sewers. All kinds of refuse being thrown or swept into these stagnant places, and the hot sun causing rapid evaporation, all sorts of fevers are rife: periodical visits being paid by the dreaded yellow jack. The streets are now (March 1885) nearly a foot deep in dark slimy mud, rendering traffic in some parts well nigh impossible. The main streets are paved with huge stone blocks or cobble stones, and every few yards the unfortunate horse or mule finds himself confronted with a hole some two feet in diameter by a foot in depth, and has in addition to pick his way through the misplaced stones strewing the track like spent cannon balls. One of our passengers gravely asserted that a horse and cart had suddenly disappeared from his sight down one of these little street holes, the top of the negro's head alone being visible. I cannot vouch for the absolute truth of his statement, not having been there at the time, but the roads are certainly the worst I ever saw in a town, the corduroy roads of the backwoods of Canada being as smooth as glass to them.

With such a state of things existing, it is not surprising that very few carriages were to be obtained, and those only at exorbitant rates, the popular means of locomotion for the native being the tram cars, with which the city is well provided, five cents being the universal fare. The sidewalks are in as bad a state as the roads, and consequently very few people walk.

To add to the discomforts of visitors, the Corporation has quarrelled with the Gas Company, who have cut off the gas from the streets, so that in the parts not lighted by the electric light, walking is dangerous, as, even when the moon shines, the dark shadows of the verandahs hide the numerous pitfalls in the footpath, and the wide open gutters.

Lawlessness is rife, murders being of almost daily occurrence, and this in a comparatively small city of 200,000 inhabitants. Few of the passengers who slept on board the *Ceylon* cared, at night, to go the dark two miles necessary to reach the centre of the town; the lack of interesting amusements, the roughness of the roads, the darkness of the lonely bye-streets leading down to the levèe, and the fact of one of our passengers, an Irish M.P., somewhat unpopular with the Nationalists, having been threatened, hardly made night rambling attractive. The hotels were nearly full, and the streets wore quite a lively and cosmopolitan appearance, the bright red shirts of the Texan cowboy contrasting well with the broad sombrero of the swarthy Mexican. Taking a leaf out of other places at exhibition time, most articles were dear, and small objects of native manufacture suitable for momentos were conspicuous by their absence; Chinese, Turkish, and Jerusalem stalls and shops seeming to monopolize the business in small fancy articles. The only thing that struck me as being at all likely to interest those at home was a live baby alligator, which I carried off in a warmly-padded box, and which on the voyage home was the constant dread of the lady passengers, who did not relish the idea of a cold reptile crawling about their cabins in the dark night.

The exhibition, which I visited for two days, is in many respects similar to those we are accustomed to see at home and on the Continent, the exhibits of the different States being, however, unique and exceedingly interesting and instructive. The ancient Indian pottery, curiously like in shape to some of our classical models, the Indian canoes, dresses, and picturesquely weird looking wigwams, repay hours of examination. Very fine photographic transparencies of large size served at once to decorate the windows and illustrate the beauty of the scenery of the several States and territories. Very few foreign countries contributed, by far the most prominent among them being Mexico, the British West Indian Islands, and Honduras.

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* Continued from page 365.

The exhibition of photographs can hardly be said to adequately represent the perfection to which the art-science has attained in America, few of the names well-known to the fraternity in England having any exhibits at all. Badly placed in an unfinished-looking and but little frequented gallery in the centre of the main building, scattered and badly hung on a background of crimson calico, the photographs are not likely to impress the visitor, who, after much enquiry, may find his way to their out-of-the-way domicile, with a sense of the importance of the art-industry in the United States. The exhibits, which are few and almost exclusively American, at once strike an English observer as being of much larger size than usual at our exhibitions. The gallery is strongly lighted, but badly ventilated, and unpleasantly hot for visitors.

At the entrance to the gallery are hung the productions of some of the amateur photographers belonging to the various societies of the States. The exhibit of the Chicago Amateur Photographers' Club consists of three frames containing some scores of prints, the majority being about 5 by 4 in size, all but a few being of landscape work, and very inferior landscape work too. The subjects were, as a rule, evidently chosen less for their beauty than for the fact of their being well known, and places of somewhat popular interest. With the exception of being of larger size, the same remarks apply to the exhibit of the New York Amateur Society, the subjects being, as a rule, frame (wooden) houses, remarkable and interesting, possibly, from an historical point of view, but as objects of beauty an utter failure. The skies are quite bare and white, and the technical demerits of these photographs are only equalled by their artistic qualities.

The four frames of Mr. E. Dumont, of Rochester, N.Y., are of very different calibre to the foregoing. Of tastefully chosen subjects, the negatives are well executed, carefully printed, and neatly mounted and framed. No figures are pretentiously introduced into the foregrounds of the photographs, and the instantaneous views of the picturesque Mississippi boats, and one or two of the landscapes, are little gems.

Mr. Peter Mawdsley's views of England are evidently somewhat over-exposed, and are wanting in brilliancy and force.

(To be continued.)

Correspondence.

THE "WOODBURYTYPE" PROCESS.

"He who steals my purse steals trash; but he who filches from me my good name, takes that which not enriches him, but makes me poor indeed."

Dear Sir,—A few days ago I was enabled to pay a short visit to the photographic section of the Inventions Exhibition, and my astonishment was very great at finding in the "Woodbury Permanent Printing Company's" exhibit a placard, of which the following is an extract, and I shall feel obliged by your publishing it, together with my notes on each paragraph.

I feel it due to myself to correct the errors and misstatements which somehow have crept into this document, and which, considering that it was compiled by the head of the Woodbury Permanent Printing Company, with the assistance of Mr. Swan, is to me most astounding: but it is certainly calculated to lead the general public to believe that I am not the author of the process bearing my name.

> The process known as Woodburytype is the result of the combined discoveries of Messrs. Joseph Wilson Swan and Walter Bentley Woodbury.
>
> February 29, 1864.—Joseph Wilson Swan took out a patent (No. 503) for the production of photographic prints in coloured gelatine.

This Patent has nothing whatever to do with the Woodburytype process, but relates to carbon, in which Mr. Swan did make several improvements. It was a process well known and practised as far back as 1858 by Sutton, Burnett, Fargier, and others, and I had also used it myself in Java before 1863.

> September 23, 1864.—Walter Bentley Woodbury, having observed the relief in Mr. Swan's prints known as Carbon or Autotype prints, conceived the idea of producing from these, or Electrotypes from these, Intaglios and Relievos in china, clay, or other plastic material.

I certainly did not obtain my first idea of a relief from Mr. Swan's prints, having observed it in carbon prints made by me in Java before 1863. In this paragraph the word "plastic" has evidently been carefully extracted from the Provisional Specification of my Patent, and other words which really describe the system left out. I allude to the words, "semi-transparent and fusible materials, which, by their thickness, show the picture or design." In these few words the whole principle of the Woodbury process is explained.

> 6th July, 1865.—Joseph Wilson Swan first used and patented (No. 1791) the method of printing in hot gelatinous inks from electrotype intaglios, obtained from his photo-reliefs."
>
> Joseph Wilson Swan, in the same patent (No. 1791), introduced the system of fixing the gelatinous ink pictures by means of a solution of alum.
>
> This was an invention of the utmost value, as previously the prints were easily damaged by moisture.

This was nine months after the entering of the provisional specification of my patent of the "Woodbury" process (No. 2338), and three months after the sealing of the same, in which the following words occur: "or a semi-transparent mixture or solution of gelatine and colour may be forced into the mould, and transferred to paper, linen, talc, glass, or porcelain for a foundation." As regards the use of alum for fixing prints, I give the palm to Mr. Swan, although I used it myself, and published it in one of the journals before his Patent was made public.

I should not have rushed into print about this matter did I not see very plainly that a deliberate attempt was being made to deprive me of the honours I have received as the inventor of the process which bears my name. An attempt of the same kind was made twenty years ago, and I will only refer any one interested to the photographic journals of 1865, which contain all the correspondence.—I am, dear sir, yours truly, Walter B. Woodbury.

Java House, South Norwood, July 20th, 1885.

FERROUS OXALATE, *VERSUS* PYRO AND HYDROKINONE.

Sir,—In a paper read before the Derby Photographic Society, Mr. Henry Bolden, while expatiating on the various good qualities possessed by hydrokinone as a developer, went a little out of his way to abuse the ferrous oxalate developer.

Now, it should be held as a canon in photography, that not only may a man have a pet developer, bath, plate, snap-shutter, &c., but also that he may not maliciously misreprent the qualities of other developers, baths, &c., with which he may not have practical acquaintance.

The charges laid against the ferrous oxalate developer are entirely without foundation; and not only so, but the very faults attributed to it are those from which it is most free.

Categorically, the defects laid to its charge by Mr. Bolden are:—1st. High price, viz., 2s. a pint; 2nd. Liability to spoil with keeping; 3rd. Incapability of helping on an under-exposed plate; 4th. Inability of retarding one which is over-exposed.

I shall proceed to combat these assertions *seriatim*, begging of my readers to notify that I shall only employ as arguments the recital of facts which anyone can verify by trial.

First, as to price. On looking over the lists of the photographic dealers, I find the price of potassium oxalate (neutral) varies from a 1s. to 1s. 6d. per pound. Ferrous sulphate is quoted pretty uniformly at 3d. per pound. Ferrous oxalate itself is quoted at from 1s. 6d. to 2s. per pound.

I also find several dealers send out the ready made ferrous oxalate developer at the rate of 50 ounces at 3s. The fact is, it can be made at home, at the rate of about 6d. a pint.

When once made, it should never be thrown away, but after each batch of plates has been developed, set aside in corked bottles, "full to the cork," with a trace of tartaric acid added, and exposed to full sunlight. I have quarts of this old solution, over six months in use, which I find invaluable for bringing out images which I suspect have been over-exposed, and in which I desire to get extraordinary density.

Secondly, as to keeping qualities. If the ferrous-oxalate developer be made up in two solutions (as it should be), it may be kept several years without any change. The only precautions necessary in this case are, to add a trace of cupric sulphate (sulphate of copper) to the iron solution, and to keep the stock bottles well stoppered or corked.

The two solutions should consist of (A) a saturated solution of potassium oxalate, and (B) a saturated solution of ferrous sulphate. At the time of using, 3 parts by measure of A should be poured into the developing glass, to which should be added 1 part by measure of B, for a normally-exposed picture.

The ferrous oxalate solution, after having been used, must not be thrown away, but treated as directed above.

Thirdly, incapability of helping on an under-exposed plate. If by this is meant the power of developing an image which has been impressed by the feeblest radiations, then undoubtedly ferrous-oxalate is far superior to any other known developer; and if made by dissolving the dry ferrous-sulphate in a saturated solution of potassium oxalate, it is the most powerful developer known, bringing out an image when no other agent will.

But if anyone expects to get an image where none is impressed, why, whether he use ferrous oxalate or any other developer, he will be doomed to disappointment. Given sufficient time, ferrous oxalate will bring out fully every detail that is impressed; and, what is more, will do this without staining the plate, without green fog, or any veiling of the picture. I have frequently left plates in the developer a quarter of an hour or twenty minutes, with the result of getting superbly brilliant negatives, without a particle of deposit in the shadows.

Fourthly, inability to control the development of an over-exposed plate. This is exactly the point wherein ferrous-oxalate shows its great superiority.

If a plate be supposed to be over-exposed, all that need be done is to begin the development with the oldest and stalest ferrous-oxalate developer there is in stock, gradually adding a few drops of fresh solution if the image come out too slowly, or a little distilled water if it appears too quickly.

So certain is this method of development, that I shall be happy to develop, and get good printing negatives, from any plates that have been exposed any length of time between the normal and ten times the normal, provided the plates have not been previously spoiled or fogged by exposure to light.—Yours, &c., S. Bottone.

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Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 16th inst.; Mr. W. M. Ayers occupied the chair.

Mr. A. Cowan mentioned that by heating Mr. Henderson's argentic stain it became brown, and the colour would not fix out; the temperature—that of a water oven—might have been as high as 180° F.

Mr. A. L. Henderson thought the discolouration was due to the presence of free silver nitrate; some tables giving equivalent proportions of silver acetate were inaccurate.

Mr. Cowan had made two batches, following the formulæ. In the first there was no discolouration; in the second, heat produced it, other conditions being the same.

Mr. W. E. Debenham objected to the term free silver, since it was not shown that there was uncombined silver nitrate present. Marking ink, he said, was tartrate of silver which became reduced by heat, and there was reason to suppose that this compound was similarly acted upon.

A question regarding strong *versus* dilute hypo solutions for the rapid fixing of gelatine plates then became a subject of demonstration by Messrs. Cowan and Henderson, but the results were rather conflicting. It was, however, proved that a fully-saturated solution had very little effect on a dry gelatine plate; whereas, when diluted with an equal bulk of water, it fixed readily. In some instances plates soaked three minutes in water cleared much quicker in the strong solution; but other plates, soaked for a longer period, as well as some in tepid water, became fixed very much more rapidly in a half-saturated solution. The experiments will be continued.

Mr. J. Sutton passed round prints in sepia from etchings on copper. They had been rendered transparent for window decoration, and presented considerable depth.

Mr. Henderson showed negatives of printed matter made by means of his argentic stain formula; they were made by contact printing. A portion of a bank-note so treated gave a very good image of the water mark.

A question having reference to the amount of exposure given to the foreground by a rise and fall shutter placed between the lenses was next discussed.

Mr. Debenham illustrated on the blackboard that any falling off in illumination would be in both directions from the axial line or centre of the plate. In the case of a rise and fall in front of the lens the foreground would receive more exposure; between the lens and plate, the sky would have the advantage.

The discussion was continued by Messrs. Cowan, Mackie, and the Chairman.

Messrs. A. Weston and F. W. Simpson were elected members of the Association.

Manchester Amateur Photographic Society.

The monthly meeting was held on Tuesday evening, in the Technical School, Princess Street, the President (Rev. H. J. Palmer) in the chair.

The following gentlemen were elected members:—Messrs. J. H. Seed, R. B. Wilson, Charles Dawson, J. E. Duke, J. H. Stephen, F. Walthew, George Edmondson, and Leopold Larmuth, M.B.

The President gave a communication upon a Useful Focussing Cloth (see page 475).

The discussion on Mr. Duncan's paper on "Copying," read at the previous meeting, was continued by Mr. S. F. Flower, who gave his method for producing the requisite density in negatives produced in copying, and showed carte-de-visite prints taken from a cabinet picture. He also made a few remarks on Monckhoven's developer, which he considered a simple and good one.

Mr. W. W. Dawson showed a new rapid lens, full plate, and seven lenses for the inspection of the members.

The Secretary (Mr. William Stanley) exhibited new lamps for the dark-room and for travelling; and

Mr. Robert Graham showed a simple and cheap form of washing trough for negatives.

The Treasurer (Mr. J. G. Jones) exhibited a very fine print of the packing room of one of the largest home-trade houses in Manchester. The plate was an 11 by 9 instantaneous; it had an exposure of forty-three hours, the cap being taken off at 1.30 p.m. on Saturday, and not replaced until half past eight on Monday morning.

At the conversazione which followed, Mr. Hutchinson laid on the table a splendid series of photographs, 22 by 17, taken from original negatives by the late Mr. Sanderson. Prints and transparencies of the previous rambles, together with other views, were shown by Messrs. Graham, Greenwood, Harrison, Jones, Parrott, Stanley, Stephen, and Whitham.

The sixth ramble of the season was to the Jumbles on Saturday, July 4th, under the leadership of Mr. R. Graham. It is a glen of great natural beauty, over a mile in extent, not many years ago teeming with wild flowers, many of them rare. The introduction of two or three works on the stream has rendered the dell uninteresting, botanically speaking, but sufficient is left for the student of photography. During the afternoon a breeze sprang up which rendered photography extremely tantalizing and difficult. The plentiful exercise, however, of that *sine qua non* of picture-taking, patience, resulted in some good negatives being taken, and a resolve to re-visit the place on a more favourable occasion.

On July 18, the members, to the number of about fifteen, left London Road Station, under the leadership of Mr. John Schofield, for Alderly Edge, the route for the afternoon being precisely a repetition of that arranged for the last excursion of the previous summer, on which occasion the weather turned out so bad that the unpacking of cameras was hardly deemed expedient. By an unfortunate coincidence, the programme of September, 1884, including the continuous rain and strong breeze, was on Saturday last carried out in its most minute and uncomfortable details. The drive was along the turnpike road, which is admirably wooded on both sides, and on arrival at the Alderly Old Mill a halt was called for, and cameras were quickly set to work. Near to this point also is the fine old church, with its ivy-covered porch and quaint surroundings, notably an old schoolhouse at the entrance to the graveyard, which makes an admirable picture. There is a sort of old-world charm about the spot, the ruthless hand of the "restorer" not having as yet laid hold of the sacred edifice, and the modern villa residences which dot the landscape on and around the edge have not encroached on this sequestered ground. Within a short distance from the church are some picturesque cottages and farmhouses of the half-timbered or black-and-white style, which, on a fine summer afternoon, will find sufficient work for one excursion; but on this occasion the drive was continued some miles farther, to Capesthorne Hall, the residence of one of the younger branches of a very ancient Cheshire family, the "Davenports." In these grounds is a beautiful sheet of water, "Reeds Mere," which, when the lilies are in bloom, is a sight worth seeing; but wind and rain were, on the present occasion, sufficient determents to the successful rendering of such subjects. The Hall itself, although a handsome structure architecturally, is not a very suitable subject for the camera, as its great length necessitates the use of a very wide-angle lens, and thus includes an enormous area of unrelieved foreground; even then an early morning light would be desirable. Despite the wetness of the afternoon, however, several good negatives were made in the conservatory and south-west front of the building, the grounds on that side being admirably laid out, and including some fine conifers.

The next out-door meeting will be held at Haddon Hall, on Saturday, August 1, train from Central Station to Bakewell at one o'clock p.m. Those intending to join on the above date will please send in their names to J. S. Pollitt, Barlow's Court, Market Street, Manchester, at least three or four days before the time of starting.

Derby Photographic Society.

An outdoor excursion was held at Tutbury on Saturday last. About sixteen members left Derby by the 1.55 train, and arrived at Tutbury at 2.20. Here, after a short wait, they were joined by some of the members of the North Staffordshire Amateur Photographic Association. From the station the party proceeded to the old Norman Church, upon which about twenty plates were exposed. The procession of cameras next wended their way to the Castle Grounds, in which they found a large gathering of people enjoying the music of the Burton Band, it being the annual flower show. Unfortunately at this time rain began to fall, but several views of the castle and of the flower show were taken, and between the showers a very successful group was secured by Mr. Bourdin, one of the Derby members. At 5.30 the members adjourned to the Hotel, where tea was waiting for them.

Much regret was felt that more of the North Staffordshire Association were not present, and much praise is due to those energetic members who, in spite of the fact that rain had been steadily falling for some three hours previous to their departure from Hanley, imperiled themselves and their cameras, in order that they might meet their Derbyshire brethren.

Coventry and Midland Photographic Society.

At a meeting held on 7th July, Mr. Danks in the chair, the minutes of the previous meeting having been read and confirmed, Messrs. Bugshaw, Davis, Hardy, and Shufflebotham were duly elected members of the Society.

The evening was spent in examining and discussing the merits and demerits of the negatives taken at the last out-door meeting of the Society.

Several of the members showed prints from their negatives, but, owing to the indifferent light in which the negatives were taken, and bad subjects, they did not make good pictures.

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Talk in the Studio.

Photographic Society of Great Britain. — The next monthly technical meeting of this Society will be held on Tuesday next, July 28th, at 8 p.m., at 5a, Pall Mall East. Open at 7 p.m. for reading journals.

South London Photographic Society.—The first out-door meeting of the season will be held at Hampstead Heath, on Saturday next, July 25th, 1885. A tea will be provided at the "Bull and Bush Hotel" (near Jack Straw's Castle) at six o'clock.

Historical Collection by the Photographic Society of Great Britain at the International Inventions Exhibition.—This, since the day of opening, has had some additional objects of interest added to it, and although there are many old processes and apparatus which are absent, still the collection is deeply interesting, and we wonder, upon looking at it, how such good results were obtained in those early historic days by the use of instruments like those exhibited. It will be a matter of much interest to learn whether this exhibit could not eventually be made the nucleus of a permanent Photographic Loan Collection, to be located, possibly, in the South Kensington Museum, where all could see it, and which, in course of time, would grow into a most important and valuable collection. We subjoin a full and complete statement of the whole of the exhibits, with the names of the contributors :—Captain Abney—Papyrotype process, executed at the School of Military Engineering, Chatham. W. Andrews—Wet collodion negatives, intensified by the Schleppes salt method. T. and R. Annan—Calotype process (negative and print), taken by D O. Hill. F. Beasley Jun.—Collodio-albumen negatives. W. Bedford—One of Archer's first cameras for collodion process. Stereoscopic arrangement by Archer to fit a larger camera. Valentine Blanchard—Instantaneous views, wet collodion, 1856-65. Illustrations of a method of enlargement, as proposed by V. Blanchard, 1873. Modification of the Brewster stereoscope by Oliver Wendell Holmes. Bullock Bros.—Photo-lithography, 1866 (Bullock's patent). T. Bolas—Detective camera, 1876. Negative photograph on bitumen, made insoluble by the action of light. Carbon negatives stripped by Wenderoth's process. E. Clifton—Portrait of Daguerre. Crystalotype by J. R. Whipple, 1854. Specimens from "Pretsch" photo-galvanographic plates, 1856. T. S. Davis—A combined preparation and wash bottle for gelatine emulsion. Adjustable guage for cutting photographic glasses. De la Rue and Co.—Surface printing from blocks executed by Paul Pretsch, 1860. W. England—Old Daguerreotype developing box. Old ditto sensitizing box. Old camera, 1860, with rapid inside shutter. Instantaneous views in Paris, wet collodion, 1856-65. Edinburgh Photographic Society—Archer's water lens. James Glaisher—Nature printing, taken over thirty years ago. G. Fowler Jones—Prints from negatives by Le Gray's ceroline process. K. Kennett—Scaife's pistolgraph. Globe lens. Dr. Maddox—Some of the earliest gelatino-bromide negatives, by the originator of the process, 1871. Mudd and Son —Collodio-albumen negatives. R. C. Murray, Early Talbotype photographs, 1844-45. H. Neville—Camera with Sutton's patent panoramic lens. Mrs. H. Baden Pritchard—Impressions from pewter plates of heliographic drawing, by Nicephore Niepce, 1827. Original letter, by Nicephore Niepce, sent to the Royal Society, 1827. View of Kew, taken by Nicephore Niepce, 1827. H. P. Robinson—Heliographic picture, by Nicephore Niepce, 1826. Photo-etched plate (from a print), by Niepce in 1827. Heliograph (from a print), by Niepce, 1827. One of the earliest printing frames, made for Fox Talbot's photogenic drawing, 1839. The first nitrate of silver bath used by Scott Archer in his discovery of the collodion process, 1850. Ross and Co.—One of Archer's earliest fluid lenses. The first photographic compound portrait lens, made by Andrew Ross, 1841. Photographic camera, believed to be the first made in England. Sands and Hunter—Old lens, with adjustable diaphragm, by Archer, 1851. Old stereoscopic camera. with mechanical arrangement for transferring plates to and from the dark slide. T. L. Scowen—Parallel bar stereoscopic camera. Latimer Clarke. John Spiller—The first preserved plates (three to twenty-one days), 1854. Illustrations of the French pigeon post. J. W. Swan—Electro intaglios from carbon reliefs (Thorwalsden's "Night and Morning"). Photomizzo tints were taken from these in gelatinous inks, 1860, by J. W. Swan, by the process now known as Woodburytype. Plaster cast from a carbon print of Kenilworth, showing the relief, taken in 1864, by J. W. Swan. Carbon prints twenty years old (photographed and printed in various colours by J. W. Swan). Old print (in red) by T. and R. Annan, by Swan's process. Carbon print, twenty years old (printed in 1864) by double transfer. B. B. Turner—Talbotype. Negatives and prints from same. Single lens made by Andrew Ross, 1851. J. Werge—Examples of printing with various metals on plain paper, 1839-42. The fathers of photography. Examples and dates of the introduction of early photographs. Daguerreotype, 1839. Collodion positive, 1851. Ambrotype, 1853. Ferrotype, 1855. W. Willis, Jun.—Specimen of aniline process. Historical illustrations of the development of the platinotype process. W. B. Woodbury—Photo-relief printing process. Woodbury mould and Woodbury type print from same, 1866. Stannotype printing press, with mould. Machine for measuring reliefs. Woodbury lantern slides. Early Daguerreotype on copper. Positive photograph on glass. Woodbury balloon camera. Microscopical objects in plaster from gelatine reliefs. Woodbury collographic process. Woodbury photo-chromograph system, coloured from the back, 1869. Machine for measuring reliefs. Woodbury actinometer. Despatch-box camera. Watermark or photo-filigram process. Transparency on gelatine. The first specimen of Woodbury printing exhibited, including the first mould printed from, and also proofs backed with luminous paint. Col. H. Stuart Wortley —Early photo-zincographs, 1861-62. Experimental prints with uranium collodion, 1867 (modification of Wothly's process). Set of apparatus complete for making gelatine emulsion and preparing gelatine plates, 1877-78. No. 1. Apparatus for coating gelatine plates, either by hand-turning or treadle. No. 2. Stove for keeping emulsion warm for any time at a fixed temperature in pure air, and for the final drying of the plates. No. 3. Apparatus for squeezing emulsion out into water. No. 4. Apparatus for mixing emulsion. Instantaneous shutter, with horizontal motion by finger or pneumatic tube; adjustable wings for cutting off sky and varying length of exposure.—*Journal of the Photographic Society.*

Photographic Club.—The subject for discussion at the next meeting, on July 29th, will be "The Soda and Potash Developers." Saturday out-door meeting at Blackwall, assembling on the pier at 2.30.

To Correspondents.

*** We cannot undertake to return rejected communications.

S. E. A.—It is cut in the direction of the width of the sheet, and you have a sample of paper that stretches very unequally. Both pictures are distorted, but in different directions.

A. Webster.—The former we have used, and we know that it can be depended upon; the latter we have not even heard of.

A. R.—It is very good of you to send us the information, and we may ask you for more; and we shall be glad to reproduce the picture, either as a supplement, or as a block.

H. G. P.—It seems to us that the spots are due to some injurious materials in the mount. To test them, divide some prints into halves, and mount one set on the new mounts, and the other on your old stock mounts. Take care that the remaining conditions are the same, and note the result. If the new mounts turn out faulty, and they were supplied by a firm dealing in photographic requisites, and knowing for what purpose they were to be used, you can probably not only return the mounts, but claim damages for loss of time, material, and reputation. If, on the other hand, you obtained the mounts from an ordinary stationer, you will have no claim, as he could not be supposed to know for what purpose you required them. When goods are supplied for a known and definite purpose, there is an implied guarantee that they are fit for that purpose.

J. E. L.—1. The process is as you suppose. 2. Sugar is better than gum-arabic. 3. Dry over chloride of calcium; that is to say, support the glass film downwards over a tray of dry chloride of calcium, and enclose the whole in an air-tight box. It should dry in about eight hours. When the chloride of calcium becomes moist, dry it in a shovel or frying-pan over a clear fire. Write again if you experience any difficulty.

W. A. W.—Thanks for the sample.

B. M. A.—Have nothing to do with any such processes; all we have investigated have proved frauds, and that you mention is one of the worst. The vendors merely give information which has appeared time after time in the photographic publications. We will try and look up some back numbers of the News with the information you require, if you will say just what you want to do.

Y. A. Cooke.—You need not hesitate to take either course, and you are not likely to lose anything by taking advantage of the economy afforded by the second alternative.

C. D. T. P.—The agreement to purchase materials for them alone practically amounts to paying a royalty, and in attempting to induce you to agree to pay this indirect royalty after the patent has expired, they are acting in a very reprehensible manner. The attention of the Board of Trade (Patent Department) ought to be called to the matter

Lux.—All you say might have some little interest if you either signed your name, or mentioned that of the individual who inspires you. As it is, all your "I thinks," and "I am sures," and "I fears," have merely descended on to that portion of the flooring where the waste paper basket ought to be. How would it be for you to show us what *you* can *do?*

A Beginner.—It is a difficult case. First make as good a transparency as you are able, as a reserve in case of further injury, and then soak the negative in a solution of cyanide of potassium, about 4 grains to the ounce of water. Finally, wash away the cyanide.

W. H. B.—Registration at Stationers' Hall is sufficient. Our Publishers undertake the matter for a fee of 1s. 6d. for each photograph.

Amateur of a Few Weeks' Experience (Stoke-on-Trent).—We sympathize with you in your difficulties, and trust that after a few months you will be able to send us a pæan of triumph framed on the young arithmetician's lament. Let us hope your lyre will soon refuse to respond to such a theme as—

"Intensification is vexation,
Reduction is as bad;
Exposure, how it puzzles me,
While development drives me mad."

Photographs Registered.

Mr. R. Hammond (Bacup)—Photo. Group of Irwell Springs' Foot Ball Club.
Mr. T. R. Braybrooke (West Hartlepool)—Photo. of Hartlepool.
Mr. H. J. Godbold (St. Leonard's)—2 Photos. of Lucille Dudley.
Mr. A. W. Cox (Beeston, Notts.)—2 Photos. of Mr. J. Lee; 2 Photos. of Mr. R. Cripps.

The Photographic News.

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A MONO-HYDRATED SODIUM CARBONATE.

(The So-called Crystal Carbonate.)

Ordinary washing soda consists, as is pretty generally known, of water to the extent of nearly two-thirds, and of somewhat over one-third of the real carbonate of sodium. In other words, its composition corresponds to the formula $Na_2CO_3+10H_2O$, and if the numbers corresponding to this composition are calculated, it will be found that the salt contains 62·93 per cent. of water, and 37·07 per cent. of the real sodium carbonate, or carbonate of soda. Apart from this, it is by no means an unfrequent thing for the commercial "soda" to contain a considerable proportion of sodium sulphate in the place of the carbonate, and as this sulphate is quite inactive in the developer, failures not unfrequently happen as a result of using the ordinary washing soda.

Although the salt containing ten molecules of water of crystallization is the one which is ordinarily met with in commerce, and is perhaps easiest to manufacture on a large scale, there are several sodium carbonates in which the proportion of water is different, and among the best known of these is the mono-hydrated salt, $Na_2CO_3H_2O$, which is deposited when a solution saturated at 104° C. is concentrated by boiling, and this salt only contains about like 17 per cent. of water. This latter has recently been introduced into commerce by Messrs Gaskell, Deacon, and Co., and it possesses decided advantages over the ordinary washing soda as regards making the developer. Of course one might suppose that it would be a matter of convenience to always use the anhydrous salt, but this is not so, as this latter gives rise to a considerable evolution of heat when dissolved in water, and, moreover, tends to cake together at the bottom of the vessels used, forming a hard mass which dissolves but slowly.

The ordinary carbonate, $Na_2CO_3,10H_2O$, gives rise to a notable fall of temperature when dissolved, and consequently often unfits the developer for immediate use. In the case of the so-called crystal carbonate, however, there is but a trifling change of temperature either way when solution takes place (it is in the direction of heat); while the minute crystals in which the new carbonate is sent into the market offer so much surface, that solution takes place almost immediately.

The crystal carbonate, or monohydrated carbonate, will, no doubt, soon be in the hands of all the usual dealers in photographic materials.

With respect to the use of the monohydrated (or crystal) carbonate in making up the developer, one must bear in mind that 210 grains of the new salt are equivalent to one ounce of the ordinary carbonate, as represented by the purest washing soda.

It may be mentioned that crystallized sodium carbonates containing other proportions of water are known to chemists, although they have no commercial existence; examples of these being the following:—

$Na_2CO_315H_2O$ (Jaquelain), obtained by cooling a solution of sodium carbonate to $-20°$ Centigrade.

$Na_2CO_36H_2O$ (Mitscherlich).

$Na_2CO_3\,5H_2O$.

$Na_2CO_37H_2O$ (2 modifications).

$Na_2CO_38H_2O$.

It may be mentioned that the crystals of the monohydrate will not effloresce in the air unless the atmosphere is exceptionally dry, also that they have scarcely any tendency to agglomerate together, even at a temperature which will occasion aqueous fusion of the salt containing $10H_2O$.

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MARKINGS IN GELATINE PLATES.

The Comparative Keeping Qualities of Gelatino-Bromide and Gelatino-Chloride Plates.

At a recent meeting of the London and Provincial Photographic Association, two matters of considerable practical interest to photographers were discussed. One was that of a peculiar marking round the edge of a certain sample of gelatino-bromide plates, which, although probably in a greater or less degree familiar to all who have experimented at all largely with emulsions, was evident to a very unusual degree in the particular example which was exhibited. The other matter was that of the relative keeping qualities of gelatino-bromide and of gelatino-chloride plates.

To take the matter of the peculiar marking first. The negative shown had a very opaque portion all round the edge, the width of it, perhaps, about half an inch. This shaded off into a perfectly clear strip, which was of about the same breadth as the opaque portion. The transparent part again shaded off into the central portion of the negative, which represented in all parts, more than about an inch from the edge, the appearance of a normal negative of average density. At first sight it appeared undoubted that the outside opaque border was simply chemical fog, and it is probable that this impression would have been left on the minds of all had not Mr. A. L. Henderson, who had brought the plate, pointed out that the small portions which had been protected by the wires of the dark slide from light during exposure were still quite clear, and that, moreover, the detail, although enveloped in fog, was quite distinguishable through the whole of the very opaque outer edging. In fact, the outer part of the plate was enormously more sensitive than the central portion, whilst the intervening strip was less so.

The appearance was explained by Mr. Henderson, on the assumption that the emulsion with which the plate had been coated had not been washed free of all soluble salts. That during the first very slow drying, at the edge the salts had diffused in towards the centre, till, as the drying began to become more rapid, it had, so to speak, overtaken the salts, leaving an outer edging of emulsion perfectly free from soluble salts, a strip next it surcharged with them, whilst the rest of the plate contained a medium amount.

On this assumption it would be expected that the washing and drying of the plate before exposure would result in a complete rectification of the defect. Mr. Henderson had tried the experiment of washing one or more plates of the batch, which showed the defect with, if we understand him rightly, the following result. The sensitiveness of the centre of the plate was increased nearly to that of the outer edges; the insensitive strip was made much more sensitive than it had been, but still remained somewhat less sensitive than the rest of the plate. Several members corroborated the deduction that would naturally be drawn from the last fact, namely, that no amount of washing will thoroughly destroy the effect of soluble bromide allowed to remain in a gelatino-bromide film whilst the latter is dried. This is an interesting fact, and one which it is useful to know.

The discussion as to the relative keeping qualities of gelatino-bromide and gelatino-chloride plates was brought up by the exhibition of a transparency on a gelatino-chloride plate, in which there was a portion without image all round the plate, the effect being, in fact, that of a vignetted picture, except that the shading followed the shape of the plate instead of leaving an oval image.

The plate shown was only one of a number which had been exposed and developed, and we have had an opportunity of seeing these, and of gaining all particulars about them.

In the beginning of March of this year a dozen quarter-plates and a dozen 12 by 10 plates were purchased from a firm which deals largely in a well-known brand of platino-chloride plates. One of two transparencies was made at the time that the plates were purchased, the results being all that could be desired. About a week ago the remainder of both the large and the small plates was used up. In the case of the small size, only the two plates which had been uppermost in the box showed any serious defect. They were spotty, and had a narrow insensitive edging. In the case of the large plates, the defects were much more marked. The upper plates of the box were exceedingly spotty, had a very wide insensitive margin, and, moreover, had large comparatively insensitive patches all over them. Besides this, there spread over the whole of the film, during development, that peculiar metallic lustre which most must be familiar with in the case of gelatino-bromide plates which have been kept for a very long time in an impure atmosphere. The defects became less and less marked as plates nearer the bottom of the box were used, the lowest two or three showing nothing objectionable, except the clear rims of insensitive film.

The plates had been kept in a chest of drawers in a well ventilated room beside gelatino-bromide plates which had been there long before the chloride plates were purchased, yet showed no deterioration.

Large plates, such as 12 by 10, are of course in much less demand than quarter plates, and it is fair to assume that the particular 12 by 10 plates referred to had been kept for a comparatively long time in the warehouse before they were sold. The quarter plates had, however, just commenced to show the effect of time, and it may probably be said that the time during which they had been kept—say (allowing for a short time in the warehouse), about five months—is the limit of time during which an opened packet of gelatino-chloride plates can be kept in London. The defects mentioned, beginning from the edges, were evidently due to the action of the atmosphere. It may therefore be assumed that plates very securely wrapped up would keep for a much longer time than five months without deteriorating. We ought to say that in the particular case to which we refer, the boxes had not even been wrapped up in brown paper after they had been opened, but had simply been placed without covering in a drawer of the chest of drawers.

The general impression of the meeting already referred to was, that gelatino-chloride plates were more likely to deteriorate through keeping than gelatino-bromide plates, the proportionate amount of gelatine being in each case the same. It was pointed out, however, that increase in the amount of gelatine is an easy means of improving the keeping qualities of plates coated with gelatino-chloride emulsion.

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CYCLING AS AN AID TO PHOTOGRAPHY.

BY HENRY STURMEY,

(Editor of *The 'Cyclist.*)

The season for out-door work with the camera having now fairly set in, it may not be out of place to say a few words, giving suggestions as to the various ways in which the bicycle and the tricycle may be rendered ready slaves to the photographer's will, and do him good service in transporting him and his belongings from one spot of beauty to another, with the minimum both of expense, trouble, and time. It matters not whether the photographer be amateur or professional, the willing wheel will be equally at the service of either; and although I doubt not the amateur will be the one to most frequently avail himself of its powers, the hints I am able to append hereto will, I trow, be of equal service to the professional who essays a journey on wheels.

The bicycle as a photographer's friend does not strike one at first sight as being a very ready one, but by a little ingenuity a clever rider can get along very well with one, though the size of his views is necessarily more limited than if he adopted the three-wheeler as his vehicle. A full kit for taking quarter-plate pictures can be most comfortably carried without much ingenuity or cleverness on the part of the rider; but a half-plate or 5 by 4 camera, and its necessary slides, &c., is rather more difficult. The first difficulty that strikes the cyclist is that of carrying the very needful tripod; and here the several inventions in telescopic and multifold stands, of which I shall speak anon, will be found to come to his aid most opportunely. If he have neither of these, the only way to carry the stand successfully is to strap it lengthways along the handle-bar. The camera and other paraphernalia had better be distributed over the machine, and he will find that by carrying the camera in its case—by one of the many devices known to bicyclists—attached to the front of the head of the machine, and fastening the receptacle containing the dark slides, lens, &c., to the back of the saddle, he will get a satisfactory distribution of weight. The ordinary large-sized multum-in-parvo bag will be found a very useful article for this purpose, and will hold half-a-dozen double dark slides for cameras up to half-plate, as well as focussing cloth, spare lenses, shutter, &c., &c., very well, whilst the entire apparatus, camera included, can easily be contained in it if the cyclist is modest, and restricts his views to quarter-plate size.

Of course the choice of vehicle with the cycling photographer will in a great measure depend upon circumstances; he may have a machine already, or may borrow the use of one belonging to a friend, and will be desirous of utilizing the means at his disposal in the best way possible; whilst on the other hand, I may be addressing those who, being photographers, are desirous of purchasing the most suitable machine for the especial purpose of utilising it in connection with their camera. With these varying circumstances of readers before me, I will endeavour, as far as possible in these lines, to frame my remarks so that they shall be of use to all parties, and therefore, before treating upon machines especially designed with a view to photographic purposes, I shall touch upon the various types of tricycles at present in the market, and show how best they can be made to serve the photographer's ends.

As I have before remarked, the chief bug-bear of the cycling picture-taker is the tripod, the conveyance of which in its ordinary and conventional form is a regular *bete noir* to him. This has been recognised already by various inventive individuals, and several ingenious contrivances in the way of special tripods or substitutes for them have been devised.

Of these, Messrs. Lancaster and Son's wheel-clip is by no means the least prominent. It is small, light, portable, and extremely handy, consisting of a pair of hinged jaws brought together by a thumb-screw, which tightens them upon the rim and tyre of the wheel, and to which is attached a socket or ring in which a brass tube, some six inches long, slides, bearing at its top an universal or ball-and-socket joint, to which a table, supporting the camera, is fitted. This, though an excellent make-shift, has several drawbacks when compared with the tripod proper, the chief being that it is a great difficulty to keep a machine sufficiently steady to secure a good view, also that it necessitates the high road being kept, or the machine dragged laboriously to the side, and restricts the photographer altogether too much in the matter of position from which to expose on his object. It is in my opinion even more useful when clipped to the handle-bar of a bicycle (when the machine can be leant against anything) than when attached to the wheel. The universal joint at the top is an excellent feature in it, and an Irish friend of mine has attached this portion of it to the top of his tripod, and finds it extremely useful in rough or uneven country, where there is a difficulty in obtaining a level with all three legs securely placed. This is a hint which tripod makers may with advantage avail themselves of.

Another portable contrivance of especial use to the cyclist is Sharpe's patent telescopic tripod, each leg of which is formed of a strip of sheet brass, and winds out like a twisted paper spill, the whole stand consisting of the three legs and triangular top, shutting up into a space well under 5 inches by 2 inches by 2 inches. It takes some little time to get used to, but when once its action is fairly understood there is no difficulty. It is the most compact and portable stand I know, and I have used one constantly for some months past. When widely spread out it is extremely rigid, though this diminishes naturally as the legs approach the perpendicular; still, for use in average weather, I have never found much inconvenience from vibration, although, unless well spread out, it is not perfectly rigid in a wind.

Another telescopic tripod (which, however, I have not used) has been shown me by Mr. Watson, of Blythe Road, West Kensington, which should also prove a very suitable and serviceable article for cyclists. It consists of a series of short lengths of tapering brass tube, sliding one within the other, and drawing out to about 4 feet in length, each leg telescoping into about 10 inches, rendering the whole concern very portable.

The seat pillars of tricycles can also be utilized as a substitute by having the pillar constructed very long, of tubing, and sliding within it a rod with attachments for securing it to the camera, the seat rod being detached and reversed when about to be used in this capacity. The objections to this form are the same as to the wheel clip, viz., the difficulty of keeping the machine absolutely still, and the restriction as to position.

I make these few remarks on the subject of tripods, as although I shall point out in each case the most suitable position for carrying the tripod, the use of one or other of these especially useful contrivances will, in most cases, entirely obviate the necessity of any anxiety or scheming on this account, and render the combination of cycling and photography a very much more easy affair.

Of the various styles of tricycle now upon the market, the commonest still in many parts of the country is that known as the rear-steerer, consisting of two wheels in front, with a third and smaller one placed some distance behind, which effects the steering. Many of these are truly sorry affairs, but even one of these is better than none, and as the carrying of luggage when properly positioned very materially adds to their safety and stability, they will not, in the hands of the careful, steady-riding photographer, prove such deceivers as when in the charge of a rash and giddy youth. Undoubtedly the best form of this variety is that embodied in the "Cheylesmore" tricycle, one of which, presented by the Coventry Machinists' Company, formed the first prize in the cycling division at the recent Amateur Photographic Exhibition. With a machine of this class, the tripod, if one of the ordinary kind be used, is easily carried by strapping it along the top of the backbone. The camera can either be carried in a frame suspended from and at right angles to the aforesaid backbone, as was shown on the machine at the Amateur Photographic Exhibition, or, if the camera be large (say 12 by 10), perhaps a better way is to get a couple of cross rods fitted at right angles to the backbone, and a foot distant from each other, and then suspend the camera and slides either in one box beneath the tube, or in two separate cases slung one on each side it. This, keeping the weight down under the frame, is a far preferable plan to that adopted by some, of carrying their *impedimenta* in a box placed on the top of the frame, as it does not make the machine top-heavy, and adds, rather than otherwise, to the steadiness and safety.

The next most common form of tricycle, and that most generally useful, is the front-steerer, in which the steering is done by means of a small wheel in the fore part of the machine. This type of machine is the safest of any, especially when descending hills, and this, when the greatly added weight of a photographer's kit is considered, is by no means a minor point, for the heavier the machine and its carried weight, the faster, as a rule, will it descend hills, and therefore, to the weight-carrying tricyclist, perfect steering and brake power is a *sine qua non*. There are two general forms of this class of machine, viz., the two and three tracks; the former having the steering wheel carried at the side at the end of a long straight side tube, the latter having the steering wheel placed centrally between the other two. The first class is the more convenient for carrying the tripod, but I think the other will be found, if anything, preferable from other points of view. All weight must be carried behind the rider, and this may, if the kit do not exceed the necessary for a half-plate apparatus, be carried attached to the saddle and seat rod in the manner I shall shortly describe, as my own plan with the "Coventry Rotary." If larger than this, it should be arranged beneath the axle. Of course the simplest way to do this would be to just suspend it from it, but this is not practicable, for the reason that the rider's heels, as a rule, traverse circles which pass a little to the rear of the axle, so that in order to clear the heels the camera case must be carried out somewhat to the rear. If the machine is fitted with two safety rods behind, this can generally be done by supporting the upper portion of the case on the axle-tube, and attaching the other to the safety rods; but where one only is provided, and where the above arrangement cannot be come to with two, the only way is to procure a frame from some maker such as Singer and Co., Coventry, on which to support the apparatus. These frames take the form of a gridiron with handle more or less bent, and are, as a rule, attached to the seat pin by a socket surrounding it. Luggage can be either suspended or supported upon them, the latter being preferable. As the beauty of this class of machine is the poise or balance, the addition of weight to the rear will affect it, and in order to counteract it, and retain the equality of balance, the rider should be possessed of an ┐ seat pillar, and should move his spring and saddle an inch or two further forward according to the amount of the added weight, the adjustment being so made that there is just sufficient weight on the steering wheel to steer, with the whole of the rest of the weight of both rider and *impedimenta* being then balanced over the driving wheels. With the two-track form the tripod goes snugly along the side-tube.

(*To be continued.*)

FLORAL PHOTOGRAPHY.

BY ROBERT OFFORD.

AT this season of the year the artistic photographer cannot fail to be attracted by the large variety of flowers, many of which are exceedingly suitable, both in shape and colour, to form charming subjects for photographic treatment.

Indeed, there are few such dwelling in the provinces who have not, at some time or other, the opportunity of perpetuating several especially fine samples of the floriculturist's subtle art; an art by which he coaxes nature into fresh colours or proportions, each one possessing some marvellous characteristics unseen before.

Among the many objects intended to please our eyes, and also lighten our purses, at Christmastide, are to be seen numbers of photographs of flowers; but in the majority of instances the subjects chosen are too dark, and the setting not of that order which best shows them up. A column might be filled with the names of those available for the purpose, either from hot house, conservatory, garden, fields, hedges, or river banks; but it will be sufficient to suggest that pale tints and white are the best, while yellows should be avoided, and that the free use of the lightest and airiest kinds of fern and flowering grasses will greatly aid in making attractive pictures.

The chief point, however, is the means by which they can be easily arranged and photographed; and after trial of many plans, the following seemed to be decidedly the best. It consists of fixing the camera vertically, and placing the flowers, &c., on a suitable background on the floor. Of course a studio affords every facility for efficient illumination, but in fine, still weather it can be easily managed in the shade out of doors. A spot should be selected where a trifle more shadow can be cast on one side, or the picture will be flat.

To begin with, a raised camera stand is necessary, and any good solid tripod can readily be adapted temporarily to the purpose by a little mechanical contriving. Take three stout sticks about four feet long (broom handles will answer in default of better), and fix in each, at a foot from one end, an iron screw eye, and these will take the spikes at the bottom of tripod legs. Then, by means of straps, or by a few turns of copper wire, or even with stout string, the short ends of sticks must be bound to the tripod legs, which latter will thus be provided with stilts, lengthening them by three feet. A hole should be bored near one end of sticks, to assist at securing the wire or string, and the other ends must of course be fitted with something to act as a spike: a headless nail will do.

If the tripod has no arrangement for making the top vertical, a piece of board can be secured by hinges at one side, and kept in position by a strip of wood and two screws, as shown on page 92 of YEAR-BOOK for 1885. The camera is then attached, lens downwards, and the object focussed, and dark-slide introduced with the help of a short pair of steps, which are removed before exposure. The latter operation is easily managed if a simple drop-shutter be available to go on in front of the lens; the spring can be removed, and a light cord attached to draw slide from end to end; this prevents the necessity of standing close to camera, and so interfering with the light.

Perhaps the best background is a sheet of grey cardboard, and nothing can be simpler than the arranging of flowers, ferns, &c., thereon, in any design to taste. It is important to have just a slight shade on one or two sides, to give the necessary relief to the picture; but if too little light is thrown on any side, the flowers opposite will cast heavy shadows, and the effect will be bad.

Five years ago I managed matters somewhat more easily by placing the camera at the top of a very high pair of studio steps, with the lens pointing down through a hole cut in the top for the purpose. The flowers, &c., were arranged on a cardboard frame with an oval cut out, so that being supported a little way from the floor, any coloured background placed below would show through the oval—a white one producing an opaque disc in centre of negative. The framework of steps being light, the illumination of subject was not interfered with, so long as the shutter and cord were employed for exposure.

Another background was tried with success; that is, the old plan of painting cardboard or wood with grey oil paint, and, while still wet, sifting over it some silver sand. A solution of pale glue, to which one per cent. of glycerine and a little whitening have been added, will answer even better. When dry, the superfluous sand is lightly dusted off, and the flowers are grouped upon it.

When a picture is required of some one special flower remarkable for its size or form, another plan commends itself very highly. The camera is placed in the usual horizontal position, and at the proper distance a sheet of very clear glass about 18 inches square is fixed vertically, and parallel to focussing screen. To the centre of this glass the flower is attached by one of two methods. Two small holes can be drilled in glass near together, or two small wire rings can be cemented on to the glass by elastic glue, or shellac, or any suitable cement, the glass being well warmed beforehand so as to ensure adhesion. A little fine wire will secure the flower in place without showing method of attachment; and at the distance of a yard behind the flower a white or tinted background is hung. The lighting in this case may be more after the so-called Rembrandt fashion; but it is necessary to guard against reflections that may be thrown into the lens from surface of glass plate. A simple plan is to hang a black cloth just in front of the camera, having a hole through which rays can pass to the lens. A background of black velvet or cloth answers well, setting off the flowers, which stand out in pretty relief.

Capital stereoscopic effects are easily obtained by the original method of shifting the camera two or three inches to right or left before a second plate is taken. Another way is to have the frame which carries the sheet of glass pivotted in the centre at the bottom, and turned a trifle in a direction out of parallelism with the focussing screen, a plate taken and glass turned as much in the other direction before a second exposure. With this arrangement, any amount of stereoscopic relief can be obtained up to grotesque distortion. Here, again, extra precaution must be taken to guard against reflected light from glass, because, in moving it, there is more chance of images of surrounding well-lighted objects being thrown into lens.

The preference is to be given to slow rather than to rapid plates, and the symmetrical form of lens with a focal length of from ten to twelve inches, and an aperture of about $\frac{f}{10}$ to $\frac{f}{8}$, will prove all that can be desired. In the majority of cases vignetted prints will prove the most satisfactory.

WEIGHTS AND MEASURES, AND THE MAKING OF SOLUTIONS.

BY G. M. JONES.*

AMATEUR photographers are largely derived from those classes in which weights and measures of capacity are seldom used, particularly the apothecaries' weight and fluid measure; while many of those engaged in the drug trade are not sufficiently conversant with the weights and measures which they daily use.

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* Read before the Birmingham Photographic Society.

Such being the case, I will proceed without further preface or apology to bring before your notice those points which I consider to have a useful bearing on the subject of photography, which, it should be remembered, is a science as well as an art, and as such requires to be treated with mathematical precision.

To begin with weights. Two systems of weights are in use by the photographer, English and French, the English being probably the most complicated and irregular system in existence, as a glance at any school table book will show.

Scientific men of all nations have already recognised the advantage of the French system, and use it almost exclusively.

Firstly, the material of which weights are made is by no means an unimportant consideration. It should not be brittle, or they would chip and break; and it must not be soft, or they will suffer loss by friction or scratching. I need scarcely say that weights should never be cleaned except by immersion in warm water, and gently rubbed with the fingers or an old soft tooth brush—in fact, they should never require it.

If the material is too light, the heavier weights would be inconveniently large; and if too dense, the small weights will not be easy to handle. It should not be affected by the atmosphere perceptibly, either dry or moist, or the value of the weights will vary either from absorbing or parting with their moisture, &c. Some substances are readily oxidisable or otherwise unfitted for making weights.

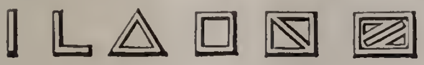
For large weights, iron may be used, but should be coated with Brunswick black or stove varnish, when the weight of the varnish may be neglected; but it should never exceed one-thousandth part of the weight upon which it is used. A coat of black-lead is preferable. Brass is better for the medium sized weights, and platinum for the smaller ones, while aluminium serves best for the smallest, on account of its low specific gravity. The small amount of oxidisation on brass weights does not appreciably affect their weight even for accurate purposes.

Secondly, the form of weights is worthy of attention. For the larger one of iron, the usual form is that of a frustrum of a square pyramid with a ring fixed on the smallest end, while brass weights are usually made to form a series of conical frustra, each one, except the smallest of the set, having a hollow base to receive the lesser end of the next smaller of the series. A better plan, where compactness is not essential, is to have them of a cylindrical form, the diameter being made equal to the height.

For weights below ¼ oz. or 4 drams avoirdupoise, and for all below 1 oz. (℥) apothecaries weight, and for all metric weights below 1 gramme, sheet brass may be employed—thick for those from ℥i to ʒi, and thin for the smaller ones. If weights are required below one grain or one decigramme respectively, they should be made of aluminium wire.

Weights from ʒi (or 60 grains) down to 10 grains may be made by cutting an oblong piece of sheet brass, and turning up one end for laying hold by.

The best form of weights from 10 grains down to ⅒ grain, or from 1 gramme to 1 centigramme, is that known as "angular." The larger of these weights are cut or stamped out of squares of sheet brass, so that the number of straight bars indicates the number of grains or decigrammes; the decimals of a grain and centigrammes are made of fine brass or aluminium wire of the same form.



Thirdly, the marking of weights. Iron weights usually have their value cast on them in making in relief, and brass weights plain large figures cut or stamped on them; the small weights as already mentioned.

It is important that no unnecessary marks be placed on weight, particularly a small one. The inspector's stamp of verification should be small, and so placed as not to interfere with the mark of value.

The sets of weights mentioned in the Weights and Measures Act, 1878, which run in tens, have series of 1, 2, 5 for measures of capacity and metric weights, but this series is not adapted for use; other series have 1, 2, 3, 5, and 1, 2, 3, 4, 5, while the sets of grain weights in common use have 1, 2, 3, 4, 5, 6. The avoirdupois sets usually run ¼, ½, 1, 2, 4, 8 ounces, and 1, 2, 4, 7, 14, 28, and 56 pounds.

Small weights should not be handled, but picked up with a pair of forceps tipped with bone or ivory, and slightly curved at the points.

I must particularly request you all to follow the Weights and Measures Act in printing dram or dr. only for the avoirdupois dram of 27·3 grains, and drachm or the symbol (ʒ) only for the apothecaries drachm of 60 grains; also oz. only for the avoirdupois ounce of 437·5 grains, and lb for the pound of 16 oz., reserving the symbol ℥ for the ounce apothecaries or troy of 480 grains, and the barred lb exclusively for the troy pound of ℥xii

Confusion is introduced into the developing formula of the Britannia and other plates by putting dram for the drachm of 60 grains.

While on the subjects of weights, a few remarks on the balance may not be out of place. For the ordinary amateur, a small pair of dispensing scales with large glass pans and silk cords are best, avoiding metals as being liable to chemical action from the substances weighed.

Scales should be always cleaned before putting away in the box, particularly so after weighing corrosive or deliquescent substances.

Measures.

As various photographic chemicals attack metals, &c., all measures should be made of glass, which has the advantage of allowing the contents to be seen.

The English fluid measures used by photographers are the drop or minim, the fluid drachm of 60 minims, the fluid ounce of 8 drachms, the pint of 20 fluid ounces, and the gallon of 8 pints.

The usual capacities of English measures are ʒ2, ℥1, ℥2, ℥4, ℥10, ℥20, ℥40, and of French measures, 50, 100, 500, 1,000 cubic centimetres.

At the upper surface of a liquid three distinct zones will be seen: the upper boundary of the upper zone is the highest point to which the liquid rises by virtue of its capillary adhesion to the glass; below this is a dark zone, and immediately below this is the upper surface of the liquid, at a little distance from the side of the vessel. The centre of the dark zone is the part which should coincide with the line of graduation of the measure.

I may here point out an error of expression which is very common even among the educated classes—*e.g.*, ¾ drachms, 1½ pints, which, when the order of the words is altered, three-fourths of a drachm and one pint and a-half, becomes palpably absurd.

Measures may be verified or solutions made of a definite strength without measuring by weighing.

If the sp. gr. of the completed solution is not known, first balance the bottle or vessel on the scales, then weigh in water 1 ounce avoirdupois for each fluid ounce; then place the vessel upon a level table, and put labels on so that the top of the label shall be level with the dark zone of the liquid, empty the water out, and make up the solution to the mark.

If liquids, especially corrosive ones, are found to run down the outside of the measure from the lip after pouring, a little hard grease, bees'-wax, paraffin wax, or even vaseline in cold weather, may be smeared inside the lip. This will effectually prevent the evil; or, if this measure is objectionable, hold a glass rod against the lip for the liquid to run down.

Remembering that for alkalies or strong acids grease will be decomposed, and bees'-wax by strong nitric and sulphuric acid, paraffin wax is best, as it is not affected by either acids (strong or dilute) or alkalies. If too hard to use alone, mix the paraffin with vaseline to a suitable consistency. A mere trace, just enough to cover the glass, will suffice.

Care should be taken to avoid exposing graduated glass measures, especially thick ones, to *sudden* changes of temperature, either heat or cold—*e.g.*, by pouring hot water into a cold measure, or very cold water into a hot one, or diluting nitric or sulphuric acids in them, as they are very apt to crack along the line of graduation.

The marking of glass measures is done in various ways:—

1. Etching with liquid hydrofluoric acid, which gives a transparent mark.
2. Etching with vapour of hydrofluoric acid, which gives a translucent mark.
3. "Cutting" or grinding with a sharp-edged emery wheel.
4. With a diamond.
5. By the sand blast.

An amateur photographer should possess at least two measures: if English, a small one with minims, and a half-pint or pint measure; if French, one of 50 or 100 c.c. divided into half centimeter tubes, and a litre measure divided at each 10 c.c.

There are other kinds of measures to be described besides those of weight and volume, but time will not allow me to do more than mention them.

Measures of Length.—Used in expressing diameter of stops, focal length, &c.

1 inch= 2·539954 cm | 1 centimetre=3·3937079 inch
1 foot=30·479 cm | 1 decimetre =0·4721495 foot
1 yard=0·9143834 metre | 1 metre =1·0936831 yard

Measures of Area.—Used in expressing sizes of plates, landscapes, &c.

Measure of Time.—For length of exposure of negatives, prints, &c.

Measure of Temperature.—For heat of plate making baths, and other purposes.

Angular Measure.—Required in certain optical measurements.

Measure of Actinism.—To indicate length of exposure, &c.

It now remains to show how calculations may be most easily made from English to French measures, and *vice versa.* For this purpose I give a short table of the most useful factors:—

Weight of Water·
1lb avoir.=16oz. avoir.=7000 grains=453·5 grms.=℥fl 16
1kilogrm.=2·20462lb. avoir=2lb 2oz. 3gr. =1000=1 litre
1oz. avoir.=437·5 grains=0·91146oz. troy=28·3495 grms.=℥fl 1
1oz. troy=480 grains=1·09737oz. avoir.=31·1002grms.=31·1c.c.
1grain=0·06479gramme—1gramme=15·432348grains

Cub. Cents. Minims. Grain Measures.
1pint=℥fl 20 = 567·92= 9600= 8750
1·761 ,, =℥fl 35·22 = 1000 = 16911 =15432·348=1 litre
℥fl 1 =28·3495= 480= 437·5
ʒfl 1 = 3·549 = 60= 54·6875
1 minim =0·0591583= — = 0·91146
1 grain measure= 0·06479=1·09714=1
ʒfl0·2817= 1 =17 =15·432348=0·03522℥fl

1 grain per ℥fl=2·2857 grm. per litre.
1 grm. per litre=0·4375 grain per ℥fl.

As an example, to show the use of this table, I will work out in full the Britannia formula into metric weights and measures.

I must, however, point out an error in the printed form, in which the dram is printed for drachm, and this error is common to other makes of plates. The Britannia formula, as published (the above error being corrected), is as follows:—

No. 1. *Stock Solution.*

Pyrogallol...	1 oz.
Ammonium bromide	600 gr.
Nitric acid (sp. gr. 1·42)...	20 minims
Water, to make	℥fl 6

No. 2.

·880 ammonia	ʒfl 3
Water, to make	℥fl 20

No. 3.

No. 1	℥fl 1
Water, to make	℥fl 20

Here, by factors taken from the table:—

No. 1.

1oz. avoir. pyro.=28·3495×1oz.=28·3495 grammes
600gr. am. br.=0·06479×600gr=38·874 grammes
20min. nitric acid=0·059158×20min.=1·18316 cent. cubes.
6℥fl water=28·3495×6℥fl=170·097 cent. cubes.

Now, if 170·097 c.c. contain the above quantities, 100 c.c. will contain—

Pyro $\frac{28\ 3495\times100}{170}$

```
     28·3495
         100
     -------
17,0)283,4·95 (16·676 grammes pyro. in 100 c.c.
     17
     ---
     113
     102
     ---
      114
      102
      ---
       129
       119
       ---
        105
```

Ammonium bromide $\frac{38·874\times100}{170}$

```
     38·874
        100
     ------
17,0(388,7·4(22·867 grm. am. br. in 100 c.c.
     34
     --
      48
      34
      ---
      147
      136
      ---
       114
       102
       ---
        120
        119
        ---
          1
```

Nitric acid $\frac{1·18316\times100}{170}$

```
     1·18316
         100
     -------
17,0(11,8·316(0·69597 c.c. nitric acid in 100 c.c.
     102
     ---
      163
      153
      ---
       101
        85
       ---
        166
        153
        ---
         130
```

No. 2.—Here, taking factors as before:—
ʒ3 ammonia=3·549×3=10·647 c.c.
℥20 water=28·3495×20=566·99 c.c.

Ammonia $\frac{10·647\times100}{567}$

```
     10·647
        100
     ------
567)1064·7(1·877 c.c. ·880 ammonia in 100 c.c.
     567
     ----
     4977
     4536
     ----
      4410
      3969
      ----
       4410
```

No. 3.

No. 1... ... ℥ } taken as cent. cubes } 5 c.c.
Water, to make ℥fl 20 } and × 5= } 100 c.c.

The Britannia formula thus becomes:—

No. 1.—Pyrogallic acid...	1 oz. Avoir. ...	16·676	grammes
Ammonium bromide	600 gr. ...	22·867	,,
Nitric acid	20 min. ...	0·696	cent. cubes.
Water to make ...	6 ℥fl ...	100	,,
No. 2.—.880 Ammonia ...	3 ʒfl ...	1·877	,,
Water to make ...	20 ℥fl ...	100	,,
No. 3.—No. 1 ...	1 ℥fl ...	5	,,
Water to make ...	20 ℥fl ...	100	,,

This form should be put on each bottle, with the quantities required to exactly fill the bottle up to the neck, and also entered in the note-book, which should be an indispensable article in every day use.

Accurate measurements of drops and fractions of drops may be made by diluting 1 c.c. to 100 with water, and measuring 100 times the quantity.

Notice that nitric acid of 1·42 specific gravity (the usual strength) contains only 70 per cent. real acid HNO_3, corresponding to 60 per cent. nitric anhydride N_2O_5; and if we wish to know the weight of the above 20 minims of acid, we may calculate it thus:—20 minims $(=0·91146\times20) = 18·2292$ grain measures, and this × the sp. gr. 1·42 gives $18·2292\times1·42 = 25·885$ grains = weight of 20 minims nitric acid of sp. gr. 1·42.

And $\frac{25·885\times70}{100} = 18·1195$ grains as the weight of real nitric acid, $H\,NO_3$, which is contained in the 20 minims.

Finally, if I have encouraged even a few photographers to discard the British weights and measures in favour of the French, I shall feel that I have done a service to the country at large, and I strongly advise those commencing to use the metric system only.

◆

THE CAMERA.

The amateur photographers of this city have a room where they meet every now and then to swap lies and photographs. They call their room "The Camera," as that is said by the High School graduate to be Latin for room. It is the custom of each of the members to give his experience when called on by the Chairman, and after the set speeches there is a general discussion on matters pertaining to amateur photography. The great interest of the last meeting was the report of Mr. Smith on the use of the tourist's film negative. Mr. Smith has always been the first one to adopt the latest inventions, and there is consequently some jealousy among the other members of "The Camera" regarding him.

Mr. Smith had with him an elegant Scovill tourist's camera, to which was attached the new-fangled arrangement he proposed to enlighten the lodge on.

"Gentlemen," said Mr. Smith, "the greatest trouble the photographic tourist has to contend with is the carrying of dry plates. These are clumsy, heavy, and fragile. He cannot carry with him more than four or five plate-holders, and this gives him the chance of taking only eight or ten pictures a day. There is then the trouble of changing them at night, when the person is fagged out by a day's tramp, and the constant worry of protecting them from the light until he reaches a place where he can develop them. Here is an English invention that does away with all this. The attachment is expensive. The one fixed to my Scovill cost $25, but it soon pays for itself. Where a plate would cost $1.25, the paper film will be only thirty cents. The holder contains two spools, on which is wound paper enough for taking thirty-six pictures 5 by 8 inches. There is no changing of plates. You can take thirty-six pictures without changing your plate-holder.

"On this stretch of paper there is a gelatine sensitive film. You take a picture, then turn this key four times, and another 5 by 8 surface is exposed ready for taking another picture. The $25 arrangement holds this roll of sensitized paper, and when a picture is turned on, it marks the correct length automatically, so that there is no trouble in cutting off the correct length of the paper. It is possible to cut off one length, and leave the rest of the roll undeveloped, ready for the rest of the tour. I will now give you a practical demonstration of how the paper film is developed, and how the gelatine is taken off and prepared for printing. I have taken a trip up to Mackinac Island, and have thirty-five pictures on this spool, which I shall develop."

The lights were turned out in the room, and the red star of the ruby lantern glowed on the table. The amateurs crowded around to see the development of the new kind of negative.

"You see," said Smith, with something of unnecessary patronage in his tone, "I use the ordinary developing mixture. I cut this first 5 by 8 sheet, and place it in the bottom of the tray, and pour the developer over it thus. You will soon notice the coming of the picture."

They peered into the tray as Smith rocked it gently, so that the fluid flowed evenly from one side to the other, over the submerged sheet. No picture appeared. Smith began to get anxious.

"Undertimed, I guess," said the Chairman. "Put in some of the intensifier."

Smith did so, but without result.

"I say, Smith," said Jones, who had been examining the spools and paper belt, "which side is the sensitive side?"

"Why any fool can tell that by the glaze."

"Well, I'll bet there was one fool who couldn't. Look here, Smith, you have been photographing on the wrong side of the paper!"

There was a general laugh at this. It struck everyone (except Smith) as funny that a man should roam all over Mackinac focussing and shooting off his camera at fine scenery when he had blank paper behind the lens to catch the picture.

When the lights were lit, young Brown came forward to explain his resignation from the society. He had an oblong canvas-covered camera-holder with him, and he placed it on the table. He sighed and said: "I have here," tapping the canvas bag, "a very good camera made by the American Optical Company. It has been used but once, has a revolving back and all the modern improvements. I will sell it for five dollars, complete as it is in the box. Who wants it?"

"I'll take it," shouted half-a-dozen voices at once.

"Well," said Brown, "I will let you toss up for it, the winner to pay me the five dollars."

With this he slowly unbuckled the strap, took off the lid, and then *poured* out the camera. He actually poured it out. There were about a hundred different pieces. It was a wreck.

"Save the pieces," said some one.

"I have done so," said Brown sadly, "although most of the ground glass is gone, and I have but four bits of the lens. I mention all the drawbacks so that the purchaser may not growl afterwards."

"That's good of you," said one of the fellows who took the five dollar offer.

Brown acknowledged the remark, and then proceeded to tell how it happened.

"You perhaps have heard of the Ice Carnival at Montreal last winter?"

"We have," shouted every one, with rather too boisterous and unanimous a yell.

"Thank you," said Brown, bowing to different parts of the room. "I like to have a unanimous affirmative like that. Photographers are too apt to deal with negatives. I'm glad you remember the carnival. I have nothing to say about it. I didn't go there. But out in Oakland County we got up a toboggan slide that almost equalled anything in Montreal. I was going to take an instantaneous view of the sleighs going down the hill. Some Oakland County people have queer ideas about jokes. While I had the black focus cloth over my head they started down the hill with a big bob-sleigh. They say they shouted. Perhaps they did. That's neither here nor there. It certainly wasn't *there* to my knowledge. They came down like a whirlwind, and the camera and I went up like a whirlwind. It was too blamed instantaneous for me. More drop shutter about it than I liked. When I got down I quit the focussing, and took to cussing the foe."

Here Brown stopped and looked expectantly around the room. There was nothing but blank silence. As this began to be painful, Jones raised his hands and faintly clapped them together.

"That was kind of you, Jones. I shan't forget it," said Brown gratefully. "You will, I am sure, be pleased to learn that the party on the bob-sleigh were so hilarious over their successful bit of humour, that they neglected the necessary details of their occupation, and ran into a rail fence, and were spilled over the greater part of the adjoining ten-acre field."

There was a genuine burst of applause at this, and Brown scooped the camera remains into its canvas box again."

"Will the gentleman who offered $5 now step forward?" he asked. "Come up to the captain's office and settle."

No one came, so Brown still has his camera, but is doing no photographing with it this season.

"Some one has handed me a note," said the Chairman, "to the effect that Robinson has abandoned the dry plates for wet plates. I am surprised to hear that. It seems a backward step. Would you mind telling your reasons, Mr. Robinson?"

Mr. R. blushed as he took the stand, and then smiled a little dubiously.

"I think it was a forward step," he began.

"Doubtless," said the Chairman, rather perplexed. "But the general opinion seems to be in favour of the dry process."

"Well, Mr. Chairman, it is like this. There is a grain of truth in that note, but the tone of it is misleading. I went out the other morning to photograph the Put-in-Bay steamer, the *Alaska*. She is a fine boat, as you know, and makes a fine subject for an instantaneous view. I got my distance and had the camera in the prow of the small boat. I had two plates and a single plate-holder. I got what I think would have been a fine view of a steamer coming towards me. I next intended to take her picture after she had passed, but I forgot about the swells from her wheels, and when the row boat suddenly raised to them, I took that unlucky step forward, and myself and the plates—camera and all—took headers into the river. I may add that, having tried both kinds, I prefer the dry process."

"That's all right in photography," said Brown, "but I think in real every-day life the wet process has its advantages; so, boys, before every place closes up, come let us adjourn and try the wet process at my expense."

The meeting adjourned accordingly.

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Notes.

The retina of the living eye has now been photographed, and it interested us much to see the negative which Mr. W. T. Jackman, of Coggeshall, Essex, brought to our office yesterday. It was taken ten days ago by Mr. Webster, also of Coggeshall, and the before mentioned gentleman, on an extra sensisive gelatine plate. The crystalline lens of the eye and a two-inch focus achromatic meniscus formed one composite optical system for projecting the image, and owing to the non-actinic colour of the retina an exposure of twenty minutes by gaslight was required; no small strain on the patient, who of course had to look steadily at a dot during this time.

The negative, although small, shows the bifurcation of the blood-vessels, and also the edge of the blind spot. Since the photograph was taken, some progress has been made as regards arrangements for future work.

We gladly notice the fact that the trustees of the British Museum announce that, during the past year, "The Photographic Studio has been rebuilt on an enlarged scale." This, we hope, is but the logical prelude to the use of that enlarged studio in a much more general way.

From a further scrutiny of the said Trustees' Report, we notice that the acquisitions made by the Museum during 1885 include twenty-nine carbon photographs of pictures of the Spanish School; photographs of Richard Wagner, Charles Darwin, Sir R. Owen, and a large number of photogravures. A much more important fact, however, is the intimation that during the past year the photographic reproduction of the more famous of the prints and drawings in the national collection has been continued. German prints have been specially dealt with in this way, and it is to be hoped that the photographs thus produced will be issued to the public some day at popular prices. In that case the Studio will not have been enlarged in vain.

The Special Artist of the *Illustrated London News*, to whose photographs in the Soudan we made reference in a recent issue, was Mr. Melton Prior. Mr. Villiers represented the *Graphic*. *Apropos*, Mr. Villiers writes: "I never carry a photographic apparatus when compaigning, because of the danger of transport, but depend entirely upon pencil and paper." One ounce of practice is worth a ton of theory, and Mr. Villiers clearly knows what he s writing about. What now remains to be done is the invention of a camera which shall not take up a larger space than is occupied by a lead pencil. The photographs would be small, but the powers of the microscope are large.

It is said that a certain charming photograph on china, by Mr. Downey, was the cause of the recent pugilistic encounter in Rotten Row between two well-known members of the aristocracy.

A retouching desk, which W. Mountain, of Clapham Road, submits to us, deserves mention. Something like a large portfolio when closed, it can readily be put out of the way, and is not subject to much risk of damage. When open, a cloth hood, which is large enough to allow the worker every freedom in the use of his hands, screens off extraneous light.

In relation to our recent remarks as to making "grain" plates or negatives, a correspondent makes the suggestion that perforated cardboard used by ladies as a ground for certain kinds of needlework, may be useful as a basis of operations.

From Washington Teasdale we receive two excellent photographs of the set-pieces of a pyrotechnical display. They are portraits of well-known persons, and are recognizable at a glance. Mr. Teasdale says: "I used a rapid rectilinear lens $\frac{f}{8}$, and uncapped for a few seconds, when the fireworks seemed pretty clear and bright."

"Burnham Beeches" was once the happy hunting ground of the photographer. It is to be feared that the place will not remain so much longer. For some time past the Corporation have been "improving" the once wild and picturesque spot, and all manners of roads and "avenues" have been constructed, for no other purpose, apparently, than to glorify certain members whose names have been given to the thoroughfares. The next "improvement" that we shall hear of will probably be the cutting down of the beeches themselves, and the erection of a summer hotel upon the site.

Public men who alter their appearance either by shaving or growing a beard ought really, in their own interests, have their photographs taken immediately after their transformation, for distribution. Singers especially should do this. Mr. Joseph Maas, the tenor, whose moustachioed face is well known, had to shave when he appeared in *Nanon*. The consequence was that, instead of that burst of applause which usually greets the popular vocalist when he steps upon the stage, scarcely a hand was raised. Why was not Mr. Maas photographed under his new aspect, so that copies might have been distributed among the audience to prepare them for the change? Mr. Sims Reeves was either less self-sacrificing or wiser than Mr. Maas. During the whole of his long operatic career he never tampered with his characteristic moustache.

Apropos, Mr. Harry Furniss, the *Punch* artist, who has lately been interviewed on the subject of caricaturing statesmen, says Members of Parliament should abstain, like actors, from growing beards, otherwise they spoil themselves for being "made up" by the caricaturist as old women, little boys, and other favourite characters. Lord Hartington, for instance, is always Lord Hartington; it is impossible to transform him into any other character. Parnell's appearance is constantly changing; one week he has a shaggy beard and unshorn locks, and the next he is all trim and spruce, so that the caricaturist has to be constantly on the *qui vive*. The safer plan, adds Mr. Furniss, is to take a man's type and stick to it. No doubt the closely-shaven face shows far more character than the bearded one; for this reason, the photographer prefers a bearded man; he is far easier to take.

It is a pity that our military photographers—many of whom are so skilful—are not "commanded" occasionally to take pictures which would be acceptable to the public. The arrival of the camel corps at Wellington Barracks, and their inspection at Osborne by Her Majesty, were events worth chronicling pictorially, not only for the pleasure of the present generation, but for the information of generations to come. Photographs of the interior of guns, of the explosion of shells, or the cracking of experimental targets, are very instructive and interesting, doubtless; but pictures recording facts in our military history are important. The matter requires to be initiated by the authorities at the Horse Guards, as the military mind somehow fails to appreciate suggestions from the outside.

The Royal Family are such patrons of photography that it goes without saying that the photographers were very busy at Osborne last week taking groups of the wedding guests and portraits of the Prince and Princess in their wedding garbs. The *Court Journal* probably speaks with authority when it says, "It is doubtful if these presentments will be shown to the world in general—or, rather, if they will ever be purchaseable by the public."

A contemporary, speaking of an international exhibition of industries to take place at Edinburgh next summer, when an imitation of Old London will be presented in the shape of Old Edinburgh, says: "These strange combinations of antique dresses and primitive buildings with modern industries will not always avoid the burlesque. Imagine, for instance, a fellow with a seventeenth century deportment taking instantaneous photographs!" And why not?

The question of "unfair" bowling at cricket remains unsettled, and as the umpires declare themselves unable to determine when a bowler oversteps the height to which the arm should be raised, perhaps the problem might be solved by photography. Why not photograph a suspicious bowler when in the act of delivering a ball? Instantaneous photography in these days is equal to the occasion.

The anti-vaccinationists have enlisted photography in their service. At the International Anti-vaccination Congress held this week at Charleroi, a photograph was exhibited which had been forwarded by Mr. Dwight Stow, of Boston, showing the injuries alleged to have been inflicted on English emigrants to the United States (vaccinated during the voyage) through bad lymph. If such photographs are considered to aid their cause, the anti-vaccinators are so zealous they will be sure to disseminate copies far and wide. So long as the publication is confined to the medical profession, one would not have a word to say; but the indiscriminate circulation of pictures of persons afflicted with hideous diseases would be very undesirable. There is a shop window in London which cannot be passed without a feeling of disgust, owing to the photographs of skin diseases which the proprietor alleges he has cured. If this kind of thing became common, it would add a new horror to life.

Patent Intelligence.

Applications for Letters Patent.

8917. Benjamin Joseph Edwards, The Grove, Hackney, Middlesex, for "A new or improved apparatus for coating photographic plates or paper."—23rd July, 1885.

8938. Charles Day Durnford, 1, Castle Terrace, Edinburgh, for "Improvements in photographic printing apparatus."—24th July, 1885.

8971. William James Lancaster, 6, Livery Street, Birmingham, for "A new or improved folding lamp for photographic work, and for other purposes."—25th July, 1885.

Patent Sealed.

4528. William Ford Stanley, 4 and 5, Great Turnstile, Holborn, Middlesex, for "Improvements in photographic cameras."—13th April, 1885.

Patent on which the Seventh Year's Renewal Fee of £10 has been Paid.

2912. Walter Bentley Woodbury, of Norwood, in the County of Surrey, "Improvements in means for and methods of producing designs upon paper, cloth, or other fibrous or soft material."—Dated 22nd July, 1878.

This specification refers to the well-known "photo-filigrane process," the claim being for the means for, and methods of producing and supporting gelatine designs in relief for the purpose of reproducing such designs upon the surface of paper or other material by pressure as described.

Specifications Published during the Week.

5523. Eugen Himly, a resident of the city of Berlin, kingdom of Prussia, empire of Germany, residing at No. 54, Zossener Street, for "Improved method of, and apparatus for taking photographs by artificial light."—Dated 5th May, 1885.

The application of the new method described in the specifications as granted to me by Her Majesty's Letters Patent under No. 11,556, A.D. August 22nd, 1884, requires strong and powerful sources of light, as, for instance, electric arc lamps, extraordinary regenerative gas burners of Siemens, as well as a considerable quantity of incandescence lamps. The costs of installation, the entertaining of these strong lights, are high, and the construction of the necessary apparatus is often very high in weight; for this reason my process could not become of general use. The use of ordinary gas-burners or a number of relative small electric incandescence lamps, appears to be possible, and the price of installation remains within reasonable prices, so that it is now a fact that besides the artificial diffuse light as described in my patent No. 11,556, small sources of light, which spend direct or reflected rays, can be used. The method and the apparatus which give this favourable result form the present object of this request for a patent.

The claim is:—

1. The use of a number of sources of light adapted to the crane, which is protected by my patent No. 11,556, or an analogue disposition combined with reflectors. Of these sources of light

there is one very strong, and placed in a semicircular niche with irregular curves, but its regular reflection is destined to illuminate the front of the model. The others below the crane furnish an equal light, and serve to grade off the shades, which the principal source of light has occasioned.

2. The use of fixed lights with reflectors to evade the formation of heavy shades on the background, and to illuminate the rear of the model.

3. The use of the system as described in 1 and 2, for selecting the illumination which is most favourable, in turning the crane and leaving the same stationary during the exposure.

4. The use of a double movable fond for a reflector with counterweight and regulation by mechanic, for giving light of different intensity and modulation. See page 389 of the present volume.

Patent Granted in America.

322,111. Eduard Kurschner, Liegnitz, Silesia, Prussia, Germany, assignor to Carl Gustave Schwabe, same place, for a "Photograph-exhibitor." Filed Feb. 8, 1884. (No Model). Patented in Germany, June 22, 1882, No. 20,798, and in Austria-Hungary Feb. 15, 1883, No. 139 and No. 5,583.

Claim.—In combination with a revolving photograph-exhibitor, a holder consisting of rods with transversal laths, strips of sheet metal, and a button.

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Review.

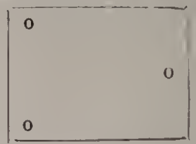
Burton's Modern Photography, formerly published as the A B C of Photography. (*Piper and Carter, 5, Castle Street, Holborn, London, E.C.*)

W. K. Burton is to be congratulated as the author of by far the most popular shilling hand-book of the day, and the present edition is well brought up to date, and has been very carefully revised.

In its present form it may be regarded as a compact and comprehensive treatise based upon a series of articles which the author contributed to the News not very long ago; but with very numerous alterations and additions which recent progress has made necessary.

Among the subjects treated of may be mentioned:—Selection of apparatus, chemicals, the dark room, "exposure," development, lenses, the management of the camera in the field, "instantaneous" photography, portraiture, tables to facilitate judgment of exposure, defects and remedies, intensification of the negative, varnishing, printing and toning with "ready sensitized" paper, mounting, sensitized albumenized paper, the platinum process, transparencies, rapid printing papers, making gelatine emulsion, coating, drying, and packing plates.

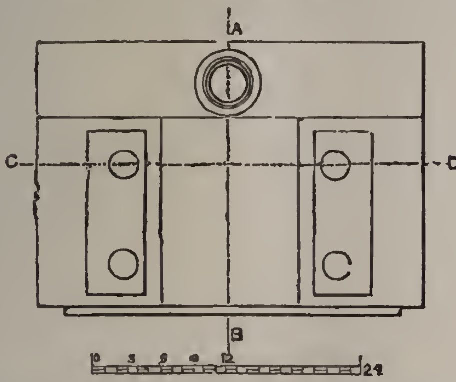
We quote the thoroughly practical remarks of the author as to coating, drying, and packing of plates:—

> To prepare plates for coating, it is necessary, if they have been used before, to remove the old films; and whether they have been used or not, to polish them on one side to receive the emulsion.
>
> To remove old films, the plates are left to soak for at least twenty-four hours in a mixture of one part of hydrochloric acid to twenty parts of water. Any waste acid will do. The strength of the mixture is not important, so long as it is not too weak, and almost any acid will do as well as hydrochloric; the same acid bath will do for a long time.
>
> After the plates have been the time specified in the dilute acid, the films may easily be removed by the use of warm water and a scrubbing brush. Whitening is the best material to give such a polish to the glass that the emulsion will flow easily on it. A mixture of ordinary whitening and water to the consistency of a thick cream is made. This is thinly spread on one side of the glass with a cloth, all the plates to be cleaned being thus smeared, and placed against the wall or in racks to dry. When the whitening has dried on them, each plate is taken in the hand. The greater part of the composition is removed by a *very slightly* damped cloth, and the plate is rapidly polished with a perfectly clean and dry one; a beautiful surface is by this means obtained. Care must be taken to remove all whitening from the edges of the plates.
>
> There are several methods of coating plates in common use. The best for those who have the skill is the method used for coating with collodion, and which we describe; but we imagine most of those who have not worked the wet process will find the plan which has been used for some time by the writer, and which is also described, the most convenient. For the ordinary method, the apparatus necessary is as follows:—
>
> A small tea-pot. A large flat dish of the nature of a porcelain flat bath to catch spillings. A pneumatic holder; this is an india-rubber ball with sucker attached, the whole forming an apparatus whereby it is possible to pick up a plate.
>
> In coating by the ordinary method, it is advisable to have two ruby lamps, one placed at the back of the operating table, the other in front of the operator, and above the level of his head. He can thus see the emulsion on the plate, both by reflected and by transmitted light. The flat dish is placed between the lower light and the operator; the tea-pot, full of emulsion, melted, and at a temperature of 120° Fahr., or thereby, may be placed on this dish, and the plates, *polished side downwards*, are placed to the right of the flat dish.
>
> The pneumatic holder is taken in the left hand, which is stretched across the flat dish, to take hold of a plate. The plate is held level, and a pool of emulsion is poured on to it, and guided over it exactly as was described for varnishing a plate in Chapter XIII., page 85. The only difference is that more than half the plate is at first covered with emulsion, and that, instead of the plate being drained, it is only slightly tipped up, so as to let a little of the emulsion return to the tea-pot. After this is done, the plate is gently rocked for a few seconds, till we see by looking through it that the coating has spread evenly. To tell whether the plate has had enough emulsion left on it, we look through it, after it has set, at one of the ruby lights. If we can see the form of the light through the film, there is not enough emulsion on the plate.
>
> The plates, as they are coated, are placed on the levelling slab to set. Some emulsion is sure to be spilled into the flat dish. It is allowed to set, is then scraped up with a strip of glass, and re-melted. For the method of coating which we recommend to those not skilled in the wet process, the pneumatic holder is not required. It is necessary, however, to make a small tripod. This is done by gluing three somewhat large-sized shot on to a quarter-plate in the form of a triangle, thus—
>
> 
>
> There is also needed a glass rod about two inches longer than the width of the plate to be coated, and a jam pot or glass measure in which to stand the rod. The dark-room lamp is placed within a few inches of the left hand end of the levelling shelf, and to the back of it. There is, to the left of the lamp, room only for the pile of plates, which, in this case, have the polished side upwards. The rod standing in the jam pot is to the right of the lamp. The teapot with emulsion in it, as before, is in front of the lamp, and farther forward still, near the front edge of the slab, is the small tripod mentioned. A plate is taken from the pile, and placed on the tripod.
>
> A pool of emulsion, about half covering the plate, is poured from the tea-pot. The glass rod is taken between the fingers and thumb of each hand, and dipped into the pool of emulsion right across the plate. The emulsion will run between the rod and the plate to each edge of the latter. By a motion of the finger and thumb of each hand, the rod is lifted the smallest possible distance from the plate, and is rapidly moved first to one end, then to the other, the tips of the finger and thumb resting on the level table as a guide. This, if properly done, will cover the whole plate with emulsion; and if the plate be small—half-plate or under—it is is sufficient to slide it to the far end of the table to set. If the plate be large, the coating will not be evenly spread unless it is lifted, balanced on the tips of the fingers of the left hand, and rocked gently for a few seconds. By this method plates may, after a little practice, be coated with great rapidity. There is no need to wipe the rod each time it is used.
>
> As no excess is poured off the plate nor spilled in this method, it is possible, by using a very small tea-pot, to keep a constant check on the quantity of emulsion going on to the plates. The covering power of the slow emulsion will be found somewhat

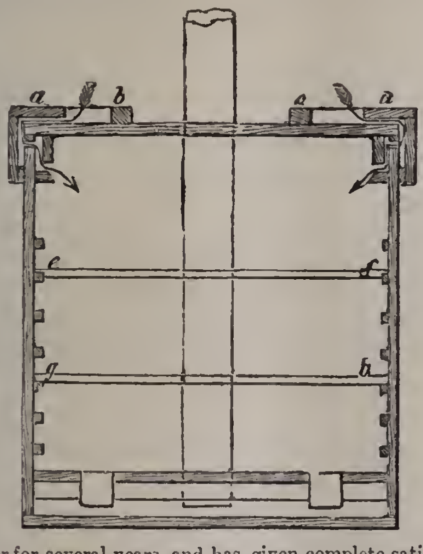
greater than that of the rapid. With each ounce of the slow emulsion, 8 quarters or 4 half-plates may be coated; with the rapid, only 7 quarters or 3 halves.

The plates will "set" in a few minutes—that is to say, the emulsion will stiffen like a jelly—and will not run off the glass, whatever position it is placed in. They are now transferred to the drying box. When dry, they are ready for use.

The drying box calls for some description. There are various forms in use. They all have in view the inducing of a current of air among the plates, generally by the burning of a gas jet in a tube or chimney. The fault of most is that the air passages are far too contracted. In many, heat is applied to the incoming air. This is quite unnecessary, if the air passages are sufficiently large and well arranged, and if the box can be placed in a fairly dry place. It is, moreover, the greatest mistake to use artificial heat in drying plates, if it can possibly be avoided, as they are rendered distinctly slower thereby.

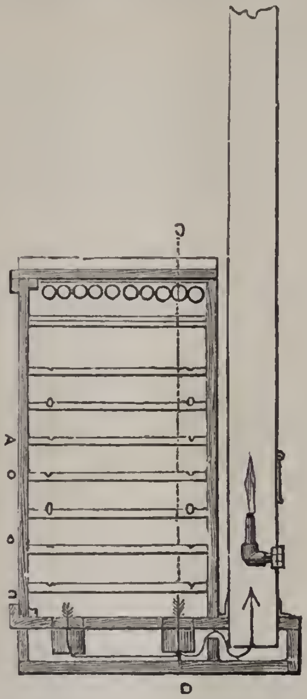


We here illustrate a form of box which has been in use by the writer for several years, and has given complete satisfaction. It will be seen that the air enters at the top of the box. It is drawn into an air chamber at its lower portion, and hence passes up the large tube with a gas flame burning in it. This tube must be carried either into the open air, or into a chimney. The plates are placed in racks, which were first designed by Mr. G. F. Williams. A sketch of one of these is given. Two plates may be placed back to back in each pair of notches if desired. The racks can be placed on the cross rods shown in the box, the height of which may be adjusted to suit various sized plates. Boxes and racks as described are made by Messrs. D. Gordon Laing and Son.



The plates will take from twelve to forty-eight hours to dry, according to circumstances. When dry, they may be used at once, or may be packed for use at any future time. No limit is as yet known to the time during which plates will keep if stored in perfectly dry pure air. They are very readily destroyed, however, by damp, gas fumes, &c.

Plates may be packed in opaque orange paper, such as is sold by most photographic dealers. The paper used for the making of "masks and discs" is the best. The plates may be packed in sets of 4 and 6. Every two plates are put face to face, and have a piece of tissue paper between them. Three packets of 4, or two of 6, are then taken, and wrapped together in a thickness of opaque orange paper. Two wrappings of brown paper are then put around all, and the package may be handled in any light. For amateurs, who never make a very large stock of plates, the best course is to use grooved light-tight boxes.



As regards the new rapid printing paper, the author says:—

The development of the print is an operation requiring considerable judgment. The image must be closely watched, and the print must be removed from the bath almost before it has got as dark as it will be finally required; if the exposure has been correct, the colours of the print at this stage will be a dullish red. If the exposure has been too short, it will be a greenish black; if too long, it will be flat and lacking in vigour. Several prints may be developed at one time, but not very many. Whenever the print is taken from the developer it must be washed in several changes of water. After this it is immersed for a quarter-of-an-hour in a saturated solution of alum. It is then washed again, when it is ready for toning. The same formula which is recommended for albumenized paper may be used, but its action is slow with the rapid paper. If, however, it be made of double strength, and there be added to each pint of it 4 grains of chloride of lime, the toning will go on rapidly enough. The toning requires to be continued till the surface of the print is quite purple, and if any but a very warm brown tone be required, for some time longer. The time to stop toning is best judged by looking through the print at a light.

The value of the comprehensive index will be appreciated by the student.

CHROME ALUM IN SILVER SOLUTION FOR ALBUMEN PAPER.

BY J. BELL.

The question will be asked: Of what use is it there? The answer to this is, it allows a much weaker solution of silver to be used, equalling one in which almost twice the amount of silver has been used to produce the same result, viz., brilliancy and the absence of softening of albumen on paper, silvered on weak solutions of silver at low temperature. But as it gains here, it also increases the tendency to blister; but this can be avoided by the use of ammonia in hypo, and also in the salt bath after the hypo; also by not taking them out of the salt bath, but letting the water into the salt bath gradually. Paper (silvered on this solution) one day old becomes very difficult to tone unless a very large amount of alkali is used in the toning bath, the action of the alkali being to soften the now insoluble albumen, and allow its being toned. I add the formula that has worked well on the brilliant albumen papers in the market:—

Nitrate of silver	437½ grains
Water	12 ounces
Nitric acid	3 drops
Chrome alum	5 grains

After silvering twelve sheets upon this solution, add the same amount of silver solution, composed as given. By experience it has been found that one ounce of silver will silver one dozen sheets of paper. By doing this, constant good prints are obtained, and poor ones when this is neglected. Chrome alum added to an alkaline silver solution will be precipitated. Its good effects are to be had only from an acid silver solution —*Philadelphia Photographer*, Pa.

STRENGTH OF THE HYPO BATH FOR GELATINE NEGATIVES.

BY W. E. DEBENHAM.*

The question of the strength of the hypo bath for negatives is one which has from time to time been referred to, generally, I think, in connection with a statement that a strong bath will not fix a plate so rapidly as will a more dilute solution; but, so far as I am aware, there has not been published anything like a complete and systematic set of experiments, and statements are still made of a most conflicting character. Certainly, at the last meeting of this Society, some plates were fixed in the presence of the members, and one thing which had been on all hands anticipated was realised, namely, that a dry gelatino-bromide of silver plate would take longer to fix in a bath saturated with hyposulphite of soda, than in one which was only half that strength. This was only what was to be expected, as the salt at that degree of concentration does not at all readily yield up its water of solution to the gelatine. Indeed, as some other considerations will show, it actually is capable of withdrawing some of the water from a softened gelatine film, and thereby renders it less amenable to the solvent action of the soda salt.

However, as we do not dry our films before placing them in the hypo, this experiment, however interesting in itself, does not bear much upon the question at issue. Another experiment that was made, was the placing of two halves of a wetted plate (thus more nearly realising the actual conditions of our work) in dishes, one of which contained a saturated solution of hypo, and the other a solution of half that strength. Here there was a curious conflict of experiences, for being carried out four times, in two cases the saturated solution worked the more rapidly, and slower in the other two. The slight differences in favour of the one on the other solution, it was proposed to explain by the fact that the plates which fixed more rapidly in the stronger solution had been soaked in water for a longer time previous to being placed in the hypo. If this really had had any influence it should have been the other way, since it is only reasonable to suppose that as a dry plate fixed slower than in a saturated solution, and one which had been swelled in water for three minutes fixed quickly, a plate soaking half an hour should, if there was really any difference, be softer still, and fix yet more rapidly.

There was, however, another condition imported into this trial which may explain the apparent contradictions. The plates that had been long soaking were placed in hypo dishes that were kept in agitation during the whole time of fixation. This would tend to remove the water from the film, and replace it by saturated solution of hypo, temporarily hardening the film by abstraction of its water. In this way, the varying results of the experiments thus made may be explained without violence.

In the enquiry as to whether a strong or weak hypo bath fixes the more rapidly, the question first arises: What strength would be considered respectively as strong or weak? A very common recommendation has been to make the bath with five parts of water to one of the salt; and if this be considered a medium strength, two of water to one of hypo may be taken as strong, and ten of water to one of hypo as weak. A saturated solution of hypo is of course more than merely strong; it is very strong, as strong as possible, and it is probable that it is not generally known how strong it really is.

Hyposulphite of soda is one of those substances which dissolve in proportions at different temperatures. For the purposes of these experiments, I made a saturated solution on a day recently when the temperature was, for a July day, moderate, the maximum for the day being 73° Fahrenheit. I found 1 part by weight (1,000 grains) of water take up just 2 parts (2,000 grains) of hypo. The next morning, however, although the lowest temperature during the night had been 57°, I found that 240 grains, or nearly one-eighth, had gone down in crystals. The bulk of solution was a little more than two volumes (2·150), so that a measured ounce of saturated solution at 73° would contain nearly an ounce by weight of hypo itself. It will thus be seen what a very strong solution of this salt is a saturated one, and even when diluted with an equal quantity of water, it is still what would generally be considered as strong.

I may remark that although what would pass as saturated solution is nearly enough exact for the purpose of the photographer, when an exact experiment is in question it is necessary to be particular, and the solution which is near the top of a bottle, with crystals lying at the bottom, will not readily become saturated, nor remain in that condition if subjected to varying temperatures.

In order to try the effect of solutions of varying strength, I made up five solutions as follows:—No. 1, saturated; No. 2, equal parts crystals of hypo and of water; No. 3, 2 parts of water to 1 of hypo; Nos. 4 and 5, respectively 5 and 10 parts of water to 1 of hypo.

Plates, one made with bromide only, and the other containing 3 per cent. of iodide, were then soaked for three minutes in water, and placed in the solutions, with the result which I have arranged in a tabular form.

	Pure bromide plate fixed in	Bromide with 3 per cent. iodide plate fixed in
1.—Saturated solution of hypo	20 seconds	20 seconds
2.—Equal weights of hypo and water	20 „	20 „
3.—Hypo... ... 1 part Water ... 2 parts	30 „	50 „
4.—Hypo... ... 1 part Water ... 5 parts	40 „	3 minutes
5.—Hypo... ... 1 part Water ... 10 parts	90 „	8 „

The fixing was conducted in black dishes, so that it might be clearly seen when the result was obtained. Nevertheless, it is difficult to tell to a second exactly when the last of the bromide is gone, and the time given for the two strongest baths must only be taken to mean that the plates were apparently fixed by the time stated (twenty seconds), and does not denote that some of them might not be fixed in a little shorter time.

The third bath, one of hypo to two of water, which is still a strong one, shows but little falling off in speed of action upon a pure bromide plate, but when, as in most commercial, and perhaps privately made emulsions, some iodide is contained, the fixing is notably slower. The most striking difference is shown when using a weak 10 per cent. or moderate 20 per cent. bath for plates, containing even the small percentage of iodide mentioned. Here the 1 to 5 bath required three minutes, and the 1 to 10 bath eight minutes for complete visible fixation, whilst the bromide plates required only forty and ninety seconds respectively. The experiments were repeated several times with very similar results. Where a difference appeared, an average has been given.

A curious appearance presented itself upon the plates fixed in the saturated solution. After fixation, and when light was freely admitted, a very slight milkiness was observable, which disappeared upon washing. Of course it might be suggested that this milkiness was due to an undissolved silver compound, but upon replacing the plate—after having become clear during washing—in the saturated solution, a similar milkiness again made its appearance, and was therefore doubtless due to the effect of the saturated solution in depriving the gelatine of a portion of the water which it had imbibed.

The total result of these experiments is altogether in favour of strong solutions of hypo for speedy fixation. Even in the case of the saturated solution, although there was no increase of rapidity upon the very strong—equal parts of hypo and water—neither was there any slowing of action, or at all events not any of consequence, seeing that the plates were fixed in twenty seconds, whilst in the weaker baths considerably longer time was required. The most remarkable effect, however, was shown with the plates containing iodide. These fixed in the strong baths as rapidly as in the pure bromide—*i.e.*, in twenty seconds—but in the 1 to 5 bath required three minutes instead of the forty seconds which the bromide plate took, and in the 1 to 10 bath occupied eight minutes in fixation against the ninety seconds taken by the bromide plate. With plates containing, as has often been recommended, more iodide than those used, the time of fixation in the weaker bath would doubtless be proportionately prolonged. When it is considered that the strength of the hypo bath is continually being reduced—that is, where many negatives are taken—by the water carried into it with each developed plate, and that photographers are but little likely to use baths of really saturated solution of hypo, it seems to be regretted that they should be advised to use weak baths which will constantly be getting weaker. It is generally admitted, too, that plates for perfect fixation should be left for some time longer in the hypo than is necessary for visible fixation, and therefore, unless the fixing agent works with fair rapidity, plates are liable to deteriorate in time, or at once if intensification be attempted, from imperfect fixation. One pound of hypo to a pint of water makes a solution that fixes rapidly, and will bear some use before becoming too dilute. If it is only intended to fix a few plates, a quart of water may be used instead of a pint.

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* Read before the London and Provincial Photographic Association.

I have since repeated these experiments with eight other makes of plates, including some of the best known commercial ones, and although the time of fixing differed in nearly all the samples, and with some was notably slower in the absolutely saturated solution than in a merely strong one, yet in every instance the strong solutions—equal parts of hypo and water, or one of hypo to two of water—fixed more rapidly than those of less strength.

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RECTILINEAR PHOTOGRAPHS BY DISTORTING LENSES.

This would seem at first sight to be an anomaly. Notwithstanding this, it is not only capable of being done, but done without entailing much trouble.

When a single landscape lens is employed in producing a view exceeding a very moderate angle, no defect whatever is appreciable, provided the subject be one in which there are no square marks or straight lines near the margin, as such would be represented with a greater or less amount of curvature. For landscapes or groups such single lenses, therefore, answer quite well. While we would hesitate to say that for the former purpose they are superior to any of the best compound lenses introduced for this purpose, we do not doubt they are at least equal to them.

Except in the sole matter of curvature of marginal lines when overworked (by which we mean the including of too great an angle of view), the single lenses leave nothing to be desired. They work clean and with brilliancy, define well with a moderately large diaphragm, and give images sharp to the corners.

When an architectural view, a map, or a chart, has been made or copied by a lens of this class, and the curvature or distortion is such as to be observable, the way to eliminate all error is to make a transparency from the negative by means of a camera with a single lens, by which an amount of distortion equalling that in the previous case is produced, the resulting photograph being absolutely rectilinear.

With a transparency quite perfect as regards drawing, there is no difficulty in producing, by superposition, a negative from which all error shall be eliminated.

It stands to reason that if distortion of a certain nature be produced by the use of a single lens having a diaphragm in front, distortion of an opposite nature will result from the employment of a diaphragm behind the lens. It follows, therefore, that if a view which has been distorted be *returned* through the lens by which it was so treated, it will, when arrested by the focussing screen, be found to be practically free from all distortion.

This principle is a simple one, but it is not quite so well recognized as it ought to be.

What is of importance to the photographer to know is this, that no matter how imperfect his photographic negative may be as regards curvilinear distortion, it can be cured, and that in a perfect manner.—*Photographic Times.*

SHAM AMATEUR PHOTOGRAPHERS IN THE UNITED STATES

Decide that it is Not Right to Profit upon Professional Courtesies.

On account of two or three of the members of the Amateur Photographers' Association having gone into the business of making pictures for sale, the question came up last evening, at a meeting of the Association, as to whether this is honorable, in view of the courtesies extended to members by professional photographers of this city.

After some plain talk, the Association decided that its members cannot, under the circumstances, honourably engage in making and selling photographs. But, as a compromise, it was finally agreed that members of the Association shall not make and sell pictures at prices below the schedule adopted by professionals. A majority of the members are of the opinion that when members enter into the manufacture and sale of pictures, they become professionals, and are no longer entitled to the courtesies usually extended to purely amateurs by professionals. In other words, the "gall" that is necessary to pretend to be an amateur for the purpose of deadheading points from professionals is more than the Association can stand without violent contortions in the abdominal region.

The Association does not pretend to say that one or more of its members shall not retire and sell photographs on their own account; but that while favours are being extended to the Association, as such, by professionals, it is not honourable for individual members to take advantage of this for pecuniary profit. One of the members, who holds a high position in the public schools, Mr. W. S. Goodnough, is reported as having pictures on sale, with a business card attached, giving the name and number of his residence, or place of picture-making business. —*Columbus (Ohio) Dispatch*, quoted in the *St. Louis Photographer.*

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Correspondence.

PAPER NEGATIVES.

Sir,—Seeing that my friend, Mr. Holroyd, has again taken up this subject, I venture to suggest to him and my fellow amateur photographers a more simple plan of proceeding than his, of gluing the argentic gelatine paper to a metal or veneer support for exposing in the slide. In using paper, I have always had a glass in front, and, provided the inner surface of it agrees with the focussing screen, it answers every purpose, and does not interfere with the sharpness of the picture.

Until the dry plates were introduced, I never used anything but paper, either the calotype, or various modifications of the wax paper process. Three prints from negatives after Le Gray's process are now in the historic section of the Inventions Exhibition, taken in 1861 or 1862. As I took up photography in '45, I have had rather longer experience in this particular than even such an enthusiast in the art as Mr. Holroyd is.

What is so material to success in the use of paper for negatives is to obtain that with the least possible grain; but the principal drawback I have found to the commercial gelatino-bromide paper, is the unevenness of the coating, some samples being full of pinholes and comets; some are liable to blister after development, both of English and French make; it is not quite so rapid as plates, but sufficiently so for ordinary work.

My plan of proceeding is to get the paper in rolls, and cut it to the sizes wanted, and to use as a holder what most photographers have by them—a single slide, easily converted for a few pieces of paper by putting a glass in it for the front. I had one made specially four or five years ago, and have used it ever since. It holds, besides the glass front, eighteen or twenty pieces of paper, and two pieces of card, one thicker than the other; the thinner I place at the back of the first piece of paper against the glass, which separates it from the store behind, and prevents any light striking through; at the back of all I place the thicker card, which, on closing the back, presses all evenly against the glass. After exposing the front piece, I remove it in a bag or changing box, and place it behind the thick card, and put another paper in front against the glass, and so on, as I take my pictures. I thus make one slide answer for the above number. Of course, the slide can be made to hold any quantity; but very little, if anything, thicker than an ordinary double slide is required for eighteen pieces of paper, with the glass and card or ebonite separations. At night I remove what paper I have exposed during the day, and re-fill the slide, to ensure the paper being in close contact with the glass.

I have kept pictures taken during a visit to Scotland and other places months before developing, and have been tolerably successful—more so with the earlier make of paper; and if the makers were more particular in their mode of coating the paper with the emulsion, more reliance could be placed in the commercial article now made by so many firms. It would be a great advantage if they were to keep it flat instead of in rolls, which, I doubt not, others besides myself have found very troublesome. Some samples I have found made with a thicker coating of gelatine, which does not appear to me to be of any advantage, as it is more liable to curl in the washing, and difficult to dry flat. In some recent makes I have tried, the film is as thick as the paper support, which, I think, is a mistake, and in my hands has not been successful. As to the transferring the film after development to glass, as some propose, it may answer; but I would rather not have the doing of it.

With this plan of a single slide and paper, a tourist's equipment is reduced in bulk and weight, with only two pieces of glass, both, in case of accident, easily replaced at any town; and good pictures can be obtained with nearly as much certainty as on dry plates, and at half the cost.—I am, sir, yours obediently,

G. FOWLER JONES.

A REVERSED PICTURE.

DEAR SIR,—You have related in this week's NEWS an instance of the inadvisability of showing a client a negative. Let me give you another. Not many years ago—but yet in the wet collodion days—a certain London photographer, a shrewd man of business, had a call very late in the evening from a sitter who wished to be taken there and then. A thing of this sort had often happened before, and, as experience had proved the wisdom of the proverb about the "bird in the hand," the practice was to go through the performance of a sitting with an empty slide, and when the proof was called for—so arranged as to be in broad daylight—the real negative was taken. This plan was now adopted, a sitting position being chosen; but when the operation was over, nothing would do but the sitter must "see the negative." Here was a difficulty. Our friend, however, proved equal to it. Putting a good face on it, he marched into the dark-room, took up the first negative that came to hand, and brought it out. *It chanced to be of a full-length standing figure!* "Why, how is this?" expostulated the sitter; "I was taken sitting, and you show me a standing position." "My dear sir," said the ready operator, "are you not aware that in the negative everything is reversed—whites are blacks, and blacks are whites—and that, therefore, had you been taken standing, you would have come out sitting?" The sitter had heard of this peculiarity—he pondered—he was satisfied; but of course "a well-directed accident" to the negative necessitated his sitting afresh at his next call. WEST END.

PHOTO-MICROGRAPHS.

DEAR SIR,—My attention has been called to a letter by Mr. Walmsley, in which that gentleman opines that the pictures which I sent you, and which you were good enough to reproduce, were not done with a quarter-inch lens at all.

Mr. Walmsley is evidently influenced in his opinion by the apparent smallness of the field.

He will, however, kindly remember that in copying the photographs by the Meisenbach process, the size of the circlets has been reduced by about one-third.

To set the matter quite at rest, I propose shortly taking another photograph of the fly's foot, with the same French triplet quarter, in the presence of two gentlemen well known in scientific circles, who will vouch for the magnifying power of the lens, &c., being as I represented them.

I shall then beg of you, Mr. Editor, to reproduce the photograph.—Yours sincerely, S. BOTTONE.

FERROUS OXALATE, *VERSUS* PYRO AND HYDROKINONE.

DEAR SIR,—Will you allow me to ask your correspondent, Mr. Bottone, a question or two as to details connected with his letter on the "Ferrous Oxalate Developer," appearing in this week's number (*i.e.*, for July 24th) of the NEWS.

First he says: "After each *batch* of plates has been developed, set aside in corked bottles," &c. How many plates ought one to be able to develop with one lot of developer?

Secondly, about how much should a "*trace* of cupric sulphate" consist of?

Thirdly, he says: "And if made by dissolving the dry ferrous sulphate in a saturated solution of potassium oxalate, it is the most powerful developer known," &c.

Does this mean that one should keep (for under-exposed plates only, of course) a saturated solution of potassium oxalate, and then add to it, when wanted for use, as much dry ferrous sulphate as it will take up, or is there any special proportion to be observed between the two salts?

I shall be very glad to receive answers to the above questions, as I intend giving the oxalate developer an extended trial, if possible, under the most favourable circumstances.—I am, yours faithfully,

CHARLES F. COOMBE, M.R.C.S., L.R.C.P.

DEAR SIR,—You were kind enough to notice my letter in your editorial review last week, and to suggest that my offer should take the form of a challenge. I am quite willing to accept, with the single condition that the trial plate should in each instance be cut in half, and labelled or marked, one-half being sent to me for ferrous development, the other developed by the sender, and the results forwarded to you for comparison.

Though not absolutely necessary, it would, perhaps, save you some trouble if the finished proofs were submitted to your inspection.

Details as to the kind of developer used by the senders would prove instructive to all.—Yours sincerely,

S. BOTTONE.

The Limes, Stanley Road, Carshalton, Surrey, July 28th.

[We shall not only be pleased to see the proposed trial carried out, but shall be glad to publish prints from the divided negatives.—ED. P.N.]

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

A TECHNICAL meeting was held on Tuesday last, the 28th inst., in the small room attached to the Gallery, 5A, Pall Mall East, T. SEBASTIAN DAVIS, F.C.S., in the chair.

The CHAIRMAN brought forward the subject of mounting prints on double albumenized paper. When using gelatine solution, he had experienced some difficulty in removing air-bubbles, and the excess of the mounting medium.

Mr. Cowan said that when working on the small scale, he preferred starch paste, as it did not set so easily; and he also recommended moistening the prints by placing them face downwards on a pine board wetted with a sponge. When the prints had acquired sufficient moisture, while still resting on the board, he pasted them over with the starch, and after each operation the board was cleaned with the sponge.

Mr. Warnerke always employed, as a mountant, a mixture of dextrine, glycerine, and alcohol. The dextrine apparently formed a compound with glycerine, and thus prints soon dried, notwithstanding the presence of the latter hygroscopic substance. In his experience, the fading only occurred when the dextrine was impure and showed acidity; it was thus necessary always to employ a pure sample. With such a mixture the mounting is very easy, and the prints do not cockle.

Mr. Atkinson had found an india-rubber solution serviceable for mounting prints in albums, but several members expressed their disapproval of such a mountant.

Mr. Shew passed round a series of wide-angle lenses by Prazmowski, similar to those on view at the Antwerp exhibition.

South London Photographic Society.

The annual out-door meeting took place on Saturday, 25th inst., at Hampstead Heath. Notwithstanding the excessively hot day, there was a better attendance of members and friends than for several years past, and on this occasion the meeting was graced by the presence of ladies. Another noticeable feature was that the majority of the company were provided with cameras, a most unusual circumstance at these gatherings of the South London Society.

After a pleasant afternoon had been spent upon the Heath, the Company assembled at the "Bull and Bush" Hotel, where a substantial tea was awaiting. After tea an adjournment was made to a picturesque and retired part of the Heath, where several photographs of the company were taken, most of those who had brought cameras having reserved plates for the occasion. This brought a very successful meeting to a termination.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 23rd inst., Mr. W. M. Ashman in the chair.

Mr. A. Cowan showed a sample of brown jelly to illustrate his remarks at the previous meeting on heating gelatine with a certain compound of silver.

Mr. W. E. Debenham read a paper on "The Action of Strong and Weak Hypo Solutions for Fixing Gelatine Negatives" (page 492).

At the conclusion, Mr. Debenham stated that he had used portions of the same plates—viz., pure bromide and bromo-iodide—in his experiments, each being cut in wedge form from the centre of a large plate.

Mr. J. B. B. Wellington found that a saturated solution required ten minutes to fix a plate.

			Per cent.			
Diluted to	80	with	2½	of iodide present,	fixing occupied	1 min.
„	60	„	5	„	„	1 „
„	40	„	3½	„	„	2 mins.
„	20	„	5	„	„	3 „
„	10	„	8	„	„	5 „

Mr. Debenham: Except the saturated solution, Mr. Wellington's experiments agree with my own.

Mr. A. L. Henderson said that when a plate fully charged with water is placed into a saturated solution of hypo, the quantity entering the film would be reduced in strength one-half at least. He had recently soaked one portion of a plate in water about 70° F. twenty seconds before developing; this portion was much slower in starting developing action, but overtook the remainder in two minutes, when both portions were removed from the developer. That portion which had been previously soaked, fixed much quicker than the other. Boiled emulsions fixed quicker than those of ammonia, and he thought Mr. Debenham's results might have been reversed with a different batch of plates.

Mr. W. K. Burton considered that any set of experiments applying to one make of plate could hardly influence other kinds; but their best thanks were due for the completeness of the experiment, which had been sufficiently laborious, and fully illustrated the points desired. He believed boiled emulsions containing iodide precipitated a portion of that haloid, hence quicker fixation. In the ammonia process there was less, or perhaps not any, iodide of silver thrown down.

Mr. Henderson was very careful to examine a particular boiled emulsion containing much iodide, for evidence of such precipitation, but failed to discover any, and thought iodide of silver did not exist when boiled with excess of bromine.

Mr. Debenham said that different speeds of fixation between boiled and ammonia emulsion plates might be due to the size of granules formed by the haloid used: large crystals would require a longer time to dissolve than the smaller, which, being finer, would dissolve more rapidly. Evidence of silver iodide not being altered was found in one of Mr. Henderson's formulas, wherein the plates made by it required a long time to fix.

After some further discussion, a cordial vote of thanks was passed to Mr. Debenham for his paper.

Mr. Henderson handed round a negative sent by a friend, in which the margins had developed a density equal to eight times that of the centre, and the portions in the vicinity of the margin were insensitive. The general opinion was that the marks in question were due to insufficient washing.

Mr. Burton, in referring to a recent statement that American plates were more rapid than English, showed a 10 by 12 chloride transparency from a negative of shipping on a commercial plate, exposure being F 32 rapid shutter; the detail was most perfect. Regarding chloride plates, he found they would not keep as well as bromide: he had some 10 by 12 size which had been kept in stock five months; these were deteriorating, the top plates being quite useless.

Mr. Debenham remarked that it would be probably due to storing them in an impure atmosphere.

Mr. Cowan had packed a number of quarter plates with sheets of paper between them in 1883, and they had kept well except at the margins not covered by paper; these portions exhibited a yellow mark on development, which was easily removed with per-chloride of iron and hydrochloric acid.

Mr. Debenham thought the reason why chloride plates required greater care in storing than bromide, was due to a lesser proportion of gelatine.

Messrs. Briginshaw, Cowan, Haddon, and Wellington, each passed round their results made at the Society's outdoor meeting. The subjects chosen were good, and elicited favourable comment.

The Chairman exhibited a large collection of choice views made by Mr. Albert E. Cox in the environs of Norwich.

In discussing a question which arose concerning a peculiar kind of blistering of a gelatine plate,

Mr. W. H. Harrison stated that M. E. Stebbing found those portions of the frilled plate more or less rotten where there was little or no image, the dense parts remaining strong.

Birmingham Photographic Society.

The above Society held its monthly meeting on July 23rd, at the Technical School, Bridge Street; the chair was occupied by W. J. Hamson, F.C.S., Vice-President.

The minutes of the last meeting having been read and confirmed, the election of members was proceeded with, after which B. Karleese, leader of the last excursion to Guy's Cliff and Warwick, read the report, in which he congratulated the members of the excursion on the fine weather they were favoured with, and the excellence of the work done that day. The party numbered seventeen.

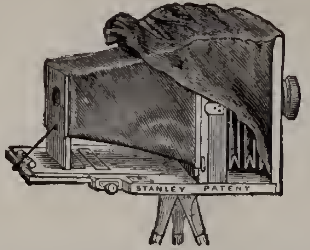
G. M. Jones was next called upon to give his paper on "Weights and Measures, and the Making of Solutions" (see page 484).

This to photographers is an essential part, and Mr. Jones gave many useful hints to those who had the pleasure of hearing his paper.

Prints of the last excursion were next laid upon the table for inspection by the members.

Talk in the Studio.

Stanley's Combined Focussing Cloth and Camera.—This contrivance consists merely of a conical silk bag placed horizontally behind the focussing screen, this band being provided with a focussing glass or simple magnifier at the apex of the cone. Such an arrangement not only enables the operator to focus with care, but it permits him at the same tlme to look about him so as to study out a position for the best view.



Law of Emanation of Light from Incandescent Substances. —By W. Moller (*Ann. Phys. Chem.* [2], 24, 266, 281).—The law of cosines for the emanation of light from incandescent substances has been based hitherto rather on the analogy of light with heat-rays, than on experimental evidence. By means of a simplified form of Wild's photometer, the author has given an empirical proof of the law, and has tested the relative intensity of the more important incandescent lamps.—*Journal of the Chemical Society.*

"Taking" a Photograph.—A correspondent is good enough to send us the following cutting from the *Birmingham Daily Mail* of the 18th inst.:—"There was a misunderstanding between two people at the Police Court the other day, such as would be almost sufficient to make the fortune of a present-day farcical comedy. A woman was charged with stealing a photograph. The prosecutor's evidence was being taken by his solicitor, when something like the following dialogue took place:—The Solicitor: Well, you found that your photograph had gone? Witness: Yes. Solicitor: And when was it taken? Witness: When was it took? Oh, seventeen years ago last May—the week after I was married. Solicitor: Good gracious, man! What are you talking about? You charge the prisoner with stealing your photograph only yesterday. Witness: So she did. Solicitor: But now you say it was taken seventeen years ago. Witness: Yes; that was when it was first taken. Solicitor: Oh, I see. You have lost it more than once, then? Witness: No, sir. It's always hung on my parlour wall till yesterday. Solicitor: Well, and then it was taken, wasn't it? Witness: No, sir. I missed it in the afternoon, but it had been taken seventeen —— The Magistrate's Clerk: What does it all mean? Witness: It was taken on the sands at Ramsgate. My wife had hers took, too. Solicitor: Oh, I see what he means, sir. He's rather confused about the word "taken." Now (to witness), when you say it was taken seventeen years ago, you mean that you were photographed, eh? Witness: Yes, sir. Solicitor: And when I said taken, I meant it was taken away—stolen. Now, then, we shall get on. Witness: Yes, sir. Solicitor: Now we will begin right at the beginning, so as to be quite clear. Where were you at the time it was taken? Witness: I had just gone out of the room, sir. Solicitor: How could that be? How could they take your photograph when you were out of the room? Witness: Of course they could, sir. If I had been in the room I should have took good care that it wasn't took. Solicitor (to the Magistrate): I am afraid he's getting rather confused again, sir. Witness (angrily): Who is confused? The Magistrate's Clerk: I am. Whatever are you all talking about? (To Witness): Was the photograph afterwards brought to you by the prisoner? Witness: No, sir. I took it away myself. (Complete collapse of the whole Court.) Nothing further could be got out of the witness until, by a happy inspiration, the magistrate told him to say what he had to say without the assistance of any questioning. Left to himself, witness soon placed the matter in a perfectly clear light."

Freaks of Girls.—Speaking of freaks of girls, a correspondent writes to a Western paper:—"Well, I was going to tell of a feminine freak in the less useful line of amateur photography. The maiden's modesty was not acute enough to keep her from self appreciation. She had never been satisfied with the portraits which professional photographers made for her. She felt sure that her sweetest expression had not been caught by the camera, as she often saw it in her mirror. Having a camera with the usual attachment for taking instantaneous views, she has spent her leisure hours for a week or two in making negatives of her own visage. A string hitched to the trigger of the instrument enables her to be both operator and subject; and thus, in the privacy of her chamber, with no spectator to hinder or make afraid, she transfers her smiles and frowns to the plates, to be subsequently developed into photographs, in case she deems them worth it. She has thus far made one hundred and sixty-seven different pictures of herself."—*Photographic Times.*

Photographic Club.—The subject for discussion at the next meeting, on August 5th, will be "The Action of Various Sulphites and Bisulphites in the Developer." Outdoor meeting at Uxbridge, Bank Holiday, Aug. 3; trains from Bishops' Road at 10.6 a.m.

To Correspondents.

*** We cannot undertake to return rejected communications.

H. M.—Morally and legally it belongs to your employers, not to you.

Rob. F. Dixon.—1. No varnish is satisfactory unless every trace of hypo is washed out of the film; but if proper care is taken, the following answers well:—

Commercial white hard varnish	½ pint
Methylated spirit	1 pint

2. Equally good, as far as we can judge. 3. We cannot very well suggest, as the requirements of persons are so various; your best way will be to look at some of the forms which are offered for sale. 4. It is best to do it before.

C. M.—Under the circumstances you should have no difficulty in obtaining the kind of appointment you require, and you should either answer advertisements, or advertise yourself.

Lens.—No. 1 is about $\frac{f}{30}$, No. 2 about $\frac{f}{18}$, No. 3 about $\frac{f}{12}$, No. 4 about $\frac{f}{10}$, and No. 5 about $\frac{f}{8}$.

A. Griffiths—1.

Nitrate of silver	10 grains
Water...	1 ounce

Add enough of a saturated solution of cyanide of potassium to redissolve the precipitate which is formed at first. 2. From any copper plate printer or dealer in printing material (Winstone, 100, Shoe Lane, London). The cost should be less than one shilling. 3. About one-eighth of an inch, but they are mounted on wood blocks so as to bring them up to type height. 4. A Winchester quart; but do not forget that a Winchester quart bottle holds half-a-gallon.

G. W. V.—It would take far too much space. You must consult some old book on photography.

Progress.—1. If you can get a quick plate, it will be all the better. 2. On the whole you will find the next size larger lens to be rather more suitable, but the advantage will not be very great. 3. The ordinary pyro and ammonia.

J. Bullock.—Thank you; use has been made of it.

A. Revon.—

Alum	1 part
Citric acid	2 parts
Water	10 ,,

A. Y.—The ordinary carbon tissue. Obtain the Autotype Manual, published by the Autotype Company, 174, New Oxford Street.

Amateur.—1. Nothing is better than very thin glue, to which a little methylated spirit has been added. 2. The exposure must be increased in proportion to the relative areas of the stop. Thus, with a stop of half the diameter (or one-fourth the area), the exposure must be increased four-fold

A. E. S.—It appears to be a basic chromate of lead, and as it is very imperfectly fixed to the paper, there will be no difficulty in removing the greater part of it by a sponge and warm water. 2. We do not know of any method for doing this.

R. T. Wall.—Can you send us a sample of the varnish, and we will try the experiment? It should be of great value for the purpose mentioned.

R. H. Preston.—Good use has been made of it, as you will see.

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THE PHOTOGRAPHIC NEWS.

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BUFFALO MEETING OF THE PHOTOGRAPHERS' ASSOCIATION OF AMERICA.

On the morning of the 14th inst. this Society was called to order in the State Arsenal, Buffalo, by the President, Mr. Landy, of Cincinnati, there being a large attendance. The meetings lasted four days, and the interest was well sustained. It was a noticeable feature throughout that there was a greater attention to matters of general photographic interest than of routine business, as of old. There was a fine display both of photographs and apparatus.

The next meeting is to be held in St. Louis, Mo., the date of meeting not yet being definitely fixed. Ten or eleven gold medals are to be awarded for the best exhibits, and it is expected that the meeting will be an unusually successful one. The new President is Mr. W. H. Potter, of Indianapolis.

We here append some of the papers that were read at the Buffalo Convention, which was certainly one of an unusually successful nature.

SCIENTIFIC DEVELOPMENT.

BY COL. STUART WORTLEY.

It will be remembered how great was the variety of developers introduced from time to time in the old wet process, but it is nothing to the proposals that have been made as modifications of dry plate development by the great army of photographic "faddists." I have before stated in print, and I repeat it again now, that the manufacture of a sensitive dry gelatine plate is a matter of absolute certainty; but that where talent and progress are shown is in working out a system of development modified at will for every class of negative and for every different kind of subject.

I have carefully investigated all developers that have been proposed, in which there were reasonable grounds for hoping that an advance was made, but I am bound to say that I have never found any developer for all-round work equal to that composed of ammonia and pyrogallic acid. I have found a prejudice existing in certain quarters against this developer, from the fact that many of the formulæ give ammonia and bromide of potassium ready mixed together as one of the solutions. Now, this method of proceeding at once takes away the whole value of this method of development; it is absolutely essential that the pyrogallic acid, the ammonia, and the bromine of potassium, should be in three separate solutions, and the developer thus capable of being varied at will according to the negative that has to be formed through its influence.

My own method of using these solutions is to have a standard solution of the strongest ammonia, 1 ounce to 9 ounces of water, every 10 minims of which will thus contain 1 minim of strong ammonia; the solution of bromide of potassium is 15 grains to the ounce of water; while the pyrogallic solution contains 8 grains of pyrogallic acid to the ounce of water. But now comes one modification on which I lay the greatest stress, and that is the addition of sulphite of soda to the pyrogallic solution.

The sulphite of soda solution is thus made:—Take 1 ounce of pure sulphite of soda and dissolve it in 12 ounces of water, then, by the addition of citric acid, remove the alkaline reaction from the soda solution by adding the citric acid little by little till blue litmus paper is turned faintly red; this is a standard solution, and can be kept ready for use at any time.

To make the pyrogallic solution, one precaution has to be observed, and it should be made as follows:—Weigh out 240 grains of pyrogallic acid and dissolve it in about 4 ounces of the above sulphite of soda solution, and then add water till you have 30 fluid ounces of solution. Be sure to mix the pyrogallic acid with the sulphite before adding water. Now, here you have a pyrogallic solution which will keep any reasonable time in working order, and your three solutions of ammonia bromide and pyrogallic acid are thus always ready for use at a moment's notice.

There is one addition that may with advantage be made, and that is a drop or two of glycocol to the finished developer, made according to the formula which I published some years ago. Its tendency is to give a richer tone to the negative, and to improve its printing qualities. In my own practice with instantaneous pictures, I find it to be of the greatest use to give the plate a preliminary wash with water containing a minim of ammonia to every 2 ounces of water.

It certainly increases the sensitiveness of the plate to the subsequent development, and since the time when I published this proposed modification, I have had ample testimony given me as to its great value.

With standard developing solutions, such as I have proposed, any class of picture can, with certainty, be made, and I need hardly tell those who understand dry plate photography that it is impossible to develop all different classes of subject with the same developer, and really to do justice to the development of each plate.

I may mention, in conclusion, that a good standard developer for an average negative, composed of the above solutions, would be of the pyrogallic acid solution $1\frac{1}{4}$ ounces, of the bromide of potassium solution 30 minims, and of the ammonia solution 25 minims.

From this, which I may call a standard developer for an average negative, all modifications should start, bearing in mind that the pyrogallic acid has the greatest influence in increasing density, and that when you have to photograph white dresses, or houses, or other brilliantly-lighted objects, the proportion of pyrogallic acid must be considerably reduced; and it should be remembered that if prolonged forcing of an instantaneously exposed negative should be required, it is wise, after the first one or two additions of ammonia, to put a drop or two of bromide with the subsequent additions, in order to keep the shadows clear; and if the negative, in coming up, seems to be weaker than it ought to be, some of the pyrogallic acid should also be added.

I give these hints, as I have generally found that amateur friends who have consulted me as to difficulties, have continued to add ammonia with the object of forcing a slow development, and have omitted to remember that pyrogallic acid and bromide are also most important factors in scientific development.

DEFECTS INCIDENT TO THE CONSTRUCTION AND USE OF RAPID COMBINATION LENSES.

BY J. TRAILL TAYLOR.

I shall confine myself to principles, not individual productions, as none of the cemented and so-called rapid lenses of the present day differ in any essential respect from each other or from that of 1866, which was evoked into being by a Munich professor on the requirement of the late Dr. Van Monckhoven. Already this lens bears from twenty to thirty different names, each dealer or each manufacturer introducing modifications in curves or form of mount to warrant the coinage of a special designation.

The distinctive characteristic of the objective is that it is *aplanatic*, or capable of being employed with full aperture, like a portrait lens; it is *rectilinear*, reproducing an object without curvilinear distortion; it is *symmetrical*, its front and back lenses being similar. The virtues of this lens are numerous and well recognised. There is, therefore, no need that I should treat of them. I therefore speak of certain defects met with occasionally in the productions of even the very best makers of this rapid and most useful class of lens.

A serious element of danger is to be found in the endeavours of some makers to produce lenses having what opticians term a greater intensity ratio than in those of others. The aperture of a lens is limited by the density of the glass of which it is formed. The large aperture of the modern aplanatic doublet is owing to its being formed of glass of much greater density than the ordinary optical flint and crown. The greater the density of the glass, the more may the aperture be increased, while still retaining those qualities for which this lens is famous, viz., good transmission of oblique rays.

But glass of this enhanced degree of density is unfortunately liable to decomposition with more or less rapidity. It seems impossible hitherto to get glass makers to prepare glass of great density in which, if it does not possess a well-marked degree of colour from the beginning, it soon acquires it by time, hastened by the action of light.

I have never yet known glass of this nature which, if ground into a lens, would not show a well-marked degradation of colour if removed from its tube, and pressed down upon a sheet of white paper. Rapidity of action obtained at such a cost is delusive. It is quite possible by employing flat curves to make a lens of safe glass which will define well in the centre of the field, and for a moderate distance away from the centre; but the definition invariably gives way rapidly towards the margin.

A well-known London optician once submitted to the notice of the Photographic Society of Great Britain, three lenses all of the same class—that now under consideration. One of them represented an aperture of about the eighth of its focus, a second a sixth, and a third a fourth. The first of these he had manufactured in the regular way. Knowing that at that time a continental maker of a justly celebrated name was introducing a lens reported to have greater illumination, I inquired why he allowed these quick-acting lenses to remain in abeyance. "Look here," he said, proceeding to a cupboard, from a shelf of which he brought down certain lenses which he handed me for examination; "these are the individual lenses I submitted to the Photographic Society. Observe how the glass has changed colour! Anticipating this, I would not risk my reputation by making one for sale." The discolouration was of a most pronounced nature. The deduction from this is obvious: Let those who possess lenses for which special claims for rapidity are made, be careful to keep them under cover from the action of light when not in use, as the glass of which they are made contains so much lead or analogous density-conferring bodies as will ensure serious discolouration, and consequent slowness of action before many years have elapsed. A lens having what may be considered a rather small aperture may work more quickly than one having an actual aperture larger in relation to its focus.

Lenses prepared by the very best and most fastidious manufacturers occasionally show this defect, and in two lenses ranking in precisely the same category, one may have it, and the other be quite free from the defect. This often arises, singular as it may seem, from the very perfection to which lens-testing has been carried in the better class of manufacturing establishments. A watch dial placed at a certain distance forms the test for definition, and when the central or axial definition of the lens has been found to be correct, then is the eye-piece (one of great power) by which the image is tested removed in a line strictly rectangular to the axis until the image of the dial transmitted obliquely is found in line. It is here where the skill of the examiner is displayed. He has to adjust the lenses so as to strike the golden mean between flatness of field and astigmation. It is a peculiarity of all combinations of lenses that if the field be made too flat, this quality is secured at the expense of astigmation, or the inability of the lens to transmit an oblique ray under circumstances giving absolute sharpness. For example: If the object to be delineated near the margin of the plate be a white cross upon a dark ground, it will be found that when the vertical lines are focussed to sharpness, the horizontal lines will be out of focus, while by racking the lens in or out, to ensure the sharpness of the horizontal line, the vertical one goes so far out of focus as in many cases to vanish altogether, the full aperture of the lens being employed.

With the most perfectly-corrected lens it often happens that when employed for out-of-door work, and used with a small diaphragm, there will be a distressing spot of luminousness on the centre of the plate. This is not peculiar alone to the cemented rapid lens, but was a well-recognized characteristic of the now unused globe lens. It is a peculiarity of almost every existing portrait combination, and sometimes also of single landscape lenses. When lenses are used in the studio for portraiture or groups, it is never seen but when a bright sky forms a portion of the included subject; then it is apparent, but mainly so only when there is a small stop, for the smaller the diaphragm the more pronounced will be the flare or ghost-spot.

I observe here, although slightly outside of my subject, that there is no lens made, even the simplest magnifying glass, that has not two foci, one of them the principal focus, caused by the refraction of the transmitted rays, the other being much closer to the lens, and caused by an internal reflection to which a portion of the light has been subjected. This it is which operates in the case of a ghost produced by a single landscape lens, and it is remedied by displacing the diaphragm from its position to the extent of from a quarter to a half inch, the ghost in such a case being the image of the stop, which is in one conjugate of the abnormal transmission, the sensitive plate being in the other. Disturb the relation of the first, and the second vanishes.

This explanation does not meet the case where a combination is concerned. Premising that the ghost is never discernible when working inside a studio, but only when operating outside with a moderately bright sky, or when taking the interior of a church or similar building, I here repeat what I have recommended as being the best means by which to discover whether a lens possesses this propensity. Screw it on to a camera, and bring it into a room lit by a gas flame. Go to a distance of several feet, and examine the flame on the ground glass. The image will be sharp, bright, and inverted. Now move the camera slightly, so as to cause the inverted image to be a little to one side of the centre of the focussing screen, and in nine cases out of ten there will be seen a ghostly image at the opposite side of the centre. This secondary image is non-inverted, and upon rotating the camera it moves in the opposite direction to the primary image. The nature of this secondary image or ghost, and the cause of its formation, may be examined in the following way:—Move the camera so that the ghost shall be near the margin, and then, placing the eye in the line of that image and the lens, withdraw the ground glass, when the posterior surface of the lens will be found to be quite luminous.

That the false image is, in this case, caused by a reflection from the back surface of the anterior lens, is demonstrable by unscrewing the cell containing it until it almost drops out of the tube, and then, keeping an eye upon both the primary and secondary images on the ground glass, move or slightly wriggle the front cell, which by its being nearly unscrewed may now be easily done, when it will be seen that when the primary or legitimate image of the flame remains motionless, the ghostly image caused by the reflection from the front lens dances about all over the plate. But observe, further, there is a certain distance between the front and back lenses at which this secondary image is sharp and bright, and in proportion as either the front or the back lens cells is screwed in or out, so does the image become more attenuated and expanded, till at last it ceases to be seen altogether, while all this time the real image is not seen to suffer in any way. This tendency of the ghostly image to pass out of focus with such extreme rapidity, upon separating the lenses by a few turns of the screw, or by making them come nearer to each other, provides the means by which this evil may be cured. A rapid doublet may be excellent for portraits, groups, copying, and every other purpose, and yet break down when employed with a small stop in landscape work.

Within the past few weeks I am aware of a lens, recently imported from manufacturers of the highest eminence, which, while perfect in every other respect, was defective as regards the ghost. As the result of careful testing in a temporary tube, it became apparent that a cure could be effected by shortening the tube about an eighth of an inch, which was done without its flatness of field being impaired in any discoverable degree.

The most perfect mount for lenses of this class would be that in which the privilege was afforded the user of making an adjustment to suit work of any nature by the separation of the lenses to a very limited extent, so as to be used under the most perfect conditions for the special work in hand. With a lens of about eleven inches focus, a sliding adjustment of half an-inch has been adopted with beneficial results.

THE DIGNITY OF PHOTOGRAPHIC ART.

BY E. L. WILSON.

Before I can say much for the dignity of photography, I must, I suppose, establish the fact that photography is an art, and that its productions may be justly considered as works of art.

I must, I suppose, use somebody's artisticy measuring rod as my standard. I will choose one of the sort that is popular among painters, and one whose honesty cannot be questioned.

During the past winter it was my privilege to listen to a very learned talk by the distinguished orator, Monsignor Capel. His topic was, "How to look at pictures." He began by explaining his understanding of what "Art" meant, and then tried to reveal its rules, and to explain how to understand whether a picture was or was not painted according to the said rules. He maintained that art does not consist in simply representing the person or scene as it is, as photographers and low grade artists attempt to do. "Many think a likeness, or an illusion, to be the first thing in art; but," said the rev. orator, "illusion is not art. Instantaneous photography pictures you just as you are, but this is not art. A photograph can never be a work of art, though it may be artistic. And this is true of a painted portrait. It may have form, feature, colour, and be true as to every detail of face, hair, body, &c., and yet it may in no sense be a work of art. You ask me, then, in what does art consist? A French author has answered the question for us, in saying that 'style is the man.'"

This may illustrate what I mean by art. The portrait painter of the first order does not represent upon canvas the form, figure, and appearance of the subject, but he studies the life, temperament, and character of the one he desires to paint, and fills himself full of the ideal man; and this he forms out in living thought, and so his picture is a representation of his own conception, a creation of what he has conceived the person to be. A second or third rate artist, however, will not produce a picture that is lifelike, though he may delineate carefully, and particularize every detail. Furthermore, declared the learned orator, and with consummate truth in every work of art, the mind of the painter must be so expressed that we discern both the thought and the style of the artist. And in order to appreciate properly the work of the great masters, we must place ourselves in their position, and endeavour to possess ourselves of the great thoughts which were in their minds. Raphael never painted but to get faith in a dogma. In Titian's famous compositions we could always discover the effort to secure sympathy between the figures and nature.

And thus far only did our orator reveal to his audience the rules of art, not advancing one thought as to the rules and forms of composition, or of chiaroscuro.

I maintain, in face of all his arguments, in face of his assertion that "a work of art is a conception, but that a photograph is only a likeness," that a photograph can be both, while a painting is very rarely both.

During my work at the World's Exhibition last winter I had no sky-light; but when people came to me for likenesses, I asked them out in the beautiful park, by the lake, or near the rustic bridge, or beneath the moss-hung live oaks, and there, in groups of my own conception, arranged them agreeably to the rules of art as I had studied them, and made a likeness of the whole conception.

Monsignor Capel, though he may be a fair amateur painter, and a clever amateur photographer, need not leave his own native England to discover some grand works of art in the conceptions of H. P. Robinson, of Tunbridge Wells, painter and photographer, likeness maker and artist "in every sense."

When we look at a picture, we should become *one with it*. It will talk to us, and we may talk to it. We first examine lines, its light and shade, and decide whether or not the rules of art are complied with. And then we endeavour to discover the conception of the artist, and study out to what extent he has secured what he attempted.

How often have we seen the same subject treated in widely different ways, by various painters; how piously photographers will pose and light the same person.

The moment I look upon a photograph which approaches a work of art, I involuntarily begin to measure it by the rules to give it as to the intention of the "likeness" taken who produced it, just as surely as I do when I am feasting in a gallery of paintings.

And now, having, as I believe, established the claims of photography to a place among the arts, what, may I ask, do we understand by the dignity of our art? I maintain that it is that element which consists in its being thoroughly believed in, respected, and sustained by those who practise it. That its dignity is commensurate with the amount of dignity thus imparted to it by the parties mentioned, in the ways mentioned, and by the quality of work which they produce by its help. I need not add even a partial list of its accomplishments in order to maintain its dignity. We all know how the stars are caught by its aid as they whirl through space; how the pale-faced moon is mapped for us; how the mysteries of the ages are revealed; how science is helped by it; how art and industry employ it as a right-hand workman; how it brings the beauties of the world to every door; how it gives the most truthful representation possible of "the human face divine;" how it almost creates.

With all its works and ways we are familiar, they alone would uphold its dignity beyond all question if those who practised it do their duty just as well. That, alas! I fear they do not. It seems to me that I never knew an artist to hold so low a position in the public estimation as it does now. It seems to have become so cheapened as to have scarcely any market at all.

The idea seems to be growing that photographs cost nothing to produce, and the ignorant patron cannot, or will not, regard one quality of productions worth more than another. He holds that because he sees cheap prints hawked about the streets, that good ones cannot cost any more, and the artist photographer must argue his cause every time he asks a living price for his work. This is indignity, and not dignity.

A PORTABLE SUPPORT FOR WASHING GELATINE PLATES.

BY W. M. ASHMAN.

Starting with a plate fresh from the fixing bath, we have a skin of gelatine swelled to its full extent with an aqueous solution of sodium thio-sulphate, and possibly plus a portion of the double silver and sodium thio-sulphate salt. The former we know to be soluble in water, and the latter is only soluble in an excess of the first named. For this reason it is customary for us to allow our negatives to remain a longer time in the fixing bath than is necessary to dissolve out the visible silver bromide.

From this skin we desire to remove all traces of the fixing salt, leaving it swelled with water or other suitable liquid, free from chemical contaminations of a harmful nature. The question then arises, which is the easiest and, at the same time, the most expeditious method of bringing this state of things about? Obviously the plan of placing a negative film uppermost at the bottom of a vessel of water has little to recommend it, for, as everybody knows, a stagnant pool is not the best place to cleanse anything. Another plan, that of passing a stream of water over the surface, possesses advantages, as we know, over the last named, but the stream needs to run a long time before there would be sufficient dilution to permit complete removal of the salts from the under surface.

Soaking plates in vessels fitted with vertical grooves is an improvement upon the foregoing, but the plan, although in general use in Europe, does not reach theoretical perfection, neither can a greater number of plates be washed in the same space than by the method I desire to bring under your notice.

All fixing salt eliminators, except alcohol and water, have a destructive influence upon gelatine, which renders their employment a matter of some delicacy, and unfit for general commercial application; therefore, unless we discover some other specific, we must be satisfied to employ dilute alcohol or water for the purpose; of the two the latter is preferable, and, until some one proves to the contrary, I take it that a method of supporting films horizontally in contact with a body of water in gentle motion is as nearly correct in theory as we can get at it. The frame I use, which may be as easily carried as a cabinet photograph, will, when extended and fixed, support six half-plate negatives (English size), and can be made by anyone in a few minutes. The films are placed downward, and are not likely to get damaged, because the sharp edges of the glass plate are in contact with, and wedged between, the three supporting pillars, and may with safety be placed in a running stream of water, until it is considered the negatives have had sufficient washing, when the frame can be placed in a current of air, and the negatives will dry without dust settling upon the surfaces.

It is convenient when travelling to have zinc tanks large enough to take one or more frames of this kind, and they might be made in the form of packing cases utilizable for the protection of lenses, bottles, &c.

If a metal exit tube is soldered in the base, or perforations made at the lower corners, so that a constant downward withdrawal of liquid occurs, the same being replaced from a faucet, about sixty minutes of such treatment would be found sufficient to effectually wash a thickly-coated gelatine plate.

Very little consideration will show that any soluble matter a negative may contain—such, at all events, as we are accustomed to deal with—must, by the natural law of gravity, pass through the gelatine into the water below, converting the film, as it were, into a kind of septum, and thus practically washing by dialysis.

REPORT ON THE PROGRESS OF PHOTOGRAPHY.

BY C. GENTILE.

Many would claim that there has not been any marked advance in our profession since our last Convention. It is true we have no new inventions to chronicle, but that photography progresses in spite of exceedingly dull times is evident. There is greater knowledge of photography among the public than there ever was. Photography is in greater demand than ever. It is now introduced in nearly every branch of business and profession. Take, for example, our own city of Chicago. The police department has added a photographic outfit as a necessary appendage; the detective camera is now called into play when any important event occurs.

Our hospitals are not now considered complete unless a skylight is available to enable doctors to photograph their "brilliant" cases, which they most successfully do. I predict it will not be long before every newspaper of any importance will have a photographer attached to their staff.

Amateurs are rapidly increasing in numbers all over the country; they are forming numerous societies, which have shown in the past year that they are willing to work harder than our professionals are willing to do to disseminate freely the information they possess. The amateur frequently has more leisure than the professional, and is imbued with an ever-increasing desire to obtain "more light."

The professional is naturally more jealous than they of his little secrets, if he has any. We expect to get the majority of our improvements from amateurs, because if we look back into the history of photography, and consult the authors who have written on the subject of photography, and from which our knowledge is derived, we find that the majority of them were amateurs, and we see no reason why we should expect to learn less from amateurs now than formerly.

It must be admitted by all that during the past year the majority of papers read on photography have been by amateurs, showing conclusively that the amateur will occupy a prominent rank in our literature, as they have always done in Europe.

Many improvements have been made in the manufacture of dry plates. As a matter of course, the past few years' experience has taught the manufacturers many lessons, which they have not been slow to avail themselves of. There has certainly been a most marked reduction in the prices of plates, which has benefited the photographer.

Commercially the past has been a bad year for photographers. The stagnation has been universal in Europe, as well as in this country: however, let us hope for better times in the near future.

In Europe recently a most successful exhibition of works by amateurs has been held, and at a day not far off we shall expect to see a convention of amateurs held in the United States.

Among other improvements in photography we must not omit to mention that the Eastman Dry Plate and Film Co. has introduced a paper negative, and also a film which is stripped from its support after development.

Many improvements have been made in the manufacture of bromo-gelatine printing paper for positives, and we may look for still greater improvements in the materials to be used in their manufacture.

There is no reason why we should not give greater attention to the making of positives direct in the camera, especially as low rates for photographs predominate in many of our large cities. Ere long we may expect to be furnished by our stock dealers with plates ready coated with an emulsion, so that we need not resort to the bath and collodion for even a tintype. We have seen a good tintype made in this manner; consequently we should not be surprised to see the much despised tintype brought prominently to the front.

The past year has not been remarkable for the number of improvements that have been introduced for developing dry plates, but doubtless much valuable information on this subject will be obtained during this Convention.

Great advancement and much skill and ingenuity are observable in the manufacture of apparatus used by members of our profession. The great increase in the demand for light portable field cameras has made our manufacturers vie with one another until they have almost arrived at perfection, as will be seen in the varied and magnificent display at our Convention.

In conclusion, it forcibly occurs to one who studies the progress of photography in this country, that greater advancement would be made in our knowledge, and also a better feeling would exist among the fraternity, if some means could be devised to induce the leading photographers in our cities to attend the meetings of the photographic societies, and to devote a little of their time to the promotion of the best interests of the profession from which they make their living, and to which we all owe a debt.

THE BACKGROUND: ITS USE AND ABUSE.

BY G. M. CARLISLE.

That the background should be subordinate to the figure I have no need to announce. This truism has been so oft repeated that the veriest tyro must be aware of its importance; yet we see every day the effects of miserable carelessness in the use of both interior and exterior backgrounds.

If one has not the time or inclination to exercise proper care in adapting effective grounds to his model, it were better he have none. A plain ground shaded gradually from dark upon the one edge to light upon the opposite edge, and so placed behind the model as to bring the face in proper relief. By placing the dark portion of the ground opposite the lighted side of the face, never fails to fulfil its mission, and is easy of management; while the elaborately painted ground, unless carefully managed, destroys all harmony, and exposes ignorance of rules of composition, or carelessness of treatment.

How often we see prints from negatives, beautifully lighted, skilfully finished, and properly printed, yet the outline of the face so identified with the ground as to be entirely lost. This is so common an error that there are few photographers in the profession who do not every month in the year send forth to the public this glaring evidence—not of their ignorance, but of their carelessness in the use of backgrounds.

Should we have frequently by discerning patrons finished pictures turned back upon our hands for this inexcusable fault, we would, by this, having our attention called to the matter in a way to touch our purses, be benefited by the loss. I am aware that photographers of experience, possessing a practical knowledge, would scarcely need to be told that a contrast between the outline of face or figure and the background is absolutely necessary; yet a reminder of this important fact cannot be out of place when we see so frequently evidence of a neglect on the part of even veterans who fail to put in practice what their experience must surely have taught them, but frequently allow glaring errors to creep into work that would be condemned very readily by themselves if seen in the establishment of another.

There was recently brought to me a photograph to be copied, which was fully up to the average in all particulars save one. A landscape ground had been employed, while the subject—a child—was posed upon a carpeted floor, reclining against an upholstered chair. By converting the chair into a rock, and the tapestry carpet into a grassy bank, we were enabled to stop a lake from flowing into the foreground—of which there seemed great danger in the original—to the destruction of both life and property. That a man capable of making any kind of photograph should use a landscape ground in connection with a carpet seems strange indeed.

Another glaring error, too often seen in otherwise good photography, is a contradiction of lighting: the model lighted from the left, while the design of ground is lighted from the right, and *vice-versâ*.

During the first years of my experience with the camera—1857—it was impossible to obtain, painted by order or in the market as merchandise, a practical or useful background; but to-day we are favoured with a variety that leaves nothing to be desired, and no excuse can be made for not possessing and properly using as an auxiliary the backgrounds best adapted to your light and requirements.

In selecting a ground, one too pronounced should not be chosen. Many have an impression that a ground, however sharply painted, will be all right if removed far enough back to be out of focus. Such is not the fact. Experience has shown that a ground properly painted should have no hard or decided lines, but should be merely suggestive, with a penumbra to all lines and figures, which should always be in proportion to what the model must necessarily be on a given size mount.

Careful attention to line of horizon should be exercised in selecting backgrounds, a large per cent. of which have their line of horizon too high, which should not be more than one-fourth the distance from the floor to top of painting. Figures are frequently photographed larger than they should be when placed in front of landscape grounds or interior designs. A lady taller than a church spire or tree is never seen except in a lying photograph. Imagine a gentleman photographed standing near an open door or arch, and his figure represented several feet higher than the door. We have all seen this error in photography. Should it not be avoided? I once saw a photograph of a lady representing her as walking by the seaside, a full-rigged ship so painted in the background as to be in danger of tearing away the lady's back hair. Thus the most ridiculous things do we sometimes witness in photography.

Injustice is frequently done the photograph or negative in printing. A portrait printed from a negative with a ground so dark as to show a marked halo in a vignette with defined edge is, to say the least, in bad taste. The gradation of a vignette, whatever the shade of ground, should never indicate the means adopted to produce the result. So far should the mask be raised from the negative that no imprint of its shape or design is visible in the print. Therefore a ground too dark should not be chosen for negatives that are to be vignetted by any process of photographic printing yet invented. Tropical plants, Italian sunsets, or gorgeous flowers are all very well, but a portrait of a lady dressed in furs surrounded by such accessories can hardly be declared *apropos*. The photographer who is guilty of such an application of backgrounds can possess but little art feeling, and a less knowledge of the eternal fitness of things in general. To those never guilty of such oversight this charge cannot apply; but should there be any present who have not hitherto given the background proper and careful consideration, I would urge upon them the importance of so doing at once.

There are not so many who have written their names in letters of gold upon the scroll of fame but that there is yet room for your name beside them. Photography in all its branches requires great care and watchfulness; but in no department is better judgment required than in the adaptation of surroundings to the model or subject to be photographed. The general public are becoming educated up to this important feature of photography.

Bear in mind that the portrait of a humble hod-carrier may fall into hands of those whose good opinion of your work it is desirable you should obtain. Eternal vigilance is therefore the price of success in this as well as any other business; and so long as you make good use of your eyes, hands, and the mental faculties given you, they will minister to your necessities, provided, however, you have the courage to charge a fair and adequate fee for your time and skill, as do men of other professions.

No business man with an eye single to his own interests will fail to note the signs of the period. If the public become accustomed to pictorial effect in photography, they must be indulged; therefore possess yourself of a variety of grounds, but exercise the most judicious care in their use.

PHOTOGRAPHIC PORTRAITS *V.* CAMERA PICTURES.

BY J. L. HURD.

We have become so familiar with the results of photography as, perhaps, to have lost in some degree a sense of its importance, and may fail to realize the value of the discovery of the principles which underlie it. Forty-six years will cover the period from the first crude Daguerreotype to the present hour. Even the first experiments of which we have any knowledge, looking in this direction, are embraced within the present century.

We designate the period previous to the Christian era by the abbreviation B.C. Pardon me if I seem to parody this by the suggestion that B.D. should stand for "before Daguerre." The sun picture not only placed portraiture within the means of the masses, but gave results which before had been but dimly hinted at by the best artists. I allude to the accuracy and delicacy of expression. However much we may admire the canvases of our best portrait painters as works of art, they never successfully rival the productions of our best photographers in depicting the emotions conveyed by the face which has been their subject. Nor is it possible, for the brush paints clumsily in comparison with sunlight. When the boy whistled in school, he excused himself by saying that it whistled itself. Photographic portraits produce themselves in one sense, as he who steps before a mirror is duplicated with the utmost exactness as he is at the moment. This fact has led to a great misapprehension on the part of the public. It is thought that photography is simply chemical and mechanical; that it goes with a crank, like a grindstone; that any man who owns a camera and possesses the secret of dark-room manipulations is a photographic artist. A landscape painter said to me, "Photographers have the same instruments and use the same chemicals, do they not? What, then, prevents one man from making as good pictures as another? I see that they don't, but I fail to understand why." I replied, "You knights of the brush all use the same canvas, and brushes, and paints; why does one man's work have greater value than another's?" "That answers me," he said; "but it never occurred to me before that the photographer had much to do with it." This prejudice is very deeply rooted in the minds of the community. The great essentials of portraiture—the study of the subject, the lighting, posing, the subordination of subordinate things, and general harmony of the whole—are matters that not one in a thousand reflect for a moment belong at all to the production of photographs.

It is told of a man who had his portrait painted by an artist of distinction, that, being no judge of art himself, he bethought him of a friend, a house painter, who surely ought to know, if anybody. The critic scanned the portrait, and finally said, "So, you paid that man $150, did you? I assure you there isn't twenty shillings worth of paint on the whole canvas." This is the whole thing in a nutshell. Are we selling the stock that enters into our productions, or is it our skill that we are offering the public? In the craze of cheap picture-making that is upon us, it would seem to be the former. We have achieved much—how much the visitor of this Exhibition can judge. But there are causes operating to degrade our art "that make the judicious grieve." Perhaps I can best illustrate this by stating what seems to me to be the difference between camera pictures and photographic portraits. Camera pictures have a high popularity because they are cheap. They are made generally by men who have a level head for business—men who have organized a factory, if I may be allowed to so express it, for the production of photographs. The requirements of the public are carefully kept in mind. Brilliant chemical effects are not hard to attain. Retouching—the chief use of which is, as generally employed, to make people's pictures look less like them—is done (or overdone) with that free and easy defiance of the modelling of the face which makes the heads of old and young suggest nothing so much as a billiard ball; and thereby the public is pleased and flattered, the picture-maker wins the good opinion of *old ladies of both sexes*, and the shekels flow into the treasury. An establishment of this kind, well organized for business, and giving their sitters a set of stereotyped positions, can easily handle from thirty to one hundred people in a day.

To make photographic portraits, the conditions are essentially different. The operator should be an artist, a man of culture and refinement, acquainted with art principles and all the resources of photography. He should have that subtle feeling for portrait effects which every man is not born with. Every sitter should be a study, and the sitting accomplished in the most leisurely way. If your appointment is with a stranger, seek to establish a little acquaintance, for until the restraint that exists between strangers in the first moments of intercourse has disappeared, the subject will not be at his best for a picture. Suggestions as to attire should be freely offered, if anything is worn that will mar the effect. There are, with most people, many little things that mark their individuality besides the lines of the face, the postures they assume, the way of holding the head, &c. : all these things should be noted before you attempt to secure a pose. A half-dozen plates are none too many to use, and two hours none too much time to devote to your client. You are thus enabled to employ various lightings, try different views of the face, and different attitudes, taking your subject in repose and action, and thus assure yourself that you are getting the most favourable result possible. Compare the proofs from your plates, and if you find that anything more to your satisfaction can be obtained, secure another sitting. It is only when you are fully satisfied yourself that the sitter should be consulted, and only proofs shown from such plates as you are willing to work from.

The further operation of retouching the negative and printing from it must be carefully supervised by yourself, or all your pains and skill may come to naught. The soft, beautiful effects that a well-handled gelatine plate will afford, leave but little necessary working of the negative in a majority of cases ; and that, I need not say, is the work for an artist. No cause, it seems to me, contributes so much to make abortions of photographs as the retouching we usually see. A distinguished portrait painter lately said that the photographs of to-day were worthless as aids to painting portraits, because of retouching.

It may be said that no more than three or four sittings could be made in a day if such methods as I have suggested were adopted. That would be quite enough. Make a charge for your services that would be made by any professional man in good repute for the same outlay of time. The ability and training required to make one competent for such work is not a whit less than that required for any professional pursuit. We pay a lawyer $50 or $500, according to the importance of the case, for an opinion. We know that we are paying for skill for special attainments.

The public will pay for the exercise of great talents and skill in the landscape painter and the portrait painter. The trouble is, photography has never been recognized as an art. I am afraid we must admit that it has not risen to that dignity of art, as it is generally practised, that might be wished, nor do I believe that every man engaged in it could practise it in the manner described here, successfully, or that every hamlet in the land offers a field for such work ; but I believe there are a dozen cities between the two great seas that wash us on either side, where an artist in photography would win a position in a few months. It seems to me that it must be some such departure as this that will rescue photography from the low estate in which it is hastening, financially and otherwise, and I venture the prophecy that in the future, perhaps not far distant, either, there will be photographic portraits hanging upon the walls of affluent homes, where taste and culture preside, which will not be spoken of as "only a photograph," but will be prized for their art value as well as for their qualities as likenesses, and the artist honoured and paid for his genius and skill.

THE HANDLING AND DEVELOPMENT OF DRY PLATES.

BY W. H. POTTER.

The subject will be briefly treated of under three heads: the man, the light, and the development.

And first, in regard to the man. No great thing is achieved in a rush ; there is a great deal of preparation, a succession of events preceding a crisis or a great achievement ; so the guiding hand, and the governing will, to be successful, must be disciplined by previous habits and modes of action. A man should seize every effort and opportunity for his own improvement and that of his productions. He should also remember that low grasping ultimately defeats itself, and that those who labour solely for low material interests seldom receive the prize. Neither will he delight in stained hands, besmeared clothes, and dishevelled hair; nor will he rush hither and thither, hoping thereby to convey the ideal of a driving business and of his own self-importance.

That a man's judgment and knowledge determine the quality of his negatives, is sufficiently demonstrated by the knowledge that his negatives differ from every other man's, although made from the same emulsion and developed with the same kind of developer.

The Light.—In the attainment of perfect chemical results, the management of the light is of supreme importance. It matters not how perfect the plates, the lens, or the development may be, if the lighting is defective, the result will not be a first class negative ; for in such cases, with the best materials, only a map representation can be obtained.

In portraiture, should one so light the face as to have crescents in the eyes, with possibly stars in the pupils for high lights, perfect modelling or definition is out of the question, because the same flood of light which has made a caricature of the eyes has utterly obliterated the delicate curves about the most important features of the face.

This criticism is made because too many photographs, even to this day, have these defects; and judging from these, too many what are considered first class galleries, use the same quantity of light for dry plates that was found absolutely necessary for the wet. This charge lies mainly against those who, having clung to wet plates till they were compelled, by the force of circumstances, to use the dry, have gone off on a tangent trying to make all sorts of different positions without head-rests, and to achieve this, flood the subject with so much light as to sacrifice definition to effect.

But it is now possible, without risk of the subject moving or of under-timing, to model up the subject with light somewhat as a painter or sculptor would under similar conditions. This can readily be accomplished if the light is brought under absolute control by properly curtaining the skylight. For a twelve-foot light there should be at least two curtains for the side-light, and two respectively fastened at the top and bottom of the top light. With such an arrangement the light may be so adjusted as to bring the high-lights in the eyes to a mere point, and, if at the proper angle, the whole face will be so lighted as to give good modelling, and, with proper timing, good definition.

Under such circumstances the pupils will not contract, nor will the subject frown. But what light you have, have it clear and brilliant, as it is folly to talk of brilliant chemical effects without a brilliant light. Proper or full timing will give all the softness required. Use rapid plates, and light boldly for relief and brilliancy. Silver plates demand too much light or too prolonged timing to get the best results as to either definition or expression.

In regard to the exposure, the only safe criterion is the relative brilliancy of the images on the ground glass ; and one should school himself critically to judge of the brightness and colour of the image ; decide that this subject requires so many seconds, more or less.

The Development.—This shall be confined to my present methods of procedure, and stated as concisely as possible.

Two kinds of development are used :—

The ammonia pyro.

Sulphite of soda (cryst.)	6	ounces
Bro. of ammonium	1¼	„
Bro. of potas.	2	„
Pyro	4½	„

Dissolve thoroughly, and add sulphurate acid 240 minims, liquid ammonia 6 ounces, and enough water to make 80 ounces solution. Use 3 drachms of this stock solution, and from 8 to 11 ounces water.

The Soda Pyro Developer.

A.—The Pyro. portion.	
Water	96 ounces
Acid	96 grains dissolved
Alcohol	6 drachms
Pyro	16 ounces
B.—Soda portion.	
Water	120 „
Carb. soda	16 „
Sulphite (gram)	16 „

Use 1½ to 4 drachms of the pyro solution, 8 of the soda, and 7 ounces water. The am. pyro and the pyro portion of the soda developers are kept in 6 ounce bottles, and will keep indefinitely.

Ordinarily the developers are mixed as follows :—

3 drachms of pyro solution, 8 drachms soda, and 7 ounces water, the am. pyro 8 drachms, and 8 ounces water.

Two trays are used in developing the smaller sizes ; partly for expedition, and partly because slight modifications may be made quickly in the mode of development.

The timing is judged to be absolutely right, but a little short ; the soda developer is poured into the tray, and the plate placed in it. Should development progress too rapidly, place the negative in it or the tray into which some am. pyro has been poured. Should the timing be considered a little full, start with the am. pyro first.

If the exposure be first right, the am. pyro brings up the image almost as rapidly as in wet plate development, and the negative has a light straw colour bloom, with excellent printing qualities.

Should its exposure be much too short, it gives too much colour and contrast. In such cases the soda developer is far superior. With the two developers combined in various proportions, many modifications may be made.

There is a peculiar relief or atmosphere effect given to the negative, which is distinguishable from that of either alone.

In developing 18×22 or 20×24 plates, the ordinary method is modified in the following manner :—In the 16 ounce bottle is mixed 3 or 4 drachms of the pyro solution, 2 ounces soda solution, and the bottle filled with water. Into another 8 ounce bottle is poured 3 drachms pyro solution, 1 ounce soda solution, and filled with water ; into another 8 ounce bottle, 1 ounce am. pyro, and the bottle filled with water. The developing tray partly filled with water, and the plate placed in it and allowed to soak a few moments, or till the water will run off without a ridging, when it is quickly poured off, and the developer in the 16 ounce bottle is dashed on and the tray rocked to secure even development.

Should the exposure prove short, this developer, weak in pyro, will save it ; or the exposure proving about right, pour it in 8 ounces of normal soda solution ; or if full exposure is indicated, use instead the 8 ounce am. pyro solution, which will check rapid development, and give intensity without making a slow printing negative.

It has been noticed in the development of large plates, when the developer is any ways near the right power or strength, the image will come up quite rapidly at first, but will soon check up and proceed quite leisurely, and the mode of procedure prove right. But if the shadows come up too much before the checking begins, without the addition of more developers stronger in pyro, the negative will have to be over-developed to get printing strength ; or if the stronger pyro solution be added, when really it is not needed, the negative will then have too much contrast, and if not speedily checked too much intensity also.

It takes an exceedingly quick apprehension to realize in time to correct a mistake made in the commencement of development, and what modifications are necessary to redeem the negative. It is impossible, in all cases, to begin development just right. Ample preparation should be made for all contingencies, as one should not rely too much upon his wit to help him out of a tight box ; and yet his mother-wit may be the ultimo theory in the redemption of an otherwise hopeless situation. The great thing is the ability to comprehend the situation in each particular case, the readiness to make possible modifications, and the grit and alertness to make them in time. It takes a brave man to avoid getting rattled, and winding up with a negative too thin, too intense, or with too much contrast.

We will close with an answer to the question, "Does rocking the plate during development secure contrast ?"

That evenness and cleanness are obtained by it, is not the question so directly to the answer. The molecules of brom. of silver, disturbed or changed by a proper exposure from the highest light to the deepest shadow, are in progressive diminution. All, or nearly all, of the brom. of silver, on or near the surface of that portion of the plate which represents the highest light, is changed, while but a small amount is a light effected in the deepest shadows.

These mechanical agitations of the developer cause a more rapid chemical action, so that before the developer has had time to penetrate the film to any considerable extent, the reduction in high-lights has been carried to a much farther point than it otherwise would, had the developer remained quiescent. The start the high-light has secured over the shadows is maintained throughout ordinary development ; all the shadows requiring all, or nearly all the changed silver, both in and on the surface of the film, to give proper definition, the high-lights have time to darken sufficiently to produce proper contrasts.

But there is still another factor contributed to the same result. The greater amount of free bromine thrown off in the high-lights, and combining with the quiescent developer lying immediately over the high-lights, retards development in the lights ; while in the shadows, the developer being less retarded from this cause, progresses too rapidly to secure contrasts ; but by agitation the power of the developer is kept uniform over the surface of the plates, and the high-lights retain all other advantage secured in the exposure.

HOW TO SEE.

BY J. F. RYDER.

Seeing carefully or carelessly is a matter of habit which, when once formed, is as easily followed as breathing. The habit of observation becomes a pleasure and a study not to be put aside and taken up at will, but the following out of the routine of life. As considered in the pursuits of our profession, the portrait photographer has a constant study in the faces he meets, and in watching the play of light and the fall of shadows over them, whilst the landscapist is adapting a tree, or clump, or a rock for a foreground and suiting it to a middle distance. I speak of the habit as in my own experience. Although I have not made a business of personally handling the sitter and camera for the past fifteen years, the habit formed nearly forty years ago has been pursued with as active diligence as when I was my own operator. If I fancied I had claims upon the Democratic party, and wanted a post-office, and was interviewing President Cleveland with a view to that end, while showing him what heroic work I had done in his interest, and how, evidently, he was occupying the chair through my efforts, I should at the same time be mentally lighting his head for a portrait.

The visitor in my house who by his conversation seeks to interest me, or whom I am trying to entertain, as becomes the host, is turned to account as a study upon whom I am at work, discovering the most favourable point of view and the best direction to light from. I do not feel that I am taking an unfair advantage of him. I am simply studying from force of habit, and because I cannot help it. Whether in the business office, the private house, the church, the street car, wherever the light falls from a given point, and particularly if favourable to developing strong characteristic points of a head or face, immediately the work commences. The unconscious model gives, without the asking, naturalness and ease of pose which would be sought for in vain with a camera pointed towards him. Then is the time to pursue the study, to carefully observe each point of vantage, and to store up the knowledge for future use. Accidental findings are as good as knowledge sought for at a cost of much labour. Good teaching in free lessons is constantly offering itself. Those who choose may profit ; it is only a question of seeing or not seeing.

From the habit of observation comes the study of comparison, an easy way of finding a fitness of things as considered in relation to each other. And here rises, as though to answer a roll-call, the three great powers most valuable to any business or profession—harmony, order, and system. They may be considered the captains of three potent forces which, when truly observed, are invincible. Applied to the simple needs of our business as aids to success, their value is as clearly shown as to the railway builders of our country.

Considered in a business sense, the advantage of tasteful and harmonious fittings and furnishings of the photograph establishment, whether upon a scale of extravagance, or the quiet simplicity of modest means, is a thing never to be overlooked. The visitor is favourably or uncomfortably impressed on entering a photographic studio. The person of no taste will not be shocked with pleasant surroundings. A place may be never so attractive, he will take no exceptions. On the other hand, the æsthetic or finneky man might feel much discomfort at the violations of taste and harmony frequently found in the reception or business rooms of photographers, as to have his confidence shaken in the skill of the proprietor, and incline him to look further. A five dollar note from the pocket of a dude is as good as that of the puddler of iron or a tanner of hides. A well scrubbed floor is better than a dirty carpet ; tidy simplicity better than luxurious shabbiness. An orderly establishment is attractive and interesting ; it is the key-note to the proprietor's character, and his business success. The value of tidiness, clean rooms, clean hands, clean dishes, clean character and habits cannot be over estimated. It is well to see that visitors and patrons be received with politeness and shown respectful attention; that while in the hands of the operator the sitter be brushed with the grain, and care be taken to encourage a comfortable cheerfulness. A rude or surly attendant can tear down faster than the proprietor can build up. To see your sitter's good and bad points, photographically, is your duty. To make the most of all the favourable, and to leave untold the uninteresting one, is what you owe both your customer and yourself. Make your camera see the same as you do. When your sitting is made, the plate developed and brought into the light for final examination, when you stand over it as judge and jury, be honest. Don't compromise with an indifferent result; if it is not right, it is wrong. The proper question to ask yourself is: Can I better it? If yes, do it at once. Your conscience and good judgment will uphold you in the conviction of having done your full duty. Your evident satisfaction impresses your sitter, and has much to do in settling any doubts he might entertain. If the photographer would inscribe a mental motto which should read: *Can it be bettered?* and hang it conspicuously upon the front wall of his mind, where it should be in full view, and religiously consulted and followed as the text of his daily work, it would stand as a true guide-board upon the cross roads of success or failure in his business. If there be a better talent than to see well, it is to perform fairly and fully all that can be seen which is profitable to put into a man's work.

Notes.

Isolated photographs of icebergs have been obtained now and again, but probably no photographer has captured so many iceberg pictures as Mr. Holloway. Our supplement, which is a reproduction of one of the series, may be taken as a sample of the whole.

Mr. Holloway only handles the camera as a means of recreation, and no doubt he thoroughly enjoys his boating expeditions in which he stalks the icy monsters of the deep. Before long he will furnish us with a paper describing his adventures, and this will be read with exceptional interest.

Lord Harris is said to look favourably on the suggestion we made last week as to the photographing of a suspected bowler in the act of delivering a ball. It is not impossible, then, that even this season we may see the umpires go into the field at a cricket match armed with the apparatus for taking instantaneous photographs; and in enterprising sporting papers the analysis of the bowling may, in course of time, be accompanied by a series of diagrams showing the style of the various bowlers. Leaving the fairness or unfairness of the delivery out of the question, a study of the bowling action of our chief "trundlers" could not but be useful to young cricketers. How much might be learned, for instance, from a series of instantaneous views of say twenty of Spofforth's consecutive "deliveries!"

A correspondent, dating from a Surrey village, tells us that, having left his rural home a few days since, he was astonished on his return to find a mounted photograph of his ivy-clad cot awaiting him on the dining-room sideboard. His premises had been invaded, it appeared, during his absence by the peripatetic agent of a neighbouring photographer, who, with marked enterprise, had proceeded to "take his house." Nor did the artistic enterprise cease here, for a message had been left with the photograph to the effect that, should the master of the house prefer to have a view of his abode taken with the family grouped in the porch, and the house-dog posed in the foreground, a special sitting could be arranged.

Clearly, then, even in the remote part of Surrey from which our correspondent dates, competition is inducing enterprise, and to such an extent that the public will soon find not only that their houses have been taken unknown to them "on approval," but that they themselves have been unwittingly photographed when they least expected it, and will thus be able to obtain *cartes* of themselves without the dreaded preliminary step of a visit to the studio and its consequent ordeal. To be thus taken without knowing it will be akin to having a tooth out "under the influence of gas," and will, we imagine, become a most popular method of photographic procedure.

Meanwhile, however, servants left in charge of country houses must not too readily accept the assurances of every party who calls with a camera, or what looks like one, that he is what he pretends to be. Otherwise she may entertain an artful dodger unawares, and find all too late that "the gent as said he only wanted to take the primises' has, in fact, contented himself with "taking" an odd umbrella or two from the hall.

Of all the numerous suggestions for making pictures on the screen truly stereoscopic may be especially noticed that of W. E. Crowther. Two lanterns are to be used, one projecting, for example, a green image, and the other a red image—at any rate, the two colours are to be complementary to each other—and these images are to be superimposed. Every spectator must wear a pair of spectacles with coloured glasses corresponding to the coloured images projected. Each eye, then, sees but one image, and a stereoscopic effect is produced. A momentary effect of the same kind can be realised by temporarily paralysing both eyes, one eye to each of the two complementary colours.

Methods of stereoscopic projection by the lantern, involving the use of spectacles by the on-lookers, have never been much more than suggestions, although the late Mr. Sutton, of Jersey, occasionally exhibited his method with prismatic spectacles to small parties of friends.

It is strange, in the interesting article on Meissonier and his method of working, which appeared in the *Daily News* a few days ago, no mention was made of the fact that the famous artist uses photography largely. The writer tells us that Meissonier first models before he draws or paints, and mentions the difficulty he had to secure a picture of a prancing horse. Meissonier is made to say: "I used to have a horse brought in every day and made to prance.

It killed him in the long run, and nearly killed me." Finally the painter made a small wax model, finding it was impossible to draw direct from nature. To obtain the correct shape of the shadow, the model was placed in strong sunlight "with a sheet of paper on the table, and the moment I had got the shadow I wanted, I rapidly drew the outline of it on the white sheet. I had to make haste, for the light shifts so rapidly that the outline was constantly changing." It is very clear that all this trouble would have been saved by taking a photograph. Perhaps this model was for an early work. Now-a-days the artist would be wiser, for the time taken in securing this wax model would have almost sufficed for the painting of a picture.

That the promoters of the proposed new photographic club (see pages 335 and 458) find it by no means easy to reconcile loud declarations of amateurism, and the actual fact of the provisional committee consisting partly of the professional element, may very readily be believed. Indeed, the proposed association, if it should really be formed, bids fair not to be a club at all.

The essence of a club is power of exclusion from membership by the general body of members; and if the suggested affiliation of country societies should be carried out, this characteristic element must be absent. Each member of any affiliated society must really be an indubitable member of the club, or he cannot be supplied with alcoholic refreshments at the club, without bringing the executive into an unpleasant intimacy with the law.

The essence of amateurism is not making a profit by the exercise of a craft, and this always has been the real touchstone of admission to the old-established Amateur Field Club.

The penalty of advertising in the *Times* the fact that you have an increase in your family is rather terrible; and we are bound to say, from the letter of a correspondent who has poured out his woes to us, that photographers contribute to that penalty considerably more than a mite. In the first place, on the day following that on which his announcement appeared, he received by an early post from two different applicants, photographic copies of the list of births, and was requested, if he kept the copies, to forward six stamps. He had no desire to keep the copies, and he asks why should he be put to the trouble of returning these copies and paying the postage. About the middle of the day he had circulars from three photographers who lay themselves out especially for the photographing of babies; but the culmination arrived when by the last post came a prospectus from an enterprising gentleman, who had not only had great experience in the taking of live babies, but was also an adept at "post mortems!"

It is too bad for a photograph to be made the medium of conveying an insult. The defendant in a breach of promise case tried last week at Liverpool added insult to injury when he sent the plaintiff her photographs, with the words "my darling" scratched out, and "false" written across the face. It is satisfactory to find that the lady recovered £500 damages, for a more personal mode of annoyance can scarcely be imagined.

It is rumoured that the public will be asked to pay the expenses of investing Prince Henry of Battenberg with the order of the Garter. As the fees and the outfit cost from a minimum of £800 up to almost any sum according to circumstances, it is only right the ratepayers should have the opportunity of seeing what their money is to purchase. According to the *World*, the full dress of the order is never worn, and has only been put on in later years by a German highness, who once donned the attire to see how he looked, and be photographed in it. If copies of this photograph could only be procured and distributed among the members of Parliament when the request for the money is made, they might have an important influence on the debate. According to our contemporary, the German potentate in question looked like "a magnificent harlequin with a cap and plumes," and if so, it is doubtful whether even the most loyal legislator would care to vote the money of the hard-working public simply to make a well-favoured and exceedingly fortunate young gentleman look like a mountebank.

The Society for Photographing Relics of Old London has just published its issue for 1885. The subjects include "Cardinal Wolsey's Palace" in Fleet Street (now tenanted by a hair-dresser); Churchyard Court, Inner Temple; Fountain Court; Middle Temple Hall; Gray's Inn Field Court; Gray's Inn Hall; The Garden House of Clements Inn, where the statue of a negro with a sun-dial used to be until, a few months ago, it was mysteriously removed; Clifford's Inn; Staple Inn, &c.

Buda-Pest, in gathering together the materials for a Hungarian National Exhibition, has not neglected to ensure that photography and photographers shall be properly represented. Among the exhibits, the following deserve special mention.

Large views, coloured and uncoloured, shown by the firm of C. Koller and Co.; excellent genre pictures by Rupprecht, of Odenburg; plaques by Letztee; costumed figures from the opera by Kalmár; collotypes by Divald and Eperjes; Rembrandt portraits by Mai; and also a very fine collection of photo-lithographs by G. Klösz.

Another gas bag explosion; this time at the Agricultural Hall. In these cases the mischief is not from the direct consequence of the explosion, but from the panic; and it is not often that the result is no more serious than on Tuesday last, when the worst thing that happened was the destruction of a reporter's hat.

The instruction in photography which was inaugurated with so much success a year ago at the Birkbeck Institution by Mr. Chapman Jones will be continued during the coming session, and it is expected that the class will be a large one. The Institution's new building, which was opened by the Prince of Wales a few weeks ago, has not yet completed its provision for the practice of photography, so that the work of the session, which begins next October, will consist mainly of a course of thirty lectures. The lectures, however, will be fully illustrated, so as to constitute them a series of practical demonstrations of the artistic as well as the scientific aspects of photography.

At the British Association Meeting, which is to be held at Aberdeen, two papers by Captain Abney are promised, one bearing on the spectroscopic method in chemical research, and the other on the chemical aspects of electrolysis.

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Patent Intelligence.

Applications for Letters Patent.

9091. **Henry Bassano Hare**, Gt. Elm Rectory, near Frome, Somersetshire, for "Improvements in single and double dark slides for photographic purposes."—29th July, 1885.

9114. **James John Walker**, 127, Long Acre, London, for "Improvements in photographic cameras."—29th July, 1885.

9247. **Hezekiah Nelson Heffner**, 101, Adelaide Road, Haverstock Hill, Middlesex, for "An improved method of obtaining light, and an apparatus for conveniently and effectively producing the same, which improvements are specially adapted for photographic and other purposes."—1st August, 1885.

9255. **Benjamin Constant Le Moussu**, 28, Southampton Buildings, Chancery Lane, London, W.C., for "An improvement in photography."—1st August, 1885.

Patent on which the Eighth Year's Renewal Fee of £10 has been Paid.

1957. **F. Newton**, "Magic lanterns," &c.—1877.

Specifications Published during the Week.

11,212. **John Veda Robinson**, photographer, 39, Lower Sackville Street, Dublin, for "Photographic cameras."—Dated 4th June, 1885.

I make the base-board of camera with a hinged or movable up and down tail-piece; this movable up and down tail-piece can be held in any required position in or out of line with base-board. I prefer to hold this movable up and down tail-piece in the required position by means of two arms, one on each side of base-board. These same two arms hold the camera together when packed up. I fix the back of camera to this movable up and down tail-piece by a screw, or other arrangement capable of allowing the back of camera to be moved in or out of parallel with the base-board of camera.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—

1st. The construction of a photographic camera with a movable up and down tail-piece as described.

2nd. The means of holding this movable tail-piece in the required position by means of the arms as described.

3rd. The attaching the back of camera to this movable up and down tail-piece by a screw or other similar arrangement capable of allowing the back of camera to be moved or fixed in or out of parallel with base-board of camera.

4th. That by means of this movable up and down tail-piece I can set the back of camera in any required position, in or out of perpendicular.

12,329. **Joseph Lyons**, of 230, Whitechapel Road, in the county of Middlesex, Artist, for "Improvements in stereoscopes, and in combining a lamp therewith."—Dated 12th September, 1884. *Provisional Specification.*

This invention relates to the application of coloured glasses which can be brought into position without destroying the focus, and will produce varied effects of colour to a plain stereoscopic slide. The coloured glasses, by their arrangement and combination with the stereoscope, do not modify the light, but impart a most brilliant effect to the stereoscopic slide. The stand upon which the stereoscope is mounted also carries the lamp for illuminating the same, and either the stereoscope or the lamp or both are capable of adjustment thereon.

12,772. **Fox Shew**, of 88, Newman Street, Oxford Street, in the county of Middlesex, manufacturer, for "Improvements in means for increasing the usefulness of photographic cameras"—Dated 24th September, 1884.—*Provisional Specification.*

This invention has for its object the construction and adaptation of means for enabling a camera and lens of any given size to be used for working plates of larger sizes than that ordinarily employed for the said camera. For this purpose is constructed an additional frame of somewhat similar character to the body of a camera, with capability of extension and contraction by means of bellows or telescopic frame, and provided with means for holding it at any required position of extension or contraction, as also for steadying the same, but with no bottom board. One end of such additional frame is provided with a frame containing the ordinary ground glass or back for focussing, and with grooves to receive the frame containing the sensitized surface, while the other end of such extra frame is provided with a skeleton frame which is so constructed as to be capable of being slidden into the groove of the camera frame into which the lens front is usually slidden. The opening in the skeleton frame of the additional frame is formed large enough to form no obstruction of the visual rays, and, if necessary, the opening in what is ordinarily used as the front of the camera frame is widened for the same purpose. In some cases the extra frame is formed without capability of extension or contraction. The extra frame as above described is adapted for the class of cameras in which the focussing is obtained from the back thereof, but in those classes of cameras in which the focussing is obtained from the front the extra frame is connected to the camera by sliding it into the grooves or guides ordinarily employed for the back of the camera, in which case the camera front is not in any way altered.

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CYCLING AS AN AID TO PHOTOGRAPHY.

BY HENRY STURMEY,

(Editor of *The 'Cyclist.*)

With the three-track variety, if the chain by which the machine is driven be at one side, the tripod can well be carried in sockets screwed on just outside the chain guard; whilst with that class in which the chain is in the middle, the only place for the stand is along one of the safety rods at the back, if it has not already been utilised for the attachment of the camera case.

These remarks pertain to the general form of front steerer; there is one especial make, however, which I consider eminently adapted for the especial purpose under consideration. I refer to the "Quadrant No. 8," manufactured by Lloyd Brothers, Sheepcote Street, Birmingham. In this machine the steering is done with bicycle handles, and the steering wheel is large and well suited for travelling over rough ground. The makers fit an extremely simple, neat, and ingenious luggage rack exactly over this steering wheel, and on this can be supported the camera and its "fixings" in any form of case obtainable. The position is a most handy one for rapidity of getting at the different articles contained in the case, and the machine will, I opine, come largely into use for light photographic work. A somewhat similar arrangement was shown at the A. P. Exhibition, fitted to a "Ranelagh Club."

The next form of tricycle, and one which is fast gaining ground in popular favour, is that known as the "Humber pattern," from having been first introduced in the celebrated machine of that name. In this variety the rider sits on a backbone very much like that of a bicycle, and the steering is, like that machine also, done by means of a cross handle in front of the rider, the two front wheels, however, being turned in place of the one of the bicycle. To those who already possess machines of this type, their peculiarities will be well-known; but to those who are about to purchase, I would give this word of ad-

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[*] Continued from page 481.

vice: "Go cautiously down hill at first." The steering is very sensitive, and is more so when descending hills, or travelling at a high pace; and to one who will be carrying any weight with him, a reliable brake is a necessary adjunct. Although, with a little ingenuity, quite a quantity of *impedimenta* may be carried on machines of this type, they do not appear so well adapted at first sight for it as the before-mentioned varieties, and in any case the tripod is a great bugbear, unless made to fold up to within two feet in length, when it is best strapped along the handle bars, as with the bicycle. As with the two-wheeler, too, a quarter-plate kit can well be conveyed in a "multum-in-parvo" bag, strapped to the saddle and back-bone, and sizes up to half-plate may be taken on a right-angled frame, running out over the back wheel, and resting against the lower portion of the backbone, though, as weight placed here, whilst making the machine safer, renders the driving more than proportionately heavy, the best general position for the carriage of photographic material will be found to be the front of the machine. For this purpose the contrivance known as the Marriott luggage carrier is best adapted. It consists of a light frame sloping forwards and downwards some inches from the axle bearings, to which it is attached. At the bottom are supports, on which the goods to be carried may rest. A member of the Cyclists' Photo-Exchange Club tells me he carries his 12 by 10 camera and all necessaries on a machine of this type very comfortably, so that it will be seen a good quantity can be carried when desirable. I need scarcely mention that when much is taken on in front, the saddle should be shifted a little farther back to counterbalance. With an automatically held brake, such as Carver's (of Nottingham), which will hold the machine absolutely still, the camera can be attached to the handle-bar by one of the several clips in lieu of stand, and this, indeed, is the most satisfactory form in which the tricycle can be made to play the part of the tripod, though of course, as I said before, there are many situations where its use is impracticable.

The "Coventry Rotary" is yet another form of tricycle. It is a special make, having a distinctive form of its own, unlike any other in the market. To those unacquainted with it, I may explain that it has one large driving wheel on one side—the left—and two small steering wheels, set in line, one with the other, on the right, these steering wheels being connected by a long bar over five feet in length. For carrying a tripod of any length this tricycle is better adapted than any other variety; and though the fact of its being a single driver makes it unsuited for carrying very heavy weights in the way of luggage, it is as handy a machine as I know for the lighter work of photography. Its single driving is against it in wet weather, when the roads are soft and heavy, but then photographers do not, as a rule, select wet days for their operations in the field; and though unsuited for very rough districts, its two-track properties make it an admirable machine for districts in which the stones lie in long lines, and in which ruts predominate. As my own operations in the field do not extend beyond the taking of half-plate pictures, I find it well suited to my requirements, and find that the best way I can carry my traps is to suspend the case containing them from the back of the saddle. I use no spring, and am in this respect singular; but spring users can easily attach to the bottom of the spring. The centre of the bottom of the case I secure with a strap round the lower part of the seat pin, whilst a couple of straps at the two corners pass round the cross tube of the frame, and brace the whole tight and firm. My tripod, when not a telescopic one—which is generally the case—is fastened with straps along the side tube; and I may here say that often, when fairly out in the country, and my telescopic stand once erected, I am simply rambling on "in search of the picturesque," I just drop the tripod as it is along the side tube, secure with a turn of a strap or a handkerchief, and with my camera ready "erected" under my arm, am ready in a few seconds to "fire away" when a "thing of beauty" presents itself.

I may here describe my camera case, which, as it was specially constructed to my own ideas, and has turned out a success, may be useful to others. It measures 11 inches by 9 inches by 7 inches, and is oblong in shape, with slightly rounded top overlapping the sides some four inches, so as to effectually exclude both rain and dust; it is made of brown waterproof canvas. Two straps pass under it and up the back, being secured all the way. These are just the width to pass through the staples at the back of the saddle, by which it is suspended. Straps for fastening, as before described, are attached, and at each of the other corners are two loops, through which shoulder straps may be passed for pedestrian work. A strap handle at the top makes it handy to carry about. The interior arrangement is as follows. Five canvas partitions divide it into six compartments. The first two—2 inches and 1 inch in width respectively—contain the camera and base-board. The third—3 inches wide—just holds my Lancaster changing-box, containing a dozen plates; or when I am not using this, it will hold two dozen spare plates in boxes, and several odds and ends, or three double dark slides, as I may require or desire. Partition four measures ¾ inch in width, and carries the double dark slide belonging to the changing-box. The next is just wide enough to hold two double dark slides, or a box of plates, as the case may be; and the last, which is 2 inches across, contains one of Newton's telescopic tripods, two lenses, pneumatic shutter, compound focusser, box of diaphragms, box of camera screws, &c.

The divisions of the box are all arranged to come to within half an inch of the top, and in the space between the tops of these and the lid of the box, the folded focussing cloth fits and keeps all snug, the whole making about as complete and compact a kit as one could wish for a short trip out with a half-plate camera. The case was made to my drawings by Messrs. J. B. Brooks and Co., Criterion Works, Great Charles Street, Birmingham, and cost 25s. The entire outfit weighs from about 14 lbs. to 17 lbs., according to contents.

So far I have spoken entirely of tricycles ridden by single individuals. There are, however, many forms of sociables and tandems, as the double machines are called, and many of these will be found really much more commodious for photographic purposes, if the rider can find a companion of similar tastes to himself, willing to share his trip with him, and not grumble at his numerous stoppages. The division of labour, too, in these double machines, as well as the greater pleasure of company, cause them to be very desirable machines. Of the sociables, I will say that almost any amount of weight can be carried strapped on behind, whilst the width renders the carriage of the tripod a matter of no consequence.

In selecting a make, the most serviceable as well as the handiest and safest, are those with a front steering wheel, and the principal suitable makes of these being the "Meteor," by Starley and Sutton, of Coventry; the "Premier," by Hillman, Herbert, and Cooper, of Coventry; the "Salvo," by Starley Brothers, also of Coventry; the "Empress," by Thomas Smith and Son, Holborn Viaduct, London; and the "Invincible," by the Surrey Machinist Company, Limited, Great Suffolk Street, London, S.E. As a rule, tandem tricycles, although among the fleetest of cycles, are not well adapted for the photographer, owing to the very limited amount of space comfortably available for the stowage of his paraphernalia. There are, indeed, very few tandems really suitable for his purpose, though these are admirably so, and in so saying, my thoughts roam to the "Centaur F. S. Tandem," by the Centaur Cycle Co., of Coventry, and the "Springfield Tandem," only just introduced by Singer and Co., both of which are thoroughly well adapted for the carriage of the camera and slides, by reason of the riders being placed well apart, and there being plenty of room, and full arrangements for carrying baggage between them, and immediately over the axle of the driving wheels where the weight is best disposed.

(*To be continued.*)

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METEOROLOGY FOR PHOTOGRAPHERS.

BY J. VINCENT ELSDEN, B.SC. (LOND.), F.C.S.

Chapter IV.—Atmospheric Pressure—Barometers—Causes of Variation of Pressure—Sunshine and the Barometer.

The fact that the atmosphere exerts pressure upon the earth's surface scarcely needs proof. Owing to the equality of this pressure in all directions, we are not sensible of it under ordinary circumstances; but the moment this equality is disturbed, it becomes sufficiently evident. Thus, to borrow an illustration from a piece of apparatus familiar to photographers, the pneumatic plate-holder consists of a flat rubber disc, communicating with an air-ball. When the air is squeezed out of the ball and the disc applied to a glass plate, the atmospheric pressure upon that portion of the plate which lies opposite to the disc is no longer counterbalanced by the pressure of the air in the ball. The disc and plate are consequently pressed tightly together, with a force corresponding to the difference between the pressure of the residual air in the air-ball, and the prevailing pressure of the atmosphere. This pressure is generally about 14·7 lbs. upon every square inch of surface.

Familiar as this property of the atmosphere appears to be at the present day, it was not until the 17th century that Torricelli, a pupil of Galileo, discovered it. Galileo himself had previously noticed that water would not rise in a pump beyond about thirty-four feet, and he ventured upon the somewhat strange explanation that a column of water, when lengthened beyond this point, at last breaks by its own weight. Torricelli, however, proved that liquids are held up in a vacuum by atmospheric pressure alone; that the atmosphere presses downwards with a uniform force upon every part of the surface of liquids; that this pressure is transmitted equally and in all directions through the body of the liquid; and that if this pressure is relieved from any portion of such a surface, by placing an exhausted tube over it, the liquid will be forced into the tube, until the weight of the column, so forced up, is equal to the pressure of a column of the atmosphere of the same cross-section as the tube. This is the principle of the barometer. When we say, therefore, that the height of the mercurial column is thirty inches, we mean that thirty cubic inches of mercury (supposing the cross-section of the barometer tube to be one square inch) weigh as much as the pressure of the atmosphere upon every square inch of the earth's surface at that locality. Pascal further demonstrated the truth of this principle by showing that if a barometer be taken to the top of a mountain, the mercury sinks in proportion as the height of the atmosphere diminishes.

The simplest form of barometer is a tube standing vertically in a vessel of mercury, the height of the column being measured by a graduated scale beside it. The standard barometer used at Kew is of this kind; but to avoid the necessity for what is called "capacity correction"—that is, the correction necessary to be made on taking an observation, on account of the alteration in the level of the mercury in the cistern—this form is usually somewhat modified. Thus, in Fortin's barometer the bottom of the cistern can be screwed up, at each observation, so that the level of the mercury in the cistern just reaches an ivory pin, marking the starting point of the scale. An easier method is adopted in the Kew barometer, in which the inches on the scale are shortened from the upper part downwards, in proportion to the relative sizes of the tube and cistern, so that a single observation is enough for each reading. The same end is gained in the well-known Siphon barometer, in which the short leg is open, and the movement of the mercury in each leg is half as much as in Fortin's instrument.

As two readings must be taken each time with this instrument, the errors of observation tend to compensate each other. Another advantage of the Siphon barometer is, that they can be removed, without risk, by sloping it until all the mercury passes beyond the bend into the long leg, and then carrying it with the bend upwards. The ordinary dial barometers are of this kind, the index being moved by means of a string and a float resting upon the mercury in the short leg. A pencil may be attached to this instrument so as to make a mark on ruled paper, moved by clockwork, thus giving an automatic record, and forming what is termed a *barograph;* but automatic registration is better accomplished by photographic means, to be described hereafter. A convenient form of barometer as regards size and portability is the Aneroid (fig. 1), in which the pressure is measured by the elasticity of a thin metal case, partially exhausted of air. When the pressure increases, the lid is forced inwards; when it diminishes, a spring pushes the lid outwards. The movements are transmitted by levers to a dial. The disadvantage of these instruments for very accurate work is the liability of the mechanism to get slightly out of order, rendering constant comparison necessary with standard mercurial barometers.

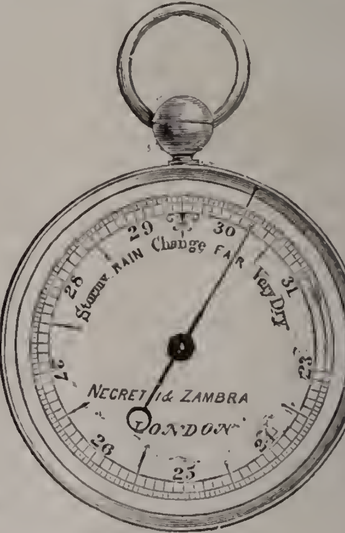

Fig. 1.

(*To be continued.*)

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PHOTOGRAPHY AND THE SPECTROSCOPE.—

Lecture I.*

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.

Every lecturer, when he begins, must have a text of some description, and I propose to make my text for the lectures a plate exposed to the spectrum. You see before you a spectroscope comprising a collimator, two prisms, and a camera, with a lens of 13-inch focal length, and in this slide is a sensitive collodion plate.

The spectrum of the hot carbons of the electric light is upon the focussing screen which you see before you, and I will simply expose this plate, and refer to it from time to time as my lecture continues.

The plate is given six seconds' exposure to the light of that spectrum, and now in the subdued light coming from this lantern, whose sides are covered with translucent orange paper,

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* Being the Cantor Lectures for 1885.

I see the picture is coming out under the action of the ferrous oxalate developer. After fixing, we see that we have the photographed spectrum on the plate.

This is the text on which I have to hang my lectures. We have three things to consider. First of all, we have got the light, then we have the apparatus, and then the sensitive material on which the spectrum is taken. The white light from the carbon poles, in passing through the apparatus, is spread out into a coloured band, which we called the spectrum; and the spectrum has effected a change in the sensitive salt of silver, as is shown by the blackening on the application of what is called a developer. The cause of the change in the sensitive material is what I first address myself to.

To conceive a right notion of photographic action we must first of all conceive, in the most elementary manner, the structure of matter. The structure is beyond our actual visual acquaintance, but we may be able to visualise it from the way it behaves; we have to draw our conclusion about it from evidence of an experimental nature. What we want to get is a mental picture of matter.

Physicists have come to the conclusion that homogeneous matter is composed of molecules, or small masses which are altogether similar one to another, *i.e.*, they have the same composition. In different matter, these molecules have different weights. Further, it is believed that the molecules, or the small particles of matter, are themselves composed of atoms, which we take to be the fundamental unit of matter. Now, from experimental data, Sir William Thomson and others have come to conclusions as to the limits of the size of these molecules, and also as to their distribution in space. From the kinetic theory of gases, it is concluded that the diameter of a molecule lies somewhere between one twenty-five millionth part of an inch and one two hundred and fifty millionth part of an inch. Further, in gases it is conceived that the molecules are free to move in straight lines in any direction, the direction being altered only when the molecules collide; that is to say, when they strike one against another. In a liquid, the particles are bonded much more closely together, and the free path of the molecules is very much shorter; that is to say, that they cannot go from one place to another without very much more frequently coming into contact with other molecules; and the molecules pass from place to place at a very much slower rate than they do in gases. A solid, such as is our silver salt, is conceived to be such that the molecule has no free path, but is confined in a limited space in which it can oscillate, moving round a mean centre. As to the distribution of these molecules in liquids and solids, Sir William Thomson has arrived at very definite conclusions also. In a lecture at the Royal Institution, he said that he concludes that in every ordinary liquid, or transparent solid, or seemingly opaque solid, the mean distances between contiguous particles is less than one twelve millionth of an inch, and more than one two thousand five hundred millionth part of an inch. Those are big figures, but still the distance apart is very small. "To form a conception of this," he says, "imagine a globe of water as large as an ordinary football to be magnified to the size of the earth, each constituent molecule being similarly magnified. The magnified structure would be more coarse-grained than a heap of small shot, but probably less coarse-grained than a heap of footballs." So you see that, by magnifying to this extent, you have a coarse-grainedness which, of course, is only relatively coarse-grained after such an enormous magnification. Or you may put it in a different sense. If you magnify eight thousand diameters by an ordinary microscope—and that is about the limit to which a microscope will magnify—and if you magnify that eight thousand diameters again eight thousand times, you would be able to see the molecular structure of water. So much, then, for molecules.

We will now turn to the atoms. These will not bear such a very large disproportion of size to the molecules as do the molecules to the smallest visible particles. We must, however, I think, conceive that every atom (and this is an important point) is charged with energy very much in the same way that the magnet is charged; only, instead of two poles, as a magnet has, each atom has only one pole. It is unipolar.

Now, suppose that this energy is something like electrical energy. We know that positive repels positive, and that negative repels negative. And further, we know that the positive energy will attract what is called negative energy; and if the two be exactly equal when they combine, of course there will be a neutral state. But in the case of the atoms of matter, circumstantial evidence tells us that the amount of electrical energy which is upon a given atom of matter—if you like to put it in that way—is never the same as it is upon another atom of matter; that is to say, there is always a surplus of one over the other. Thus we may have an atom charged with what we may call *plus* 2 of energy, and another one charged with *minus* 1 of energy. Those two atoms, on coming together, give you a result of energy of plus 1, and this would again be capable of attracting another atom of matter which was charged with a negative energy, and so on. From chemical considerations, it would appear that plus and minus energies of different atoms, as I have said before, are never exact multiples of one another, and that when they are bonded together there is always an excess one over the other. A good example of the energy of the combination of atoms together may be shown by the combination between a gas, chlorine, which we have here, and the metal antimony, and you will see that when the latter, as powder, is thrown into the former, the two combine with an evolution of heat, showing that a vast amount of energy is given out. The chlorine and the antimony form chloride of antimony; that is to say, five atoms of chlorine and one of antimony. [A small quantity of finely-powdered antimony was dropped into a jar of chlorine.] You see the evolution of heat between those two; so much, in fact, that the chloride of antimony, as it was formed, was at a perfectly bright white heat. The case immediately before us is the silver salt. Let us experiment with that in a similar way. Into the chlorine I will throw some powdered silver, and I wish you to notice the difference between the results in the two cases. [A small quantity of the powdered silver was dropped into a jar of chlorine.] You see that the combination between the silver and the chlorine only produces a red heat, whereas antimony produced a white heat. In other words, the combination between antimony and chlorine is much more vigorous than the combination between silver and chlorine. If you had to separate the atoms of chlorine from those of the antimony, you would have to use very much greater force than if you had to separate the atoms of silver from the atoms of chlorine.

When two electrified bodies attract one another, they attract one another inversely as to the square of the distance; that is to say, if there is a distance of one foot between them, they attract one another with a force of say—1. If they are two feet from one another, they only attract one another with a quarter that amount. Supposing atoms attracted one another according to the same law, then of course they being so very close to one another, the attraction would be considerably greater than if they were visibly apart.

But besides this attraction between atoms comprised in the molecules, there also seems to be a repulsive action, into which I will not enter more fully now, because that would be almost beside my subject; but I may say that besides the atoms attracting one another (we will take chloride of silver, for instance) when they get within a certain distance of one another, they repel one another, and so there is a continual oscillation between the atoms composing those molecules.

(To be continued.)

Correspondence.

DR. EDER'S NEW SULPHITE OF AMMONIA DEVELOPER.

Sir,—As nearly every week sees the publication of a new developer, or some modification of an old one, it seems to me possible that the above may fail to meet the attention which it merits, especially as the new light, which is to render all others needless, published the formula with the trifling omission of the ammonia, and which, of course, disappointed those who followed its leading. I think this new developer contains all the advantages, with none of the defects, of those which have preceded it. It comes up rapidly, giving brilliant and well-graded pictures, without a trace of fog or frilling. It does not discolour on the plate, and the same solution may be used two or three times, although I do not think such close economy desirable; and it shares with the sulphite of soda the advantage of not staining the fingers. As the original formula was published in the French fashion of "parts," the understanding of which does not come by nature, it may be worth while to repeat its English equivalent:—

	Ounces.	Drams.	Grains.
A.—Pyro...		2	34
Sulphite of ammonium ...		7	42
Water	3	4	
B.—Bromide of ammonium ...		1	20
Ammonia, ·880	1	6	
Water	5	4	

For use, take 1 dram 8 m. each to 3½ ounces of water. Perhaps a little less of the B, or the quantity of water may be somewhat increased if needful; for, as usual, this developer, like all others, requires to be mixed "with brains," of which all photographers worthy of the name keep a stock on hand. It seems to serve equally well with all commercial plates; at least, I have tried it with Edwards', Paget, and the Imperial with perfect success.

I shall discard the use of all others for this till a better appears, which I do not think will be very soon.—I remain, yours obediently, F. H. Carter.

FERROUS OXALATE *VERSUS* PYRO AND HYDROKINONE.

Dear Sir,—In reply to Charles F. Coombe's query, under this heading, I beg to reply:—

1st. Supposing we are developing quarter-plates, using about 2 ounces of mixed developer in the dish, a batch of about a dozen may be developed without any serious loss in developing power being noticeable.

2nd. A sufficient quantity of sulphate of copper (to be added to the ferrous sulphate solution) will be about 10 grs. to the pint.

3rd. Sixty grains of dry powdered ferrous sulphate will dissolve in 1 oz. of saturated solution of potassic oxalate (neutral) without producing a precipitate. S. Bottone.

DULLING METAL FOR PHOTOGRAPHING.

Dear Sir,—Can you tell me of a good mixture for "dulling" the surface of cast-metal?

I have tried one which acts indifferently well, composed of gold size, turpentine, and the required quantity of white lead and black; but a slight glaze occurs.

Perhaps some of your correspondents have an acquaintance with such work as photographing cast-metal goods; if so, I should much value a recipe for the treatment, so as to secure a dull surface.—I am, yours truly,

R. B. Smith.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 30th ult., Mr. A. Cowan in the chair.

An interesting discussion on positive printing by the gelatino-chloride of silver process was initiated by Mr. A. L. Henderson, who showed a number of transparencies, made according to the formula recorded on page 398, and that gentleman found it possible to utilize discoloured emulsions by treating them with an excess of chloride, which excess, after adding more gelatine, was removed by washing; the usual proportions of citrate or acetate could then be added. Another series of transparencies was shown by Mr. H. S. Starnes, some of which had been printed on citro-chloride emulsion plates, the silver having been previously converted into an oxide, and others, wherein a mixture of acetate and chloride, prepared from silver carbonate, had been used; these latter examples, untoned, were exceedingly rich in colour, but some toned specimens were disappointing. The general opinion appeared to be that for the purposes of reproduction or lantern work, toning would not be necessary. It was stated that citrate gave a blacker image than acetate, but lost much vigour in the toning bath, and one half at least, or even two-thirds, of the silver used should be combined with an organic salt rather than a chloride.

The Chairman hoped the process would receive further attention, as he believed there was still something to get out of it beyond their present knowledge. In reference to the mixture of silver citrate and chloride, he had obtained a rich chocolate brown by using equal parts of each.

Mr. Henderson remarked that the power of modifying the proportion of chloride in these emulsions allowed of results being obtained which could not be done in any other way; as an instance, a large proportion of chloride gave thin images, and a small proportion great density.

The following question was then read:—"Are there any white enamel plates in the market cheaper than opal?"

It was said that a ferrotype plate coated with a white composition was an article of commerce.

Mr. Skene (Columbo) spoke of the annoyance caused by insensitive marks on some commercial plates, and which, he believed, was due to the racks used in drying.

Mr. A. Mackie had met with several kinds of stains in commercial plates, which were attributable to an inefficient method of drying.

Mr. Henderson used cane racks, which did not stain the plates; still, he thought that an emulsion insufficiently washed was often the cause of these markings.

Mr. A. Haddon exhibited a remarkable case of red and green fog, in which the image was of a deep ruby colour. Another plate of the same batch, developed without bromide, and with very little ammonia, yielded a clear negative, which pointed to bromide being one of the causes of green fog.

The Chairman was of opinion that a large proportion of bromide would have given a clear negative.

Another short discussion anent the rise and fall shutter between lenses, was then opened by Mr. W. B. B. Wellington, who found that an opening of one-sixteenth of an inch at the bottom was sufficient to illuminate all but the four corners of a plate.

The Chairman thought that meant unequal illumination, because, had that opening been in the centre of the lens, the corners of the plate would have obtained the advantage. The shape of a stop would not alter the image, but the position of the stop did make a difference.

The discussion was continued by the Chairman, Messrs. Mackie, Wellington, Haddon, Collier, and Henderson.

Amateur Photographic Association.

A council meeting was held on July 27th at 25, Old Bond Street, Lieut.-General the Right Hon. the Lord de Ros in the chair.

The minutes of the last meeting having been read and confirmed, the following members were elected:—W. Gaddum, Rev. E. Raste, J. P. Holmes, H. Favarger, and Ludwig G. Barber.

The Secretary then laid before the meeting prints from the negatives which had been sent for the current year; but it was found impossible, owing to the large number contributed, to make the awards, and the decision respecting the prizes was therefore deferred till the next meeting.

A number of portraits recently taken by Mr. Bassano, by order of the Council, for the Museum series, were submitted by the Secretary for approval; they included portraits of H.S.H. Prince Edward of Saxe-Weimar, Mr. James Abernethy (Pres. of the Institute of Civil Engineers), the Earl of Scarborough, Mr. Sant, R.A., Mr. Benj. Scott (City Chamberlain), Lord Sherbrooke, Mr. Scharf (Keeper of the National Portrait Gallery), Mr. Thomas Salt, M.P., Sir Samuel Scott, Bart., the Marquis of Abergavenny, and others.

Mr. Bassano showed the Council the gallery and rooms which he proposed to set apart for the use of the Society, and for the exhibition of their pictures, and all present expressed their entire satisfaction with Mr. Bassano's arrangements.

A telegram was received from Mr. Walter Wood, the Manager of the *Standard*, expressing his regret, owing to absence from England, at being unable to be present.

Manchester Amateur Photographic Society.

A number of the members have had an excursion to Hawkstone near Shrewsbury, under the leadership of Mr. S. F. Flower. On arriving at Hodnet, cameras were quickly unpacked, and shots fired up the quaint village street. Proceeding up the street, more plates were exposed on the black and white cottages and church. The party was then driven to the Hawkstone Hotel, and, after a cold collation, entered the park, a domain of singular beauty—hill and dale, wood and water, all contributing in turn to set it off. Plates were exposed on a white marble statue erected by the tenantry and friends to the memory of Viscount Hill (1800 to 1875). The party visited the various sights, including the "Lion's Den" and the deep Roman well; and then, entering a deep ravine, found themselves in a long subterranean passage, lighted only by a few wax matches, suddenly emerging into the hermit's cave, the interior of which is lined with beautiful shells, and lighted with coloured windows. This had a plate exposed on it. After tea the party re-entered the waggonette for the return journey; but some time before the entrance to the Park was reached, a halt was cried, and a few more plates were exposed on the "Citadel," the residence of the Rev. John Hill.

The eighth excursion of the Society was under the leadership of Mr. Henry Champ, the ramble being to Gawsworth, near Macclesfield, a village with picturesque attractions. The weather was unpromising, and proved wet. Nevertheless some thirty to forty plates were exposed, some under considerable difficulty; for when to the attention demanded by focussing, light, screws, shutters, stops, and exposures, is added the skill to hold up an umbrella in wind and rain to protect the polished mahogany and bright brass fittings, it is pretty certain that if pictures are secured, credit is due to the zeal with which this enjoyable and instructive pursuit is taken up.

Gawsworth so abounds in picturesque combinations—old hall, rectory, church, water (reflecting the church, and carrying on its bosom patches of lilies), abundance of foliage, and cottages—that a Saturday afternoon is all too short. The first exposure was upon an old cross by the roadside, before reaching Gawsworth. This was taken in the rain. The members were fortunate in being kindly permitted to enter the grounds and take several views of the Hall, the residence of Lord Petersham; the old three-storied window at the back being pointed out as unique in the black and white style of architecture. Views of the church were afterwards secured, the members finishing up their efforts amid a downpour of rain, the enthusiastic secretary being fairly pelted away by it in "taking his last shot." Although the plates were exposed under such adverse circumstances, the resulting negatives have proved in many instances good ones.

North Staffordshire Amateur Photographic Association.

The ordinary monthly meeting was held on Wedesday, July 29th, Mr. F. J. Emery (Vice-President) in the chair.

Some of the members showed prints from negatives taken on the occasion of the last excursion to Tutbury, &c.

The Chairman expressed regret that unpropitious weather, on the day appointed for meeting their Derby friends, had deterred so many members from taking advantage of the opportunity offered, and hoped that on a future and more auspicious occasion the North Staffordshire Amateur Photographic Association might have the pleasure of assembling in greater force, and meeting their courteous neighbours.

The Hon. Secretary produced a photograph of a group of members taken at Tutbury, and kindly sent by Mr. Bourdin, of the Derby Society.

It was resolved that excursions be made to Dovedale, on Wednesday, August 5th; to Moreton Old Hall and Windlop, on Saturday, August 15th; to Trentham Park and Gardens, on Saturday, August 22nd. It was also resolved that an exhibition of members' work be held in the large Mechanics' Hall in November next, and that amateurs, members of the neighbouring societies of Liverpool, Manchester, Derby, Nottingham, and Burton, be invited to send contributions thereto.

Some financial matters having been disposed of, the meeting terminated.

Manchester Photographic Society.

On Saturday, August 1st, the seventh out-door meeting was held at Haddon Hall, in Derbyshire; and notwithstanding the event of Bank Holiday falling on the following Monday, there was a considerable muster. The weather on the occasion was fortunately all that the most fastidious photographer could wish for.

Arrangements having been made with the custodian of the place, a master key of the various doors about the building was obtained, and cameras were got to work without delay in al directions, and at every available point of advantage.

Plates were exposed on the terrace steps, the terrace front, the Eagle Tower, the courtyard, ball room, chapel, and other interiors; whilst some splendid general views from a distance, and from two or three good points of view, were also obtained, and a very large number of pictures were obtained which could only by accident fail to turn out successfully.

After tea, there being still an hour to spare, a group was taken on a 12 by 10 plate by Mr. Hutchinson, with a picturesque cottage in the background, including also the famous box trees, fantastically clipped into the form of the boar's head and peacock, which forms the crest of the Duke of Rutland. A pleasant return drive in the cool of the evening to Bakewell Station finished up the proceedings.

The next out-door meeting will be held at Worsley, under the leadership of Mr. William Broughton.

On Wednesday, the 19th of August, it has been proposed to have a full day excursion, particulars of which will be duly notified.

Talk in the Studio.

A Rotating Top for the Tripod.—We have seen an ingenious and useful arrangement devised by C. Cusworth, and calculated to be of use to the photographic tourist. The top is double, and the upper part can be made to slowly rotate by turning a milled head, so that not only is it easy to follow a moving object, but the taking of a series of views which shall sweep the horizon is facilitated. The rotating part projects upwards about one-eighth of an inch, so that the camera shall quite clear the legs of the tripod, and the whole thickness of the top is a trifle under one inch.

Death of Mr. R. W. Sprague.—It is with regret we have to announce the death of Mr. Robert Winter Sprague, of the firm of Sprague and Co. To the deceased gentleman we are indebted for that skill and energy which have made the well-known "Ink Photo" process of the firm a commercial success.

Use of Carbon Bisulphide in Prisms. By H. Draper.—Although carbon bisulphide has a higher refractive power than glass, yet its use in spectroscopic observations has been much restricted, owing to the spectra produced by prisms filled with this material being ill-defined. The result is due to striæ, caused by convection currents produced by inequality of temperature. These can be prevented by an active rotation of the liquid, and by maintaining the temperature of the prism constant; the former being effected by the author by a small propeller wheel driven by an electric motor, the latter by a temperature regulator. The constant temperature also prevents the changing of the refractive energy of the liquid, and the continual shifting of the position of the spectral lines either in one direction or the other. The adoption of these devices is of great practical value, inasmuch as a bisulphide prism, whilst giving seven-eighths as much dispersion as six flint prisms, gives four times the light in the entire spectrum, and eight times the light in the region near G. For photographic purposes, the carbon bisulphide prism should replace the train of glass prisms, and even gratings.—*Journal of the Chemical Society.*

Production of Platinum in Russia. (*Dingl Polyt. J.*, 255, 489.)—It is stated that platinum was discovered by accident in the process of gold-washing at Werch-Issetsk in the Ural mountains in 1822. According to Köppen, however, the discovery of platinum appears to have been made at Newjansk in 1819. The extraction was commenced in 1825, 10 puds (1 pud = 16·38 kilos.) being obtained. In 1830 the quantity rose to 106 puds, and in 1840 it reached a maximum, namely 213¾ puds. The large increase in 1840 was due to the introduction of the platinum coinage. The production fell as soon as the coining of platinum money was abandoned. The following quantities were obtained between 1860 and 1881:—

1860.	1862.	1867.	1870.	1871.	1872.	1873.	
61·5	142 5	109	118	125	93	96 puds	
1874.	1875.	1876.	1877.	1873.	1879.	1880.	1881.
122	94	96	105	126	138	179	182 puds.

The district of Gloroblagodatski and the works at Nishne-Tagilsk are the centres of the platinum production.—*Chemical Societies Abstracts.*

Light and Sound Metrets.—Now the waves of light as they travel between the objects we are looking at and our eye, are of various lengths, but all shorter than the sixth metret. The shortest are about four, and the longest about eight, of the seventh-metrets, but none so long as ten seventh-metrets, which would make up the whole of a sixth-metret. They must therefore take rank with microscopic objects so small that they can only be seen with a tolerably high power. Small as they are, these tiny waves advance with extraordinary speed, travelling a distance of thirty quadrants of the earth in a second of time, meaning by a quadrant the distance along a meridian from the earth's equator to the pole, a distance which measures ten millions of metres. The vibratory motion at each point of space is transverse to the direction in which the waves are travelling, a kind of motion with which we are familiar in the waves that run along the surface of water. The range of this transverse motion is about a tenth-metret, the very minute quantity to which I draw attention below; and the rapidity with which it is repeated varies with the colour of the light, and for green light has about its mean value. In a ray which produces this colour the oscillatory movement is repeated about as often every second as there are seconds in nineteen millions of years. *What, then, are Metrets?* Scientific measures are now made in metres and divisions of the metre. The metre itself is a few inches more than a yard long, and is divided into metrets, a convenient name for its decimal sub-divisions, that is, sub-divisions each of which is the tenth part of the one before it in the series, and ten times the next after it. The decimetre, or tenth part of a metre, is the first of these metrets; it is about a hand-breadth. The next metret is the centimetre, the hundredth part of a metre, and is about a nail-breadth. The third-metret is the millimetre, about the distance across a small pin's head. The fourth-metret is the tenth of this, and is about the thickness of a sheet of paper. The fifth-metret is microscopical; it is intermediate in size between the diameters of the red and white discs that float in human blood. The tenth of this, the sixth-metret, would be a very small object in the microscope, and no microscope is able to show the seventh-metret, which is the next of the series. However, the study of nature has obliged us to go farther than the microscope can penetrate, and leads us on to, at all events, the tenth and eleventh of this series of metrets. The tenth-metret is so small that a child during the years of its most vigorous growth is growing at the average rate of between thirty and forty of them every second, and the eleventh-metret is the tenth part of this again. This is about as far as the scientific examination of nature has as yet obliged us to go.—*G. Johnstone Stoney, lecturing at the Royal Institution.*

A Typical Girl-Portrait by Galton's Method.—The professor of chemistry and his assistant at Smith College, says the *Journal*, have succeeded in accomplishing, by the means of science, a feat which has been attempted through literature in many resolute and vain experiments. The typical young woman of culture, the ideal of many poets, the study of modern novelists, has been finally discovered and made public, not by insight, nor philosophy, but by the useful, though apparently prosaic, art of photography. The process by which the typical girl has been produced is well known to those who have seen the results of Francis Galton's experiments in photography. Two points are marked on the camera, and the eyes of the sitter exactly coincide with these points. Perhaps a dozen or twenty-five sitters are chosen, and each quickly takes his place before the camera, occupying only a second or two. All are placed in the same position, the sitter with the most regular features being taken first, and in the end there is developed the composite photograph which shows the features common to all the sitters. Remarkable results have been obtained. Composite photographs of men of science and mathematics have been developed in which the features of the type have been preserved, and individual peculiarities lost. The experiment at Smith College has been particularly interesting and successful. Eleven girls in the senior class in physics were placed before the camera in turn, and slowly the typical girl of culture grew out of the shadows, one might say, since she exists only in part anywhere. The photograph, fully developed, excites an uncanny feeling, for the eleven seniors have melted into one, a being that does not exist, yet serves a useful purpose as a type. The mystery of the camera is undeniably beautiful. With high brow softened by fluffy waves of hair, deep-eyed, with refined features and earnest expression, she is a young woman of dignity and sweetness. She is born for deep thought, and yet for sympathetic comfort and cheer. To be sure, she has a tendency toward a double chin, but the lines of her countenance are noble, and her head is evenly developed. The senior class at Smith College has named its new sister Miss Senior P. Smith, the P. indicating Physics, and will place her photograph in their albums, a shadow substance of a thing unseen, among the class photographs of bright and thoroughly alive graduates.

Photographic Club.—The subject for discussion on August 12 will be "On the Use of Sulphites and Bisulphites in the Developer." Saturday out-door meeting at Chiswick; meet at Gunnersbury Station at 2 o'clock.

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To Correspondents.

*** We cannot undertake to return rejected communications.

Ebbw Vale.—1. The series is not yet complete, and will be continued shortly. 2. As far as we know, there is nothing of the kind published; but it is probable you will experience no difficulty in making a satisfactory arrangement. Perhaps, if you send us a rough tracing we may be able to make some useful suggestion.

E. Edwards and Co.—Your request is unreasonable. We have written to you.

Teignbridge.—As a matter of fact we have both in use at the present moment—one thickness of each. Perhaps it is needless to give a formal opinion.

Ceramic.—A short handbook of the enamel process, by the dusting-on method, is published by Solomon, of 22, Red Lion Square, and we have in hand a paper on the same subject by the late H. Nathaniel White, which paper will be published shortly.

E. Moorfield.—It has been sent.

Stockwell.—1. It will answer very well. 2. If you cannot obtain them from Warnerke and Co., of Poplar Walk, Herne Hill, S.E., there is but little chance elsewhere.

Litho.—An article on page 770 of our volume for 1882 will give you all the information.

J. W.—Soak it in the following:—

Alum	1 part
Citric acid	2 parts
Water	10 parts

When the negative is cleared, wash thoroughly.

H. H.—1. The paper will be best. 2. This should not happen. If the lens is by a responsible maker, take it to him, and point out the defect. Perhaps you can improve matters by shifting the stop, so as to bring it closer to the lens.

B. L. Breston.—Perhaps the bath is too strong; add one-fifth of its bulk of water. 2. Not long enough in the bath; leave it twice as long. 3. A good quality of white printing paper will answer the purpose; better to have it rather stout than thin. 4. Certainly, if he engaged to do it.

One in Trouble.—Obtain Abney's "Instruction in Photography," published by Piper and Carter. Although we have every desire to be useful to our correspondents, we can hardly publish full working details of every-day processes in these columns.

Nitrate.—Three.

Transfer.—The following will answer:—

Gum	25 grammes
Common salt	3 ,,
Perchloride iron	8 ,,
Tartaric acid	4 ,,
Water	100 cubic centimetres

Beginner.—It is quite possible that the original glasses have been replaced by others, and that the instrument is quite valueless. Only those who can form a decided opinion as to the value and condition of such goods should purchase them at a pawn shop. If you like to send the lens to the News office we will tell you what we think of it.

Opal.—It seems to us likely that you have exposed the emulsion or the plate to light during the preparation; but it is impossible to say with certainty from a mere inspection of the plate that you send.

The Photographic News.

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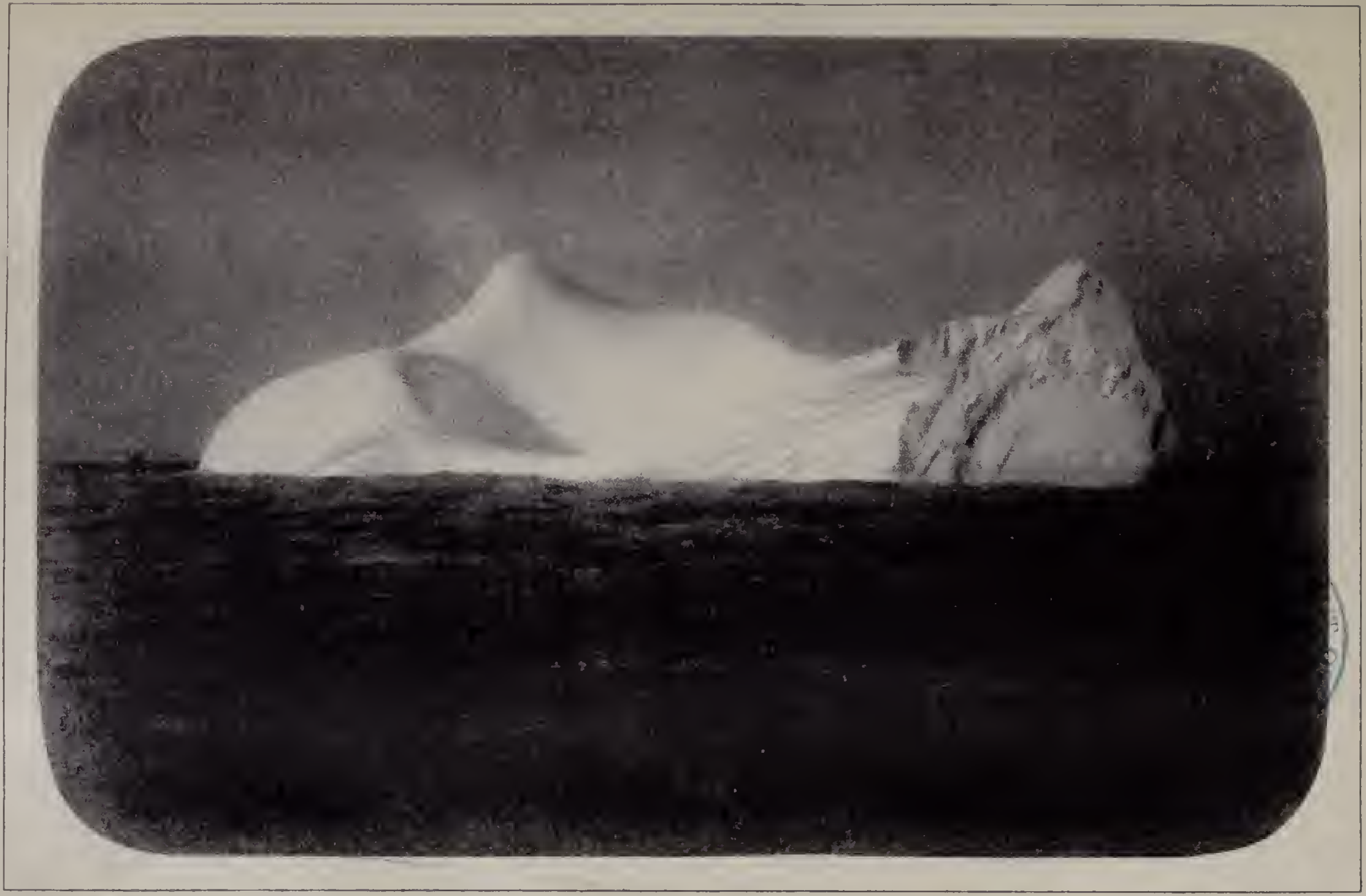

"Ink-Photo" Sprague & Co 22, Martin's Lane Cannon St EC

ROBERT E HOLLOWAY, PHOTO

AN ICEBERG A MILE OFF THE HARBOUR OF ST JOHN'S, NEWFOUNDLAND.
(About ¼ Mile in Length.) June 1885.

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THE PHOTOGRAPHIC NEWS.

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INTERNATIONAL INVENTIONS EXHIBITION.

LIST OF AWARDS.

The following items are extracted from the general list of awards which was published on Wednesday last as a supplement to the *London Gazette*. It may be noted that the list is issued as subject to revision, but we assume that this refers rather to the wording of the clauses describing the subjects of awards, rather than the awards themselves. G, signifies gold medal; S, silver medal; and B, bronze medal.

Atmut—Tailfer and J. Clayton, photographic dry plates—S. J. J. Ayling, examples of photo-mechanical printing—B. A. Boake and Co., manufacture of sulphurous acid and sulphites—S. J. Cadett, instantaneous shutters for photography—S. C. G. Collins, excellence in manufacture and useful photographic appliances—S. A. A. Common, Celestial photographs—G. D. C. Dallas, examples of photo-mechanical printing—S. Eastman Dry Plate and Film Co. (U.S.A.), apparatus for the production of negatives in the photographic camera from continuous rolls of paper—S. E. W. Foxlee, examples of the continuating action of light in carbon printing, as discovered by Captain Abney—B. C. Hancock, examples of photo-mechanical printing—S. George Hare, excellence in manufacture of photographic cameras—S. F. W. Hart, various photographic apparatus, ingenious and of good workmanship—S. Professor W. N. Hartley, spectrograph and spectrometer, with photographs of the spectra of metals—S. A. L. Henderson, ceramic work—S. Hopkin and Williams, fine chemicals—S. F. E. Ives (U.S.A.), improvements in the production of prepared paper and photo-typographical blocks—S. J. B. Jordan, sunshine recorder—S. Dr. Maddox, replacing collodion by gelatine in the emulsion process of photography—G. Marion and Co., photographic apparatus—S. Morgan and Kidd, argentic gelatino-bromide process for photography—B. Paget Prize Plate Company, dry plates for photography—B. Photographic Artists' Stores, dry plates for photography—B. Photographic Society of Great Britain, historical exhibit of various processes—*diploma of honour.* Platinotype Company, excellence of results in photographic printing produced by W. Willis' invention—G. Poldireff (Russia), photography by artificial light—B. Ross and Co., progress and excellence of work in the manufacture of lenses since the early days of photography, also microscopic and other optical apparatus—G. W. W. Rouch and Co., improved camera and dry plates—S. T. Samuels, apparatus to be fitted to the photographic camera for holding and exposing dry plates—B. Sands and Hunter, adaptation of various improvements for photographic apparatus—B. B. J. Sayce, prominent share in the invention of the collodio-bromide process—G. J. F. Shew and Co., various convenient contrivances in connection with photographic apparatus—B. A. Spiller, gelatino-chloride of silver transparencies, developed with hydroxylamine—B. Sprague and Co., photo mechanical printing—S. J. W. Swan, incandescent lamps—G. Ditto, part taken by him in carbon printing—G. Thornthwaite, Horne, and Wood, improved lime-light apparatus, and photographic apparatus—B. Van der Weyde, electric illumination of the sitter in photographic portraiture—B. Count Ostrorog Walery, carbon and enamel photographs—B. L. Warnerke, progress in connection with film negatives for photography—S. Wenham Patent Gas Lamp Co., Limited, regenerative gas burner—S. W. B. Woodbury, the part taken by him in inventions in connection with permanent photographic printing—G.

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THE TREATMENT OF DOUBLE ALBUMENIZED PAPER.

Printing on double albumenized paper is becoming from day to day more common with photographers. Whether or not the very high gloss of some albumenized papers made at the present time is to be desired, is a question we can scarcely enter upon. It is certain that the painter, as a rule, prefers a dead or matt surface to a glazed one; but there can be equally little doubt that the pictorially uneducated eye rests with pleasure on a picture done on paper of high gloss, and it must be admitted that there is something to be said for the opinion which we have heard expressed: "Better have one thing or the other, either a true matt surface, such as that of a platinum print, or a thoroughly good gloss, such as that of double albumenized paper. In fact, if you go in for what some people call 'meritricious gloss,' better have a good dose of it at once."

Whatever the right or wrong of the question may be, the fact remains that "double albumenized" paper is used to a greater extent every day, and that, moreover, by improvements in the manner of manufacture, double albumenized paper is to be had to-day with a much higher surface than that of any paper which could be got a few years since. With this very high surface paper, it is certainly possible to get passable prints from negatives which will give nothing presentable with single albumenized paper; whilst with very dense negatives the shadow detail is better rendered.

There are certain difficulties in the way of working very high surface paper, of which we propose to say a few words.

The first difficulty appears the moment that the paper is floated. The edges rise from the bath much more determinedly than in the case of single albumenized paper. Indeed, if the high surface paper be very dry, it will curl up almost into a roll, and the sheet will be spoiled by the bath liquid being carried on to the back.

Vigorous breathing on the back of the paper will, as might be expected, flatten it again after a time, but this is a troublesome operation to repeat for every sheet, especially as a much more prolonged breathing is necessary than for single paper.

The best course to pursue is to have the paper, before it is sensitized, as damp as it can be made without danger of at all spoiling the surface. It is scarcely sufficient to hang it in a damp cellar for a few hours, unless, indeed, the cellar is almost preternaturally damp. The best method that we know of is to hang the sheets in a cupboard with a large flat vessel below, and into this latter to pour some boiling water. If the paper be rendered damp enough, it will show no tendency to rise at the edges, and will, moreover, as we explained some time ago, absorb less of the bath solutions.

The next nuisance consists in the formation of "tears" on the paper whilst it is drying. This can, to a great extent, be prevented by weakening the bath, and it is undoubtedly the case that on a weak bath relatively better results can be got with double albumenized paper than with single; still, we cannot recommend the plan. We prefer not to let the bath go much below 60 grains to the ounce, but to blot off the sheets before hanging them up to dry; or laying them flat with the albumenized side downwards, which is the course we generally adopt. The paper we use is the ordinary white blotting-paper, sold by stationers; but there can be no doubt that it would be a wise precaution to use the paper free from all chemical impurities, which is made specially for photographic purposes.

If the albumenized paper be washed by floating, and be afterwards re-sensitized on a weak bath, as we recommended some time since, there will be no tendency towards the formation of "tear drops."

In the first washing after printing, double albumenized paper tends to curl up in a way that is very irritating. The only remedy here is patience.

It is in the toning, however, that high surface paper is liable to prove most recalcitrant. Indeed, at times, with a bath that will readily tone single albumenized paper, double albumenized simply refuses to change colour at all. Various toning baths have been recommended, especially on the other side of the Atlantic, for high surface paper; but the only departure from ordinary practice that we have found at all necessary is the use of more gold in the solution. This does not involve waste, as might at first sight appear. The amount of gold necessary to get a certain tone on a print appears to be, to all intents and purposes, the same whether a long or a short time be taken for the toning. To tone paper that, from its being of a high gloss, is obstinate, the only thing necessary is to make the toning bath so concentrated—as regards gold, not as regards acetate of soda or other salt which may accompany the gold—that the prints will tone to the deepest purple in from ten minutes to a quarter of an hour, when the temperature of the solution is 60° to 70° Fah. With some brands of paper it is necessary, to secure this speed of toning, to increase the bath to as much as 1 grain of gold chloride to each 4 ounces of water; but, as a rule, 1 grain to each 8 or 10 ounces is sufficient.

Double albumenized paper appears to require a little more gold in toning than single, whether the bath be weak or strong. It should, however, always be possible to tone a sheet 22 by 17 inches with 1¼ grain of the chloride. Perhaps the greatest manipulative difficulty with very high surface paper occurs when it has to be dried both after sensitizing and after the final washing of the prints. The paper curls up to an excessive degree—to such an extent, indeed, in some cases, that if it be allowed to completely dry at either of the stages mentioned, without the adoption of some means for keeping it flat, it will be impossibe afterwards to flatten it without cracking the albumen. In the case of the paper after sensitizing, the difficulty may be overcome by placing the sheets between blotting-paper before they are absolutely dry, or even in the printing frame. Many printers prefer to print with paper which is not "bone dry."

The prints we prefer to treat in the manner which we described a few weeks ago; that is to say, by rolling them, albumenized side outwards, on a wooden roller before they are absolutely dry. They may, however, be dried by piling them between sheets of dry blotting-paper before they have begun to curl severely, and leaving them under a weight for twenty-four hours or more.

THE CITY AND GUILDS EXAMINATIONS.

The list of those who have taken prizes is now made public, and a list of the successful competitors in photography is appended:—

The number who have received recognition is 38. Of these, 4 are first in honors, and 3 second; the remainder comprise 15 first, and 16 second class, in the ordinary pass grade.

Only five prizes have been awarded, and they go without exception to one Metropolitan class—that held at the Polytechnic. The names of those who gained certificates identical with results on a former occasion are not here given, as fresh certificates of corresponding value will not be issued.

First Honors.—W. E. Gray, Miss E. L. Hare (2nd prize, £5, and bronze medal), T. H. Norris, F. A. Velasco.

Second Honors.—F. T. Beeson, J. Cartwright, C. J. Leaper.

First Ordinary.—A. F. Adkins, W. H. Carley, H. Chambers (2nd prize, £3, and bronze medal), J. J. Cole, A. F. Evans, C. Faulkner, H. Frewley, F. Glover, C. W. Hollyer, H. Morgan, E. Pierce, E. Senior, J. Thomas (5th prize, bronze medal), F. S. Wells (1st prize, £3, and silver medal), C. W. R. Whiting (3rd prize, £2, and bronze medal).

Second Ordinary.—F. Coglan, J. E. Cross, F. B. Dagley, J. Henderson, E. H. Lugard, G. M. Masters, C. E. Nelson, A. E. Rice, M. A. Senior, W. J. Simpson, H. G. Thornton, A. J. Webber, G. E. Whatley, C. Whiting, W. Wills, G. S. Wilton.

The prizes and certificates will be distributed in December next.

A VISIT TO THE STUDIO OF A PHOTOGRAPHIC PAINTER.

Turning out of Queen Square—that favourite resort of workers who wish for exceptional quiet, combined with immediate proximity to the turmoil of the City of London, we enter a minute squarelet, where the still profounder quiet and the rustic aspect of the green-covered walls suggest the idea that the last step or so has been made with the renowned seven-league-boots. This, it seems, is called Queen Place; and applying for admittance at No. 4, we are speedily taken to the top of the house, and into Miss Twyman's studio. She is at work on a portrait of Sir Moses Montefiore, and tells us that it is a commission from one of the family. On an adjacent easel is a carbon enlargement of the same size as the painting, and this circumstance suggests the question: "Is the painting on a photographic basis?" The reply was, "Yes; on just such an original as my guide-print; and the saving of labour effected by availing one self of the photographic outline is so considerable as to be important; but were it not a question of time, I should always prefer to commence work on the bare canvas." "Does the photographic base economise the labour to the extent of one-half?" we hazarded. "No, certainly not," was the response; "possibly one-third, but not half. Here, for example, is a portrait for which I have already had two sittings, and it is now in such a condition as to involve about as much future labour as if a photographic basis existed on the canvas. It is remarkable," continued the lady-artist, "that although the oil painting over a photographic basis may be every bit as good as one in which the canvas was bare at the outset, the public do not estimate the former so highly as the latter; the very mention of photography often influences them, especially those who cannot judge for themselves as to real artistic merit."

Turning again to the painting of the deceased Hebrew baronet—for it is essentially a painting, notwithstanding that some little distance below the surface a photograph exists—we note very many points of difference between the guide-picture and the painting. The heavy, black, and ungracefully placed curtain background of the original photograph, into which the shaded side of the face inartistically merges, is no more, and in the painting is replaced by a folding screen, while the somewhat exaggerated contrast between the right and left sides of the face and figure is very considerably modified. Seldom have we seen the exact characteristics and expression of a likeness so completely preserved in a painting from or upon a photograph as in the present work of Miss Twyman, and this in spite of the modification which she found it necessary to make in order to meet the shortcomings of the original.

Turning round, we took up one of some half-dozen large sheets of cardboard upon which were mounted portrait studies by O. G. Rejlander. "Truly this is an instance of a photographer really being an artist," remarked our hostess; "they belong to Mr. ——, one of the few persons who possess a nearly complete set of Rejlander studies. He brought them the other day for me to look at. This set is a little valuable, as each sheet is signed by the artist, but unfortunately the prints are fading fast." The last remark was too true, and led to a few of the usual commonplaces on the fugitiveness of photographs in general, and on the wide distinction between the so-called permanency of the most permanent of photographs on paper, and the more real permanency of photographs vitrified on enamel or porcelain. Under these circumstances we naturally criticised some of Miss Twyman's vitrified paintings on china, and examples of her working up of vitro-enamel photographs, a branch of artistic work in which she excels. "Still," she remarked, "how much more common, but how much less satisfactory, are coloured photographs on opal glass—the so-called porcelains; of these I do fifty or sixty for one vitrified picture." Portraits on paper painted with exceptional taste in water colours, and also some large wooden trenchers painted in oil, were also to be seen in Miss Twyman's studio; but to mention them is sufficient.

It is because the greater part of Miss Twyman's commissions come from photographers that we call her a photographic painter; and the fact that in looking round we see work in hand from many of the best West End photographic houses, justifies us in this. One piece of work from an original of W. E. Debenham strikes us; it is a half nude infant, and unites in itself the merits of a thoroughly executed photograph and a high-class painting. We do not enquire whether the painting is made on bare canvas or over a photographic basis.

"I think I told you that the portrait of Sir Moses is not quite finished," says Miss Twyman, accompanying the remark with that kind of half-smile which on the face of a woman indicates that there is rather more meaning in her words than a superficial observer might recognize; as she said this, she made a slight movement in the direction of her palette so we said "good afternoon," and in two or three minutes were in the busy thoroughfare of Holborn.

THE RECENT CONVENTION OF PHOTOGRAPHERS AT BUFFALO, NEW YORK—EXHIBITION OF PHOTOGRAPHIC NOVELTIES.

The following resumé, which we presume to have been written by Mr. F. C. Beach, President of the Society of Amateur Photographers of New York, who, we are informed, attended the Convention, and which lately appeared in the *Scientific American Supplement*, will doubtless be read with interest, as involving points not considered in our notice of last week.

Perhaps the most striking novelty was the very complete exhibit of apparatus and specimens, including a practical demonstration, by the Eastman Dry Plate and Film Co., of Rochester, New York, who illustrated the capabilities of their improved paper negatives.

By the invention of more perfect machinery, this company have been able easily and uniformly to coat large strips of paper with an extremely sensitive gelatine emulsion. The paper is cut into suitable widths and wound upon spools, which are easily inserted in the special but ingenious holder, held upon the back of the camera, and so arranged that the unexposed paper on the loaded spool is drawn over a board occupying the same plane as that of a sensitive glass plate, and is wound upon a vacant spool at the opposite end. Intervening smaller rollers are provided, which keep the paper stretched taut across the face of the board, and arranged on the periphery of one roller is a projection which at each revolution punctures a small hole in the edge of the paper strip, and also presses down a flat spring, which, as it is released, makes a loud click. As the small roller is one-quarter the diameter of the spool holder, it makes four revolutions for each single revolution of the latter; hence, after one exposure has been made, the empty spool holder is revolved by a key; the operator, upon hearing four clicks, knows that a new surface has been brought into place ready for a second exposure. In taking out a spool of exposures, each picture can be determined before development by counting every four dots pricked in the edge of the paper, and thus, with a pair of shears, it is readily separated from the others.

The exposed paper is developed in the ordinary way with an alkaline developer, preference being given to the use of carbonate of soda combined with sulphite of soda and pyrogallol. It is fixed in a fresh solution of hyposulphite of soda. When dry, it is rendered transparent by means of castor oil. Specimen paper negatives of heads nearly life-size were shown; also positive prints from the same. No grain was apparent in the latter, and the peculiar softening of the dark shadows, which it is claimed the paper will do, was especially noticeable. The ease with which retouching on the paper may be done was also noticed. The advantage of the amateur when about to take an extended pleasure trip, in having only to employ a light case of sensitive paper instead of loads of heavy glass, was very forcibly shown.

A series of landscape paper negatives, made by a young lady who had had very little experience, illustrated the remarkable uniformity of the paper, and the ease with which it may be worked. The workmanship on the spool holder box was of the best character, and reflected credit upon the designers. It was substantially made, and well finished.

In cameras a very large assortment was shown, the exhibits of Messrs. Anthony and Co., and the Scovill Manufacturing Company, of New York, being the largest. From the delicate bicycle camera, weighing a trifle over a pound, to the mammoth 24-inch portrait camera for life-size work, seemed but a step, yet there was a large variety.

Cameras with revolving fronts or revolving backs were to be seen. Some improvements in view cameras, whereby their folding beds were secured in a horizontal position by sliding bolts instead of the old-fashioned screw, and improved means of focussing, were also noticeable.

The display of the Blair Tourograph Co., of Boston, Mass., illustrated the American idea of making one instrument adaptable to as many uses as possible. The construction of their instrument is made as light as possible, and by a simple attachment much larger pictures can be taken with the same apparatus than was originally intended.

The Rochester Optical Co., of Rochester, New York, exhibited a series of view mahogany cameras, well made and light. One of the recent improvements which they have introduced is a peculiar rotary cam button for securing the upper portion of the ground glass frame or the plate holder in position. The movement is quite simple, and at the same time effective, in holding the plate holder tightly against the back of the camera.

One of the simplest cameras was shown by Chas. Schofield, of Utica, N.Y., styled Schofield's Unique Apparatus. A box formed the base of the camera; the rear frame of the latter was hinged to the upper side of the cover of the box; the front frame, which carried the lens, was fastened by keyhole slots to the upper edge of the box. Focussing was accomplished by moving the cover of the box in or out. To pack the apparatus, the front lens frame was detached, and the camera turned over and compressed under the cover in the box.

Various forms of tripods were exhibited for large and small instruments. One of the newest was a folding tripod, made by Anthony and Co., of light hickory and ash. It was capable of being folded into a length of twenty inches, and weighed less than two pounds. It was said to be of sufficient strength to support a large eight by ten camera. Other tripods were constructed with metal tops, having camera screws permanently attached, and also provided with sliding legs for adjusting the height of the camera.

Very few shutters for instantaneous work were shown. That exhibited by D. W. C. Hoover, of Buffalo, known as Hoover's combined shutter and diaphragm, attracted much attention. It consisted in having two light thin strips of gutta-percha pass in slits through the lens tube in the place usually occupied by the diaphragm The principle of the movement was "go and return,' and the strips were operated by a toggle joint and a coiled watchspring Diamond-shaped openings were made in the strips, and the size of the diaphragm was regulated according as the strips were drawn apart or closed together. The whole was neatly encased in a gutta-percha box. It possessed the advantage of enabling the operator to make a time or an instantaneous exposure at will, with any sized diaphragm he might desire to use. It also tended to make pictures taken instantaneously much sharper and more distinct than is usually the case. When the spring was placed at its highest tension it was estimated an exposure of the mere fraction of a second could be made. Another feature of the invention was the absence of any jar.

Messrs. W H. Walmsley and Co., of Philadelphia, Pa., exhibited a new rotary snap shutter, which was placed on the end of the lens tube. A circular rotary plate, with an aperture in it to match the lens tube, was propelled at its axis by a flat coiled spiral spring, in front of a stationary plate, which was secured to the lens tube. When the rotary plate was released, by a simple trigger or pneumatic device, its aperture rapidly revolved past the lens tube, making the exposure ; after passing the aperture, the plate, instead of coming to a quick stop, was constructed to ride up on a metal incline arranged on the periphery face of the circular stationery plate. In this way the jar which usually accompanies such shutters was avoided. Suitable mechanism was arranged to increase or decrease the tension on the spring, and thereby vary the speed of rotation.

A shutter intended for a studio camera, styled Van Sickle's perfection shutter, and exhibited by Geo. F. Green, Kalamazoo, Mich., worked very easy, and was quite simple in construction. It was arranged on the interior of the camera behind the lens-board, and was composed of two broad quarter moon-shaped thin gutta-percha discs or wings, connected together by a pivot at their lower ends, and provided also with peculiar shaped slots, which engaged with a certain pin attached to the face of one wing. which served as a locking device to assist in holding the wings open. The weight of the wings was exactly the same, so that they always balanced, in whatever position they were placed. They were actuated by a novel pneumatic piston, which consisted merely of a vertical metal tube attached to the end of a rubber tube ; sliding over and outside the metal tube was a metal cap, having a horizontal projection at its lower end, which engaged in a hole at the lower end of one of the wings The metal cap took the place of a piston. As the air in rubber bulb was compressed it elevated the metal cap piston, and it in turn opened the wings quickly ; on releasing the bulb the vacuum drew down the cap, which was also assisted by its weight, and the wings were closed. The rubber bulb was connected by metal tube to the rubber tubing, and was provided with a small hole near its extremity. To hold the wings open for focussing it was only necessary to compress the bulb, and slip off for a quarter of an inch on the metal tube the rubber tubing until the whole of the metal tube was exposed. Air was thus admitted, and when the bulb was released the wings would not close. The manufacturer had several other forms of the same shutter on exhibition, illustrating the various stages of improvement. He appeared to have a very simple and perfect pneumatic device in the latest invention. By suddenly pounding on the bulb, it was possible to make an instantaneous exposure.

One of the most complicated shutters for studio work was exhibited by S. S. Benster, of Toledo, Ohio, known as the Benster shutter. It could be placed either at the rear of the lens in the camera, or in the centre of the lens tube in the place occupied by the diaphragm. Some fifteen thin, diamond-shaped metal leaf plates were pivoted at their extreme angle to a permanent stationary metal ring, and to a rotary ring which revolved inside of the stationary one. A vertical projection on the rotary ring engaged in the horizontal piston rod of a pneumatic piston connected by flexible tubing to the usual rubber bulb.

The elongated portion of each diamond-shaped leaf plate joined and covered each other at the centre of the lens aperture, closing the same. When the rotary ring is actuated or revolved the elongated point of each overlapping plate is by the motion, in connection with the pivot on the stationary ring, carried away from the centre, making a gradual opening ; and when it has reached its greatest extent, each leaf plate is thrown to one side. When the bulb is released, the piston flies back, and the leaf plates return to the centre, closing the aperture. The principle of the shutter is quite ingenious. Owing to the great number of leaf plates, there seems to be danger of its occasionally leaking light.

Gilbert's automatic retoucher for retouching negatives rapidly was arranged to run for half an hour by clock work, and gave a rapid reciprocating motion to the pencil. It weighed but fourteen ounces, and was suspended and balanced near the operator by a pulley and cord. The inventor stated that it saved much labour, and was largely used.

A very large assortment of backgrounds, artificial stumps, trees, vine covered doors, and devices for beautifying photographic pictures, were exhibited. Mr. Seavey, of this city, displayed several novelties in the way of glass foregrounds made under Moreno's patent. Clouds are painted on a large sheet of glass held upright on a wood stand, behind which the sitter is posed ; an appropriate background of clouds is arranged behind. The resulting negative makes the person appear as if he or she were floating in the clouds. In place of clouds, water waves, a burning fire, and other novel effects painted on the glass could be used. By means of this improvement, the double printing of negatives to obtain similar effects was avoided.

The Mallinckrodt Chemical Works of St. Louis, Mo., made a large, well-arranged, and creditable exhibit of many of the principal chemicals used by photographers.

We noticed a simple but effective paper stretcher and drier, to keep sensitized sheets of paper from curling up, invented by Kuhn, of St Louis. A wire plate lifter to take plates out of the different baths or trays, and a compact portable dark-room lamp, were shown by the Scovill Manufacturing Company, of this city.

As the dry pyro is largely used in the development of dry plates, many ways of using it have been devised ; we noticed one firm put it up in homœopathic papers, five grains to the paper ; another compressed it into tablets of two grains each. A pyro auger was a third and novel way to obtain exact quantities of the chemical. The pyro was held in a glass cylinder, through one end of which passed a rod having auger-shaped leaves attached to its inner end, which fitted tightly against the interior of the cylinder. A small metal scale was cemented lengthwise on the exterior surface of the cylinder, having degrees marked on it for 1, 2, 3, 5, 10, or 15 grains of pyro. All that was necessary was to revolve the auger against the pyro, holding the cylinder in an upright position until the auger came opposite to the number of required grains on the scale. The proper amount was then taken out and mixed with the developer.

An improvement in large-sized dark-room lanterns was shown by the Seed Dry Plate Company, of St. Louis, Mo. It consisted in having a long wick shaft project through one of the flat sides of the lantern, properly protected to prevent the leakage of white light. The object of the device was to enable the operator to control the light without opening the lantern door.

A large majority of specimen photographs shown consisted of portraits. Mr. James Inglis exhibited specimens of instantaneous work, and enlargements therefrom, which were excellent. C. Cramer, of St. Louis, Mo., made the best general exhibit. W. A. Armstrong, of Milwaukee, Wis., exhibited fine landscape effects, and Mr. Geo. Barker's large collection of assorted sizes and styles of Niagara Falls elicited general commendation for the technical skill displayed, and the variety of effects produced. We were privately shown a new device for rapidly packing gelatine plates by the inventor, of Mr. F. D. Bull, of St. Louis, Mo., which was in some respects quite novel. Corrugated cardboard partitions were made to fit into each end of a paste-board box, two plates being packed edgewise back to back between each groove.

In order to slip the corrugated strips between the plates, the latter were piled above each other between two sets of vertical rods, and each pair of plates was separated along its length by a metal plate, forked at each end equivalent in space to the groove in the corrugated paper strip. Metal guides containing grooves similar to the corrugated paper strips were arranged in a vertical plane obliquely to the edge of the tier of glass plates, and after they had been piled up to the requisite number, the paper corrugated strips were very quickly slid over the metal corrugated guides in between the edges of the glass plates. Then pressure on a treadle below, actuating a lever, withdrew, by a horizontal sliding motion, the separating metal plates from between the glass plates, and allowed the latter, having the corrugated paper strips between them at each end, to be removed, and by another operator be slipped into the paste-board packing box.

It should be stated that the metal separating plates travel over the two sets of vertical rods previously mentioned, and as the rods are secured to the sliding bases, they withdraw the separating metal plates from between the glass plates.

It had been found, in view of the large industry of the manufacture of sensitive plates, some more rapid method of packing them had become necessary, and the object of this invention was intended to meet this want. It appeared to operate very perfectly, and was a most useful improvement.

At the first meeting of the Convention, Mr. C. Gentile, editor of the *Chicago Photographic Eye*, made an address on the "Progress of Photography" (see p. 500 of our last number).

Other papers were read on the succeeding days [these were printed in the last number of the Photographic News.]

W. H. Potter, of Indianapolis, Ind., was elected the new President of the Association, and it was voted to hold the Convention in 1886 at St. Louis, Mo.

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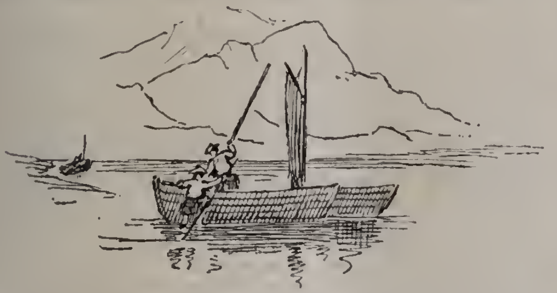
ARTISTIC FEELING IN PHOTOGRAPHY.

BY A. H. WALL.

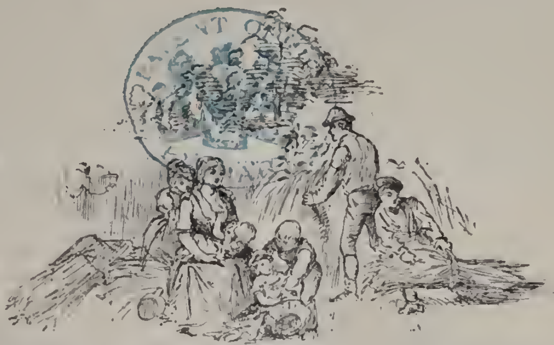
Part V.—Figures in Landscapes.

When a landscape painter introduces figures into his pictures, he usually does so with several objects in view. They may add to the particular sentiment, and thereby impress more strongly the spectator's feelings; or they may serve various kinds of technical purposes in connection with the composition. In most of Turner's landscapes where figures are introduced, they were created for the last-named ends; and so careless was he of any others being served by them, that most of his figures are put in without the slighest regard to accuracy of drawing, or even (which was a mistake) to probability. Thus, in his picture of Loch Awe and Kilchurn Castle (painted, probably, in 1801), he represents three boats, managed, as Mr. P. G. Hammerton first pointed out, by kilted Highlanders, two of the three boats having sails. As no one ever dared raise a sail when boating on Loch Awe, in consequence of the violent uncertain gusts of wind which prevail there, the reasonable conclusion is that no such boats were ever seen on Loch Awe, and that Turner's only reason for their presence is to be found in the fact that by cutting the base-line of the mountain, and so coming well forward in the picture, they introduce an appearance of greater space and air—in technical language, "throw the mountain further back." I append a slight explanatory sketch. This is only one of many similar illustrations that might be pointed out in works by Turner. Yet Monkhouse tells us that he was "very careful to study not only the principal features of the country, but the costume and employment of the inhabitants, and the description of local vehicles, on wheels or keel."



Figures are valuable in landscape when they add force to its expression. Pedestrians struggling against wind, or driving rain, or bewildered by rapidly-falling snow, emphasize storm effects very powerfully if well introduced and conceived. Intense cold may be expressed more readily and strongly by the introduction of figures. Human terror added to nature's grandly terrible effects will strike home to the spectator's feelings and imagination more readily in association, than either can be separately; and bits of rustic life add greatly to the interest of country scenery.

Of this a very good example is given in one of the pictures exhibited at the Royal Academy in 1848, "The Harvest Field," by W. J. Witherington, R.A., a landscape painter who was peculiarly happy in his rustic landscape figures. I append a slight pen-and-ink sketch of the principal group, which was most carefully chosen and arranged, adding great technical value to the work, while it at the same time increased its human interest, and marked strongly its essentially English and rustic character. I say nothing of the opportunity it afforded for colour; and the way in which it kept retiring objects in their places could only be seen in what I cannot give—a very elaborate and highly-finished copy of the original.



Figures serve important uses when they are introduced as spots or masses of light and dark, to balance a composition or emphasize effects of light and shade.

I have lately been making some sketches in Epping (of which I shall some day have more to say in special connection with woodland photographs); in fact, for some days I worked with Mr. Lindley, whose recently-published "Walks in Epping Forest" you may have seen, and with him traversed that wild and picturesquely romantic dis-

trict in all its most lonely and secluded sections. One of the many sketches then made may here serve to show how much assistance even a single figure may render in giving effect to light and shade. Before I introduced the figure, the sunny effect I endeavoured to copy seemed very imperfectly rendered, but it brightened up wonderfully when I placed the shadowed flesh and dark dress of the lady in contrast with the strongest light. For this reason I have asked our Editor to reproduce it in black-and-white, instead of merely in lines.

Another illustration which struck me as likely to be suggestively serviceable to the young photographic art student was obtained from "Vietri," a picture in the royal collection by Clarkson Stanfield, R.A. The grouping and arrangement of the foreign fisher folk, with their fish and baskets, are admirably managed in the original to give effect and interest; but they are further aided by other figures—not given in my rough and hasty sketch

—which figures by their relative sizes and tones, give wonderful expression to the feeling of air and space in this noble work of art.

I remember in one of Witherington's canvasses an excellent result secured by the introduction of some figures working in a woodland gravel pit, but regret that the memory is not so strong that I could sketch it. In one of the best pictures Richard Redgrave, R.A., painted, a woodcut copy of which appeared in the 1859 volume of "The Art Journal," there is an excellent example of figures in landscape, which increase the interest, give brilliancy to the light, and the perspective and the expression of air, while at the same time composing well pictorially. I shall resume this subject in my next paper, and add other sketches from the pictures of well-known painters.

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METEOROLOGY FOR PHOTOGRAPHERS.

BY J. VINCENT ELSDEN, B.SC. (LOND.), F.C.S.

Chapter IV.—Atmospheric Pressure—Barometers—Causes of Variation of Pressure—Sunshine and the Barometer.*

We now come to speak of the more important corrections which must be made, in order that barometric readings, taken in different localities, may be compared with one another. One of these corrections, called the *index error* (due to an improper laying off of the scale), is given on the Kew certificate. If the barometer is a Fortin, this correction will be the same throughout the scale; but if it is the Kew pattern, it will generally be variable, and as the corrections are only given for every half-inch between 27·5 and 31, it will be necessary to interpolate for intermediate readings. The next correction is for temperature —*i.e.*, to reduce all readings to a fixed temperature, 32° F. For this purpose, a thermometer should be attached to the case, as near as possible to the barometer tube, and the temperature carefully taken *before* the height of the barometer is read. The necessity of applying this correction is obvious, since, owing to the expansion and contraction of the mercury at different temperatures, the correct height could not otherwise be ascertained. Tables are published* giving the correction for every half-inch, for each degree of the attached thermometer. These corrections are all *subtractive*.†

Since the height of the mercury varies with the elevation of the locality, it is also necessary to reduce all readings to one fixed level, viz., mean sea-level, which is taken to be the mean half-tide level at Liverpool. The amount to be *added* to each reading for this purpose is also given in the published tables. Thus, it is necessary that the height of the locality above sea-level should be known. This can be easily determined, with sufficient accuracy, in the following manner. Take the difference between the barometric readings at the given locality, and at another locality, the height of which is known; then multiply by 9 the difference taken in hundredths of an inch. The product is the difference in height in feet.‡

A common defect in barometers is the presence of air or moisture in the tube, which will cause the readings to be too low. The presence of moisture also tends to make the mercury sluggish, and adhere to the glass. To prevent this, it is usual to boil the mercury in the tube. An improperly boiled tube can usually be detected by the appearance of small specks or air-bubbles in the mercury when examined by a lens. The access of air or moisture at any subsequent period can usually be provided against by the introduction of a pipette in the lower part of the tube.

The almost constant variations in the height of the barometer are mainly due to two causes—viz., *temperature*, and *aqueous vapour* in the atmosphere. Air, like most other substances, expands when heated, and contracts on cooling. Cold air is, therefore, denser than warm air, so that cold air descends, and warm air ascends. The ascent of warm air causes a diminution of pressure, and the barometer therefore falls as the temperature rises. This influence of temperature is more especially seen in the dry interior of continents and in the tropics, where the daily variations of the barometer are so regular and striking, that it is said that the time can be told within twenty minutes by the height of the barometer, and any irregularity is an unfailing sign of a storm. In England, however, these diurnal variations are not more than ·02 inch, and are nearly always concealed by the non-periodical oscillations, due to the passage of storms. But temperature is not so important an agent in affecting the pressure of the air as the influence of aqueous vapour. The more heavily laden with vapour the air becomes, the less is its pressure; for whereas a cubic foot of perfectly dry air weighs more than 500 grains, a cubic foot of water vapour only weighs about 5 grains under ordinary conditions. Supposing, then, that atmospheric pressure is due solely to the weight of the constituents of the air, we see why damp air should exert less pressure than dry air. We may, in fact, consider atmospheric pressure as made up of two constituent parts, dry air pressure, and the pressure of the vapour present, which latter is generally called vapour tension; and it is

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* Continued from page 508.

* See "Instructions in the Use of Meteorological Instruments," by R. H. Scott, F.R.S.

† The reduction may be made by the following formula:—

$$h = \frac{H}{1 + t(\cdot 000018)}.$$

Where h=height of mercury at 0° C., H its observed height, and t the temperature in centigrade degrees.

‡ More accurately, the difference in elevation between two stations is found by the following formula of Laplace, which can also be used for reductions to sea level, if the altitude is known:—

$$f = 60159 \log \frac{h}{h^1} \left(1 + \frac{t + t^1 - 64}{900}\right) (1 + \cdot 00268 \cos 2l) \left(1 + \frac{f + 52251}{20886861} + \frac{x}{10443430}\right)$$

Where f=the difference in height of the two stations, x the height of the lower station above sea-level, h and h^1 are the barometric readings of the two stations reduced to 32° F.; t, t^1 the temperatures, and l the latitude of the place. In the last factor, an approximate value is used for f.

an easy problem to determine exactly how much of the barometric pressure is due to the air alone, if we know how much vapour is present in it at any given time. This is easily determined by finding the dew-point, as will be subsequently explained. Now let us suppose that the barometer on any given occasion stands at 29·8 inches, the temperature being 25° C., and the dew-point being 20° C. On referring to a table of vapour tensions, we find that the pressure of aqueous vapour at 20° C., in a space saturated by it, is ·7 inch. Therefore, in the present case, we have only to find what the pressure of this same vapour would be at 25° C., and substract the amount from the barometric reading. A pressure of ·7 inch at 20° C. becomes at 25° C. a pressure of—

$$\cdot 7 \times \frac{273+25}{273+20}$$

which is nearly ·712 inch. Therefore the pressure due to the air alone is 29·8 — ·712, or 29·088 inches. Thus we see that the vapour tension is always extremely small compared with the dry air pressure, and the greater the proportion of vapour in the air, the less dense it will be. Since the temperature and humidity of the air are constantly changing, the barometer is in a state of continual oscillation; and as wind is the result of differences in atmospheric pressure, these determination of these conditions is of the utmost importance in meteorology.

We shall conclude this chapter by referring to the connection between the height of the barometer and sunshine. In a communication to the Meteorological Society in 1879, Mr. Whipple shows that the readings of the so-called weather-glasses are misleading in this respect. He found that, for Kew, the maximum sunshine appeared when the barometer had a height of 30·15 inches, and that, when higher, clouds returned, so that at 30.6 the sunshine was no greater than 29·2. Thus, as Captain Abney points out, it appears that for London the most favourable weather for landscape work is when the barometer stands at about 30 inches, and then, according to Mr. Whipple's observations, there should be, not absolutely clear sky, but just such a proportion of cloud and sunshine to give good effects of light and shade, and a rich gradation of tone. This does not necessarily apply, however, for other localities. It would be interesting, from a photographic point of view, if, by careful comparison of the sunshine records with barometric heights, it were possible to foretell the probable kind of light which might be expected, by observing the height of the barometer.

(*To be continued.*)

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APERTURES FOR STOPS FOR LENSES.

BY C. FERRIS.

On page 248 of the *Times*, I find the scale of sizes for stops for photographic lenses which have been adopted by the Photographic Society of Great Britain, which, taken in connection with the comments, would carry the idea that it is only necessary to know the *equivalent focus* of a lens to be able to make a stop that will give the same amount of illumination on the plate, whether the lens be a single, double, or triple combination.

There seems to be a principle in optics which all writers on apertures for stops have overlooked; that is, a larger bundle of parallel rays of light will pass through a given size stop after passing through a condensing lens than before, and the greater the distance of the stop from the lens, or the greater refracting power of the lens, the more light will be admitted.

In the single combination, or view lenses, the stop is always placed in front of the lens, and the amount of light admitted is always the same, and with such the scale for stops referred to is all right; but when we have the compound lenses to deal with, with the stop placed within the combination, there can be no scale or system of stops adapted to "equivalent focus."

A little mathematical demonstration will show the difference between the two classes of lenses. Take, for comparison, a single lens 12-inch focus, $\frac{f}{12}$ stop, and a compound lens 12-inch equivalent focus, front lens 15-inch focus, stop 3 inches, back of front lens. Now it is evident that a bundle of parallel rays of light that would be condensed to a point in 15 inches would be condensed one-fifth their diameter in three inches, the place of the stop, which would be equal to a bundle of parallel rays one and one-fourth the diameter of the stop. This would give an illumination on the plate more than one and one-half (1·56) times as strong as the same stop in the single lens camera.

Now move the stop back one inch farther from the front lens, or shorten the focus of the front lens to about 12½ inches, and you will increase the illumination on the plate to double what you would have with the same stop in the usual place in the single view lens.

The English scale is all that can be desired for single lenses; the ratio is a good one, being such that one stop is about 1·42 times the diameter of the next size smaller, and giving just double the intensity of light on the plate. What the photographer requires is a uniformity in the numbering and size of his stops, such that the same number of stop shall give the same illumination on the plate, whatever be the combination of lens used, and as "equivalent focus" will not harmonize a compound and single combination lens, the only alternative is for the optician to estimate the extent of refraction between the front lens and the stop in double combinations, and make and number the stops to correspond with the adopted scale.—*Photographic Times.*

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Review.

Die Photographie mit Chlor-Silber Gelatine. Von Ludwig David und Ch. Scolik. (*Vienna: A. Hartleben.*) A well-written and compact hand-book of the gelatine process, and consisting of a hundred and fifty large octavo pages. The book bears the impress of being written by practical workers, and as it contains much condensed information, is likely to be of service to all who are engaged in photographic work.

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Notes.

With what persistent ingenuity enterprising photographers turn to account the publication of "births" in the *Times*, we described last week. But it is not the "hatches" only which are made an excuse for touting for business. The "matches" and "despatches" are also watched with similar care, as everyone who perpetrates a marriage, or loses a relation, and subsequently makes the fact public in the newspapers, has only too good reason to know. The photographic copy of the list of marriages is usually mounted on an appropriately fancy card, whilst, in the case of the deaths, a mourning-bordered card, ornamented with the usual insignia of the tomb, is employed.

Nor is this all; for whilst the Benedict is often inundated with offers to photograph the wedding-cake, the bridesmaids, and the marriage presents, the mourner has his grief aggravated by batches of sample photographs of mausoleums, sarcophagi, and various styles of family vaults, accompanied with business-like invitations to make his choice, and to secure the liberal discount allowed by Messrs. Mould and Co., by paying ready money, and so on and so forth. At least one enterprising undertaker in London has taken the trouble to have his funeral paraphernalia photographed – mutes, feathers, catafalques, and all—and is thus enabled to issue a most realistic illustrated price-list, showing what he is prepared to do for various terms from ten guineas upwards. Thus it would seem, then, that the camera literally haunts us from from the cradle to the tomb, and after duly recording the fact of our births, positively follows us to the grave, and secures a negative of our tombstone.

Few photographs of the last twelvemonth have been more popular than the portrait of the Princess of Wales in the college cap and gown, when the honorary degree of Doctor of Music was conferred upon her in Dublin. It has also done what can scarcely be said of any other photograph: it has set a fashion. We are now told by a fashion journal that the newest thing in ladies hats is the college cap, very like the one photographed, except that the gold braid is replaced by a bugle trimming. Those ladies who desire to be in the extreme style wear a cloak also with the cap; "but," says the journal in question, "the cloak is less becoming, and if it must be worn with the cap, the college cap is not likely to achieve a wide popularity."

What is the process by which a lady's photograph suddenly becomes the rage and is to be seen in every photographic print dealer's window? In the case of an actress who achieves an unexpected success, and leaps from obscurity at a bound, the matter is easy to understand; but how is it when you see a photograph labelled with a name quite unknown to the general public? An instance has occurred quite lately. Everybody has been asking who is the Miss Dene whose photograph takes the front place in the windows. She is neither an actress, a vocalist, nor a professional beauty, whatever the latter may be; and the puzzle has been, what was her qualification for the position. It is now stated that Miss Dene sat to Sir Frederick Leighton, and is regarded by the President of the Royal Academy as a type of beauty. All this is very interesting, and we have not a word to say against it; but what we want to know is, who first thought of the lady being photographed, and of her photographs being offered for sale. Was it the enterprising photographer, Miss Dene herself, or Sir Frederick Leighton?

The question whether the National Art Collection in Trafalgar Square is to be on view during certain evenings of the week has been ostensibly a mere question of expense; and it is satisfactory to note that the First Lord of the Treasury, who has obtained an estimate of the additional cost, sees no obstacle on this account.

In a photograph of a cricket match, sent to us by H. E. Murchison, of Dulwich, there is much to interest those who delight to handle the bat and ball. The action of the underhand bowler has been admirably caught almost at the instant of the delivery of the ball. Two other men are shown in action, these being the batsman at the receiving end, and point.

"Turn Mr. Holloway's picture of an iceberg, which formed your supplement last week, with the shaded end uppermost, and you will see a most remarkable resemblance to a sheep's face." So writes a correspondent. We turned the photograph on end, looked, and saw the sheep's face; while on turning it over the reverse way, something was seen which had a more remote resemblance to a human face.

The police who have been on duty at the Royal Courts of Justice for the purpose of protecting the building against dynamite outrages were recently photographed by M. Louis Carbonel, of Paris. Both uniform and plain clothes men were in the group. To the ordinary mind, the photographing of plain clothes men, whose value depends entirely on their not being recognised by the would-be criminal, seems attended by some risk. What is to prevent the dynamitists obtaining a copy of this group, and making themselves acquainted with the features of the "detectives?" But perhaps the authorities think the plain clothes men are already so well known that their being photographed would make no difference. Certain it is that nothing could well be more clumsy than the attempts of policemen to disguise themselves. The walk, the stiffness of the shoulders, the cut of the hair and beard, and the obvious attempt at "loafing," all betray the member of the force; while the look of recognition which invariably passes between a plain clothes and uniform man when they meet is of itself quite sufficient to indicate the detective.

Photographers who take the portraits of warriors belonging to the household regiments require to be careful of the position of the sitter with regard to the camera and the various articles in the room. We recently saw a picture of a life-guardsman who had been photographed in full regimentals, and on his polished breastplate were the reflections not only of the camera, but of the photographer's hand holding the cap of the lens, of the sash bars of the studio, and of a Winchester quart which stood on a side table. If the photograph were taken for a love *souvenir*, how such accessories must have spoilt all the romance!

Mr. S. Drewett, the publisher of an etching of the "Tabard Inn," Southwark, in a letter to the *South London Press*, detailing motives which had led him to undertake this and other etchings of historical buildings in Southwark, says:—"The Society for Photographing Relics of Old London had published photographs previously; but on account of the very limited issue, and the inequality of excellence, owing to the variable light of these inn yards, they were, though good, not generally appreciated, or, indeed, known." If this statement be true, the Society should do all in its power to improve its productions. The "variable light" spoken of is, with dry plates, much more under control than with wet, and possibly the Society's photograph of the "Tabard" was on a collodion plate. The etcher has of course an immense advantage over the photographer, as he can leave out anything which is inartistic, or alter its outline so as to assist the composition. A slight touch, a light put in, or a shadow, will often do this. He need not also be too rigidly accurate in matters of perspective, and can get more into his picture than the eye of a person standing on the ground can take in at one glance. The photographer has no such latitude allowed him. With all these drawbacks, however, we do not see why the photographs of the Society should not be appreciated, unless it be due to the hideous colour of the mounting boards. The Society's productions are certainly got up in a most unattractive form.

A curious speculation was started the other day by a medical friend, to whom we were showing a photograph of a group of three persons who occupied the photographer the entire day, owing to the difficulty of obtaining a negative in which one of the three had not moved. "What," asked our friend, "would be the mathematical chance of a person moving whilst being photographed, and in what ratio would that chance increase as the number of persons being photographed together was added to?" We were obliged to confess that the question had never occurred to us before. No doubt such a calculation could be made, since the doctrine of probabilities must come in here as in other things; but the difficulty would be to find data to go upon. If every photographer had kept a record of every negative spoilt through the sitter moving, one might have a few statistics which would determine the point. But what dismal recollections, what horrible memories of bad language in the dark room, what consequent injuries to the nervous system, such a record would indicate! We really have not the heart to suggest that henceforth every photographer should note the number of times the misery occurs, even to give him the gratification of knowing the chance to ever so many decimal places of its happening every time he takes a photograph.

We are constantly hearing of photographs on behalf of which it is claimed that they are "the largest in the world." The American Government—always eager, it is popularly supposed, "to lick creation"—make the latest claim to a "biggest on record," in a photographic sense. It is exhibiting at the New Orleans Exposition a series of views of the public buildings at Washington, taken under its superintendence, which are 7 feet long by 5 feet wide.

The practice of photographing statesmen in their studies, painters in their studios, and authors in their libraries, has now become general, and the glimpse behind the scenes thus afforded is evidently appreciated by the public, who much prefer portraits of celebrities with the realistic backgrounds and surroundings furnished by the said celebrities' own homes. As supply inevitably endeavours to meet demand, we may shortly expect, then, that the above notion will be developed, and that not only artists and politicians, but actors and athletes, dancers and divines, judges and jockeys, will all be taken in the midst of the surroundings they are most associated with.

Patent Intelligence.

Applications for Letters Patent.

9286. William Thomas Morgan and Robert Leamon Kidd, Kew Foot Road, Richmond, Surrey, for "A roller camera slide or carrier for use in producing photographic negatives on paper or any flexible support in rolls or lengths."—4th August, 1885.

9288. Ernest Edward Pickard, 89, Malpas Road, Brockley, Kent, for "Improvements in apparatus for carrying and exposing photographic dry plates."—4th August, 1885.

9505. George Lowden, 65, Reform Street, Dundee, for "Shutter for photographic lenses."—10th August, 1885.

Patent Sealed.

14156. George Percival Smith, Beechholm, Tunbridge Wells, for "Improvements in photographic apparatus."—Dated 25th October, 1884.

Specifications Published during the Week.

13,156. James William Thomas Cadett, Mechanical Engineer, 84, Grove Lane, Camberwell, Surrey, for "New or improved arrangements applicable to photographic shutters whereby the duration of exposure can be varied."—Dated 13th October, 1884.

For slow and moderately fast exposures, stops or catches are so arranged on a photographic shutter that, when the exposing or uncovering part of the shutter is liberated, by moving or pressing a lever or levers, or liberating catch or catches, the exposing or uncovering part of the shutter is opened or moved, so as to give exposure, and then kept open, or in condition to give exposure by a catch or stop, or catches or stops, until the lever or levers, or liberating catch or catches, is or are again moved, or pressed, or released. When quick exposures are to be made, the catch or stop, or catches or stops, for keeping the exposing or uncovering part of the shutter open, or in condition of giving exposure, is or are put or moved out of gear or action, so that when the exposing or uncovering part of the shutter is liberated by moving or pressing the lever or levers, or liberating catch or catches, the exposing or uncovering part of the shutter can open or move, so as to give exposure, and then without necessitating further movement of the lever or levers, or liberating catch or catches, close, or move, so as to cease giving exposure.

12,855. William Watts, of Norman Villa, Burlington Road, Withington, in the County of Lancaster, Silversmith, for "Improvements in camera tripods or supports."—Dated 27th September, 1884.

The patentee says:—My invention relates to the portable folding tripods or stands employed to sustain cameras when in use, and has for its principal object to render such stands more portable and compact when folded and out of use. To this end I so construct the parts as that, when folded, the stand may be made to assume the shape of a walking stick. I make each of the three sections of the stand of such a shape as that, when arranged together, the sections form a round or cylindrical body. Each section consists of two parts, one part being fitted to slide within the other. In practice, I should make the one part of metal, as, for example, of drawn brass tubing, and the other part of a suitable tough and light wood. Each tubular part is formed at its upper end to engage with the tripod top, to which the camera is secured. This top is formed with three spring clip arms, which have grooves to receive wire or metal staples on the tops of the sections. Sliding sleeves, screws, or other means tighten the clips upon the staples. For convenience of manufacture, I may make the said top of two stamped pieces of sheet brass riveted or secured together in the central part. The upper ends of the sections are arranged to be held together by means of a suitable cap, sleeve, or ring. In one construction I so form the upper end of each section as that, when the sections are fitted together, a socket is formed which can be tapped so that a knob, handle, or cap, provided with a sleeve to enclose the upper ends of the section, can be screwed on to the top of the cluster. When so fitted, the stand can be used as a walking stick or staff or alpenstock. The lower end of the staff is also provided with a removable cap or ferule. The wooden parts can be slit outward so as to extend each section. The upper or inner end of each of the wooden parts is slit, and a spring is inserted so that the said part slides within the tube with an elastic friction. A cross wire or studs coming into contact with the ends of wires soldered in the tube or any other suitable stops, prevent the wooden part from being entirely withdrawn. I do not confine myself to the use of wood for the parts which slide within the tubes, nor to the round or cylindrical form of the folded stand, although I consider such form to be most suitable and convenient.

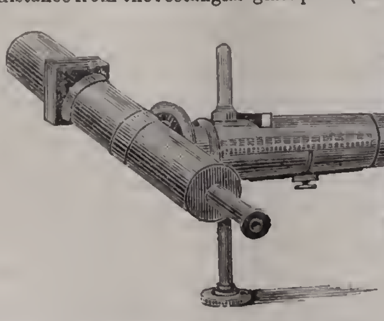
The claims are—

1. The combination of parts constituting a camera tripod, or stand, formed, fitted, and arranged substantially as set forth and indicated hereinbefore.
2. In a camera tripod, the telescopic legs of the formation indicated, substantially as and for the purpose set forth and indicated.
3. In a camera stand, the formation of the telescopic legs so that when shut up and fitted together they form a walking stick or alpenstock, substantially as set forth and indicated.
4. In a camera stand, the camera top formed with spring jaws to engage with staples on the tops of the tripod legs substantially as set forth and indicated.

NOTE ON PROFESSOR LEONHARD WEBER'S PHOTOMETER.

BY BOVERTON REDWOOD, F.C.S., F.I.C.*

This instrument consists essentially of two tubes attached at right angles, in the form of the letter T, in such a manner that, while one is supported in a horizontal position, the other can be placed horizontally, or at any required angle. At the junction of the two tubes is a reflecting prism, by means of which, in combination with a diaphragm, the field of vision of an observer looking into an eye-piece, which forms one end of the movable tube, is divided vertically into two equal portions. One-half of the field is illuminated by the light passing through the movable tube, and the other half by light passing through the fixed tube. The source of the light passing through the fixed tube is a small lamp burning petroleum spirit. This lamp furnishes the standard light, and a scale is attached to enable the observer to measure accurately the height of the flame. Inside the fixed tube, between the petroleum lamp and the reflecting prism, is a frame, carrying in a vertical position a circular plate of opal glass, and travelling along the tube, from end to end, by means of a rack-and-pinion. At one end of the movable tube (the other end being furnished, as described, with an eye-piece) is a holder, in which a rectangular plate of opal glass (or, if desired, two or more of such plates) is placed. The petroleum spirit lamp having been lighted, and the flame adjusted to the height of two centimetres, the light to be measured is placed at a convenient distance from the rectanglar glass plate (usually 1 metre), and the eye of the observer being applied to the eye-piece, the travelling opal glass plate is moved by means of the milled head of the pinion until the two halves of the field of view are equally illuminated. The position of the travelling opal glass plate is then read off on the graduated scale attached to the fixed tube, and the illuminating power calculated by means of the table of values supplied with the apparatus. It is obvious that the travelling opal glass plate, being illuminated by the petroleum lamp, becomes itself, to some extent, a source of light; and the amount of illumination of one-half of the field, therefore, depends partly upon the proximity of this plate. If it is found that the light to be measured is so powerful that the standard side of the field is not equally brightly lighted, even when the travelling plate is brought as closely as possible to the reflecting prism, at the junction of the two tubes, the light may, of course, be removed to a greater distance, or a second opal glass plate may be inserted in the holder. Under ordinary circumstances both tubes of the photometer are in the same horizontal plane; but if it is desired to measure the illuminating power of angular rays, the movable tube, which is fitted with an arc divided into degrees, may be placed at any desired angle. The apparatus is also applicable to the measurement of diffused light



PHOTOGRAPHY AND THE SPECTROSCOPE.—

Lecture I.*

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.

I will try to show you on the screen how we can picture the motion to ourselves. It is only a mental picture, but still it will give us a sort of idea of what happens. [An image was thrown on the screen by means of reflection.]

In this circular glass trough of water is floating a little magnet, the magnet being held at the surface of the water by a cork. Passing round this coil, which is large enough to surround the trough, is an electric current from three Grove cells, and if I place it round the cell which contains the little magnet, and not quite on a level with the water, you will find that the single magnet goes into the centre of the water. It is repelled from the sides by the current that is floating round that wire. Well now, we have here one magnet. Suppose I put another magnet in. The ends attached to the cork have poles of the same name. They repel one another, to a certain extent, and yet the force outside makes them go as near one another as possible. By moving this coil vertically, we can make them separate and oscillate, and we can picture to ourselves the way in which two atoms in a molecule may oscillate, and be attracted, and yet repelled one from another. I put another little magnet in, so now there are three; and here, perhaps, we have a picture of chloride of silver, which, I say, is composed of one atom of silver and two atoms of chlorine. We can still make them vibrate and oscillate. Here we have a mental picture—at least, it is a mental picture to me—of the way in which the atoms of chloride of silver may be made to oscillate. Again, I take four, and we repeat the same thing. Here we have a picture of ammonia—three atoms of hydrogen and one of nitrogen oscillating. And so I might go on. I might put five or six or a dozen in, and we might get some idea of the way in which they would all oscillate.

Here, then, we have endeavoured to draw from visible phenomena a mental picture of the way in which atoms of a molecule are vibrating.

I must, however, call to your mind that those magnets are vibrating only in one plane, whereas, of course, the atoms of a molecule are vibrating, not in one plane, but in space of three dimensions; but anyhow, I hope that you have got into your mind, at all events, the same kind of mental picture regarding the oscillations or vibrations of the atoms which I have in mine. I think that the case of the magnets is a particularly happy one, because, from all the evidence which we have at present, we are led to the conclusion that all atoms of matter are really charged with electricity, or what answers to electricity, of either one name or the other—that is, either positive or negative.

Now, we will throw a spectrum on the screen. I will call to your recollection what it is. I am now going to send the light of the lamp through this bisulphide of carbon prism, and I need scarcely say that the prism has to play an important part in spectrum photography. The wave length of the red is about one forty thousandth of an inch, and the wave length of the violet, which is on the left of the screen, is about one fifty-seven-thousandth of an inch. Each ray of light is transmitted in air at the rate of about 190,000 miles in a second. Thus the number of vibrations of the red rays is 500 million millions, and 700 million millions in the case of the violet rays, and this rapid succession of blows batters against anything upon which they fall. The mean violet, I may say, is the photographic light *par excellence*, and we shall recollect that such rays might beat upon the sensitive salt which we expose to it 700 million

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* A communication to the Society of Chemical Industry.

* Continued from page 509.

million times in a second. Therefore, you see, if you give an exposure of the 100th of a second you still have seven million millions of vibrations beating on the sensitive plate, so there is ample vibration to effect any change on the molecule of silver chloride, supposing always the amplitude (or distance of swing) is sufficient. Instantaneous photography will not be complete, I suppose, until you can reduce by a million times.

We may take it that an atom vibrates somewhat in the same way that a pendulum vibrates. Here I have a very rough contrivance to show what I mean. I set the pendulum swinging. Now picture to yourself that the bob is an atom, and picture to yourself, also, a wave of light falling upon that pendulum; if the wave of light be synchronous with the pendulum, it will increase the swing, or, in other words, it will increase the amplitude of the swing of the pendulum. For a rude illustration, suppose I take puffs of my breath as illustrating the beating of the wave of light, and suppose the atom to be at rest; I begin, and I blow; every time I give a well-timed puff to that pendulum, the pendulum increases in amplitude, or swing. But if my breath does not come in unison with that pendulum [blowing irregularly], you see that very soon I should bring that pendulum to rest; in other words, unless the wave of light beats in unison with the atom, the amplitude cannot be much increased. It is true that as long as the breath strikes the bob as it is going away from me the amplitude is increased; but if the puffs are regular and slightly more rapid or slower than the pendulum oscillation, the amplitude must eventually be diminished.

Here we are met with a difficulty, and a very great difficulty. I exposed the plate to the spectrum, and you see the blackening not only was where one wave of light synchronised with that atomic motion, but that there were a great many waves of light extending from the ultra-violet as far as the blue which affected it. How are we to get over that? That is a difficulty which has puzzled a great many people. I would ask you again to form a mental picture of how that could possibly arise. I do not say that it is the correct way, but all I say is that you can form a picture in your own mind—can conceive of how it could be done. Here I have another pendulum, but in this case the bob is attached to an elastic band. The time of the vibration of a pendulum depends upon the length of the pendulum. Therefore, if, during the time of the oscillation of the pendulum, I alter the length, I also alter the rate at which the pendulum vibrates during any instant. I pull down the weight of the pendulum, and at the same time set it swinging, and you will see that during every part of this motion the length of the pendulum is altered so that a great many differently timed puffs of breath might be synchronous with the pendulum. It is not like this other rigid one, where it is of a definite length, but here the length of the pendulum keeps altering. I only ask you to form a mental picture of the way in which such a thing might happen. In this way you can picture to yourself how a molecule might vibrate, and still be synchronous with more than one vibration of light.

Proceeding another step, I may say at once that, to my mind, the theory of the photographic image is well established. I know that there are some people who differ, but in my own mind the formation of the photographic image is not a working hypothesis, but it is a theory. The difference between a working hypothesis and a theory is this—that you adopt a certain idea, and say "I will work upon that idea, and see whether every experiment fits with the idea I have conceived. If it does not fit, then that working hypothesis is no use. I must give it up; I must take some other working hypothesis." As regards the idea of the formation of the photographic image, I think that it has passed from the stage of the working hypothesis into one of a really acceptable theory. It does not follow that everybody will accept it, but still it is an acceptable theory, accepted by most people. I am not going to enter into that very strongly to-night. At the next meeting of the Photographic Society, I propose to deal with it more fully; but, at the same time, I just wish to state publicly, to perhaps a more extended audience than I shall see at the Photographic Society in about three weeks' time, that this photographic image theory—that is to say, the theory as to the action of light upon molecules of silver—is as well established as, at all events, the wave theory of light itself. Now I am going to show you an experiment which, perhaps, will help to illustrate what I mean by the vibrations of atoms. In this slide I have got a gelatine plate, and I have a little flat iron which has been made warm. It is rather too warm to be borne comfortably. Here I have a phosphorescent plate, which I propose to illuminate with magnesium wire, in order to give an even source of light; I press this flat iron against the back of the plate which is in this slide for a short time. I shall not let the plate cool, but while it is warm I will expose it to the phosphorescent light for about fifteen seconds. The plate is now allowed to become cold, and is developed. If everything has gone right, we ought to have something which shows us that the oscillations of the atoms of bromide of silver (which is the silver salt on this plate) have been given extra amplitude by the action of the heated iron to the back of the plate. I am afraid that I cannot show you the development in the light. [When the development had been carried out, the plate was shown.]

You now see we have a picture of this flat iron produced by the deeper blackening of the heated part, though the whole plate was given but a short exposure to the light from the phosphorescent plate. I will impress this further upon you. I have here a collodio-bromide emulsion plate. But in this case, instead of heating it by a flat iron, we will heat it by immersion in hot water. Of course a collodion plate is not so sensitive as a gelatine plate. I put it into cold water for a short time to moisten it, and then dip half of it into some nearly boiling water; on withdrawing it, I expose it to this candle, and develop it when it gets cool, which we effect by placing it a short time in cold water. It will be seen that the part immersed in hot water is much blacker than that which was exposed cool. If I heat the plate and allow it to cool, and then expose, there will be no effect. The plate will develop normally, for the increased amplitude of vibration will have ceased, and the light will have to perform the same work on each part of the plate. Now, in whatever manner increased amplitude is given, when the cause of the increased amplitude is withdrawn, the amplitude will cease in the same manner. The case before us next was the cause, and it will cease after a very short period—in other words, when the plate gets cold. One of the chief reasons against what we may call the "vibration theory" of the photographic image—namely, that the molecule is unaltered by the action of light - is this: that the increased amplitude would cease with the same rapidity with which it would cease when the hot iron was applied to the back; that is to say, after five or ten minutes the amplitude of the vibrations would come back to the normal extent, a condition which is not fulfilled in the photographic image.

I can illustrate this in a very visible manner. I think you can all see this phosphorescent plate. Now, what is the reason of that phosphorescence taking place? It is that the atoms of the molecules which comprise this phosphorescent material are swinging in a certain rhythm, which gives us the sensation of light. Now, if I apply a hot iron to the back of this plate, I think at once you will see that the image of the hot iron is present. Here is the same kind of action taking place in the one case as in the other.

Now we come to another point, which is a slightly different one, and that is the energy of radiation. I may say that the energy of radiation is a subject on which I could discourse for a good many hours, but here I can devote but two minutes to it. I must try to make it as clear as I can. I hold in my hand a little instrument which is called a thermopile, which you see has a narrow slit which could be narrowed to any degree of fineness; attached to it is a screw motion, which will make that slit travel along the base of the instrument; beneath that slit are some thermo-electric couples. It is not my business to enter into how they are made, but still we know that, when thermo-electric couples are heated, an electric current is generated sufficiently strong to cause the needle of a galvanometer to deviate; and the amount of energy of radiation which falls upon the face of the pile can be measured by the deviation of the galvanometer needle, from the energy heating the lampblack at the junction of the couples. In a great many experiments which were made, this thermopile was caused to travel along the spectrum by the screw motion, and at every part of the spectrum at distances of, say, a quarter of a turn or half a turn of the screw, the amount of deviation which was given to the galvanometer needle was read off. By that means we are able to compare the energy existent at different parts of the spectrum. The spectrum used was that of the electric light, the comparative energies at different parts of its spectrum I have in the diagram—at five turns of the screw we have the end of the red, and at different turns we have the yellow, the green, the blue, and the violet; whilst from five to twenty we have the dark rays which lie below the red, and with which we are not to deal to-night, at all events. The energy, I may say, being measured by taking the amount of the deflection of the galvanometer needle, you will see that the dotted line divides the energy area into two parts.

On measuring this area of the curve in which lie all dark rays, and the area of the curve for the visible rays, it will be found that, roughly speaking, the energy of the latter rays is about half that of the former. But for photographic action we do not have anything like that amount. The red rays for ordinary photographic work are useless; and why that is we shall see by and by. We will say that the photographic action stops at the blue, and we find that the total energy of radiation, which is used for photographic purposes in the electric light, is only about one-hundredth part of the whole energy of radiation. The remaining ninety-nine parts are wasted as far as photography is concerned, except in so far as they heat up the molecules in the same way as the flat iron heated up the molecules on the photographic plates. The other curves show the energy of incandescent lamps. You will see that they have very little of what is called actinic power; that is to say, they have very little blue ray at all compared with the arc light. In the lowest curve we have a lamp at only a yellow heat, the middle curve being that at a white heat, and you will notice the enormous difference there is in the energy between the two. The energy of the middle curve, which measures the total energy of radiation from the incandescent light, is about twelve times that of the visible power. Yet, when you have to measure the photographic part of the spectrum, you will see that it is only about eighty. That is to say, supposing you have a filament of an incandescent lamp which is one-hundredth of an inch wide and half-an-inch long, then if you take an arc electric light and cut off from the glowing positive pole the same area, the photographic value of the one, area for area, is about eighty times that of the other. [A spectrum was thrown on the screen.]

I will ask my assistant to put in front of the slit something which I showed you at my last Cantor Lectures, and which I dare say you have forgotten all about. That something is a film of the same silver salt with which I photographed the spectrum at the commencement of the lecture. You see that it cuts off all the violet, and well down into the blue. I want to show you that the colour of the photographic spectrum is perfectly different from that which the human eye can see. I wish to show you a little device by which, perhaps, I shall be able to give you an idea of the integrated colour. A tolerably bright spectrum is on the screen of the camera; I raise the screen so that the spectrum falls on a lens placed a little beyond it; and if we had time, I dare say that we should be able to get a screen placed in the focus of the second lens, so that the recombined colours would form a white patch, without the slightest tinge of colour. We have got a white circle, however, which is sufficient for our purpose, though at one margin there is a very narrow red fringe to it. [A white patch about 6 inches in diameter was formed on a transparent screen about 6 feet away from the camera.] In the place where the coloured spectrum is in focus, I place a horizontal aperture, about ¼-inch wide, and by a little arrangement I can, by strips of card, cut off any colour I like from falling on the collecting lens, so that it recombines only the remaining colours.

You remember that the photographic spectrum does not extend as far as the green, ordinarily speaking, so now I cut off all rays as far as where the photographic spectrum begins, and you can see the colour of the light which is really useful for photography. It is a sort of sea-green colour. If I were to take that light, and pass it through a slit and a prism, you would soon find that the whole of that spectrum would be photographically active, because all the light which is not photographically active has been cut off. I shall have to revert to this in my next lecture.

I will show you one more method of recombining the photographically effective colour disc; that is, by taking the ordinary disc, and cutting out the red and orange. We have, then, only the green, the blue, and the violet; and those, when they are combined together, ought to give you pretty nearly the integration of the colours which are ordinarily photographically active. I will ask my assistant to spin it in front of the lantern. [The instrument was rotated.] I do not know whether you can all see the colour-chart which I hold in my hand, but those who can will see that the colours, when placed in the blue-green light, appear totally different from what they did in the whiter light. The yellows are much deepened, and the reds are much blacker.

I will ask now to have the spectrum thrown upon the screen once more, and we will again pass this colour-chart through the spectrum. The colours are very pure for pigments. I think that it is the finest colour chart of the spectrum which I have ever seen. It is one prepared by Professor Piazzi Smyth, and appears in his Madeira spectroscopic observations. Notice that the blue appears perfectly black when the chart is in the red, the red at the left hand being brilliant. Passing it into the yellow, the yellow is vigorous; the blue is black, and the red undimmed. Upon my passing it still farther on in the green, you will see that the red is blacker, and the orange is blacker, whilst the yellow still keeps its colour, and the blue begins to get more bright. Passing it still farther on into the violet, we see that the yellow is now perfectly black, the red has gone, and the blue begins to shine out. Passing still further, you will see that the blue still shines out, but is less intense, all the other rays appearing black. Upon my passing it again rapidly through, you will now be prepared for the changes that take place. In this lantern, which has been used to form the spectrum, the light passes through a slit. The slit, you see, is perfectly straight, with parallel edges. Now comes the question, "Is it necessary that light, in order to be decomposed into a spectrum, should be passed through a slit of this description, or what shapes may it be allowed to take?"

I propose to try to answer this query in an experimental manner a little. First of all, we will see what the effect will be if we use no slit at all. You see that the colours are not pure. I replace the slit, and you will see at once that we now have, not the various colours light overlapping, but a tolerably pure spectrum. Now let us take a slit of another shape—a zig-zag slit; and here we have another form of spectrum delineation of the rays. Placing a metal in the arc, the bright lines due to the vapour flash, and, it will be seen, take the zig-zag form of the slit. There is, then, no particular reason for using a straight slit, except convenience. Then, again, I may take a ring slit, and to test its value we will put a little silver in the arc to show you. I am not simply showing this as a pretty experiment, but I want to show you that such a slit is absolutely useful in photography; the spectrum of silver now on the screen shows rings of different coloured rays. It is a very pretty spectrum. This form of slit is extremely useful in one branch of spectrum analysis.

You are perfectly aware that, during a total eclipse, the body of the moon covers the sun; but that there are seen beyond the dark moon certain red protuberances which belong to the sun, and are known as "prominences." It has been the work of astronomers to determine the composition of those protuberances, and also to form a definite idea of the corona of light which surrounds the body of the sun, and can only be properly seen during a total eclipse. The picture on the screen is a representation of the total eclipse of the sun which took place in Egypt in 1882. It is a negative picture, and of course the dark halo which you see around was seen as a bright halo, and the white disc is the black moon. On the left-hand bottom corner you may notice the comet which was discovered during the eclipse, and which received the name of Tewfik, after the Khedive of Egypt. Round the disc of the moon are little prominences. Those prominences are vastly more bright than the corona itself, which is the halo extending some distance round the sun. Thus we have a bright ring of light round the moon surrounded by a feeble light. The former, when viewed by means of a lens in front of which a prism is placed, shows ring of colour composing these prominences, add of course these rings can be photographed.

I now show a transparency of a photograph taken in Egypt by means of the slitless camera, from which much valuable information has been derived.

The ring slit was used by an Italian astronomer about 1870; but the eclipse in Egypt was the first time it was entirely successful for photography.

THE CRUISE OF THE *CEYLON*, 1885.

A Voyage to the Spanish Main with a Camera.

BY NORMAN MAY.[*]

The Philadelphia Amateurs' Club hang one large frame of bright silver prints, but they, too, are not all chosen so much for their artistic feeling as for other and less pleasing qualities. Two prints on salted paper in this frame are very delicate, and creditable in the highest degree. Mr. G. K. Johnson, Bridgeport, W., shows a frame of eight photographs, illustrative of "Camp Life on the Adirondack," which are curious and interesting. R. A. C. Smith, an amateur, of New York, has an exhibit of very good work indeed, a whole-plate of a lighthouse being of considerable artistic merit.

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[*] Continued from p. 477.

Among the professionals, Mr. Blanks, of Vicksburg, exhibits some large and small panels of admirable execution. Forcible and vigorous, they are well posed and lighted. The same photographer also shows some somewhat hard, but remarkably brilliant and good landscapes. A frame containing some stereoscopic views of the Vicksburg Soldiers' Cemetery, representing the gravestones of the men who fell in the war, laid in dreadful regularity, bears also the same photographer's name. Mr. Taber, of San Francisco, shows some exceedingly good direct landscapes, about 24 by 20, taken on plates of his own manufacture. Messrs. Jackson and Co., of Denver, Colorado, contribute some good things of the least known portions of the American continent. A large photograph of some gigantic cacti, with a Mexican city in the background, is one of the finest in the Exhibition. Mr. Lilienthal, a well-known photographer of New Orleans, has a large and well-hung exhibit of portraits—soft, bold, and pleasing. Mr. Lilienthal seems to be more than usually successful with large direct heads.

Miss Louise Rieva exhibits an enlargement finished by one of the thousand photochrome, ivorytype, or crystoleum methods, with a result of which, perhaps, the least said the better. It has the merit of being unique in size, and I certainly never saw anything to compare with it at the Pall Mall Exhibition—I hope I never shall. Mr. Mugnier exhibits several landscapes illustrative of New Orleans and vicinity, which are clean and good; his stereoscopic views of the Levèe and Sugar Plantations being of great interest.

Herr Haberlaudt, of Berlin, Germany, has two small frames of good commercial work; and Herr Heinr Graf, also of Berlin, shows a frame of exceedingly well-posed panels. Messrs. Hargrave and Gutchmann, of New York, have several frames of views of varying quality, some street and river views being very successful. Mr. Turner, of Tuskaloosa, Alabama, exhibits some good commercial, though hardly high-class, work, hung in massive frames. Mr. Guerin, of St. Louis, makes a very large show of some of the best work in the Exhibition. Of his twenty-six large direct portraits, where all are so good, it is difficult to choose one to call the best. Two pictures of a very small boy fishing are excellent; as is also a large head of a lady peeping through some flowers. Two boys playing at see-saw would have been better if a few less accessories had been used. Mr. Guerin also shows frames of statuesque portraits, and children in shells, baskets, &c. This exhibit possesses in the highest degree the characteristic of all American photographs—viz., extreme brilliancy. Mr. H. Pietz, of Springfield, Illinois, has a very large frame, containing numberless photographs of various sizes, lacking, as a rule, in artistic feeling, and somewhat constrained in pose. Elaborate backgrounds are not always sufficient to make pictures.

There are some excellent views of ruins in Arabia and other places in the East, bearing the stamp of "Wilson" in the corner. His five frames contain some perfectly-lighted and well-chosen views, evidently obtained under circumstances of difficulty, and at an expenditure of much time and trouble. Mr. Schurr, of Lockport, shows some well-posed heads of children (a few being double printed in not the best of taste) with landscape borders. A more simple style of printing and framing would have given a more refined appearance to his lower exhibits. Possibly the majority of the American public appreciate a florid style of framing.

There are specimens of the "Acme" water colouring process, which may have a future before it when it is made applicable to wall posters.

Mr. Hardy, of Boston, has specimens which are choice alike in posing, lighting, and printing. Arranged with tasteful care in neat frames, they certainly form the best exhibit in the photographic section of the Exhibition. There is life and action in the posing, and though not quite free from the fault of overcrowding of accessories, they are soft to a degree not generally found in American photographs. The white drapery in the pictures (albeit it owes something to the retoucher's skill) is beautifully rendered, and technically these pictures are perfect. A large composition group, a very difficult thing to carry out successfully, is hardly so pleasing in effect.

There are some good examples of photo-engraving, collotypes, &c., by two American firms of repute. Mr. H. Collin, of Philadelphia, has a very large exhibit of solar enlargements and monster blue prints for architects, draughtsmen, &c. Messrs. Anthony and Co., Mr. Blessing, and Mr. Blair exhibit photographic cameras, materials, and requisites. The cameras have some details which might with advantage be adopted by English manufacturers; but, as a whole, they cannot compare with those of the best English make in point of portability, durability, and workmanship. The metal used in the construction of many cameras on view is nickel-plated. The folding cameras are somewhat cumbrous and bulky. The studio cameras, in which lightness and portability are of no object, are excellent in many ways, the swing-back adjustments being easily worked and good. Examples of the old lever-worked table-camera stand show that this style of stand still has its advocates. There are some good backgrounds and accessories by Ashe and Schneider on view.

One's impression of the show of photographs at the Exposition of New Orleans, compared with those of Pall Mall, is that, as a whole, the direct pictures are much larger in size; portraits and views alike are more brilliant, even sometimes to the verge of chalkiness; the portraits are more crowded with accessories and elaborate backgrounds; the pictures are not often placed in separate frames, as with us, and the frames are more pretentious and elaborate. A few of the frames and styles of mounting are neat and in the best of taste, but, as a rule, are showy and gaudy.

Beyond the Exposition, and the spectacle of Buffalo Bill, who with his troupe of Sioux and Pawnee Indians, dare-devil looking cowboys, and the genuine old Deadwood coach, go through, in a very large field, a performance representing life on the frontier at the time of the pony keepers, we saw little in New Orleans to interest us.

I exposed some plates on the Cotton Levèe, and the huge floating palaces of the Mississippi, but beyond these things and the desolate swamps surrounding it, New Orleans presented few features of interest to us, and we were not sorry when, at 3 p.m. on Wednesday, March 11th, our six days' stay having expired, we were steaming rapidly down the river on our way to Cuba.

The day after leaving New Orleans was an ideal tropical day; the sun shone powerfully forth from a cloudless blue sky, the glassy sea being without a ripple. In the afternoon we approached what, at first sight, seemed an abandoned boat, but a nearer inspection proved to be a bale of cotton half sunk in the water. Closely following the first were other bales, till the sea became thick with them, and in the course of the afternoon we passed about two hundred of these bales, each worth, damaged as they were, about eight pounds. I have regretted ever since that I did not charter a steamer and pick up the cotton; but owing to my want of knowledge of the salvage laws, the certainty of being plundered, and the fact that I should lose my passage and a great deal of time, I did not then care to make the attempt. It is not every day that one sees a thousand pounds clear profit waiting to be picked up. Land came in sight in the grey dawn of March 14th, and by six o'clock we were steaming under the frowning fortress of El Morro, into the harbour of Havana, the capital town of Cuba.

Cuba, the pearl of the Antilles, of all those splendid provinces which attested to the genius of Columbus; and the fortunes of the Escurial alone is left to Spain, the earliest and the latest memorial of a brittle glory. Pronounced by Columbus to be the fairest land the eye had ever gazed on, it is in truth one of the most favoured countries in the world, both as regards its charming scenery and its abundant natural resources. Cuba possesses a number of the finest harbours in the world, that of Havana being surpassed by Matanzas, and some half dozen others on the west and north coasts. The climate, though tropical, is marked by an unequal distribution of heat at different periods of the year, indicating a transition to the climate of the temperate zone. The hottest months, July and August, do not give a greater average than 83·8°; the coldest, December and January present the mean 69·8°; the changes, however, are very rapid. More than four-fifths of the extent of Cuba consists of lowlands, there being two or three ranges of mountains, a point in the mountain group of Sierra-del-Cobrè attaining an altitude of 7,674 feet. Cuba produces, in addition to tobacco and coffee, a variety of attractive fruits, among them being the pineapple, cocoanut, grape, melon, orange, lime, lemon, citron, date, banana, fig, guava, and mango. Its population is estimated at 1,500,000, of which some 600,000 are Cubans or Creoles.

Havana, or Habana, population 200,000, lies on the north-west side of the island, not far from the Florida Channel, and with its long lines of warehouses, its gaily-painted houses, and numerous strangely-fashioned church towers, presents a pleasing picture to the visitor as his vessel wends its way through the shipping in the commodious harbour. The houses, like those of the Spanish Main, are chiefly of one storey, very solidly built, with enormous windows, which in lieu of glass casements are protected by brightly-painted iron gratings. Hackney carriages are very numerous, upwards of 6,000 being in daily use; the fare to any place in the city being 8d. for two persons, the price per hour 2s. There are several good hotels and restaurants, three or four theatres, and numerous churches in the city.

HAVANA CATHEDRAL.

At nine o'clock my camera was put into the native boat, and, going ashore at the Custom House wharf, I found the official had gone to breakfast, and would not return till eleven o'clock, another example of the Spaniard's way of managing business. There was no help for it, so leaving my case in charge of the baggage man, I, with others, drove through the town to look at the hotel. The natives somewhat stared to see a long line of carriages containing helmet-clad Englishmen and ladies, and a drive of about a mile landed us at the hotel Telègrafo, where we alighted, and at a money-changer's hard by, exchanged some of our bright, clean-looking gold pieces for the dirty, flimsy notes used in Cuba, getting about twelve of their depreciated paper dollars for each sovereign—five cents, equalling a penny. Fancy, a bank note for a penny! We passed some very fine shops, filled with Spanish, French, American, and English goods; and over the narrow business streets were stretched awnings of coarse canvas, from which depended swaying painted calico signs, setting forth the proprietor's name and wares. The roughly paved streets are bordered by side walks, so narrow that two persons cannot pass each other on them, one having to step down into the rather steep gutter. There were few or no ladies in the street, it not being the fashion for Cuban ladies to venture out unattended. Negresses are met in plenty.

At eleven o'clock I went back to the Customs wharf, but no officer had arrived; a messenger, however, started for him, and in a few minutes I was able to put my traps in the waiting lobby, and drove about the town to see what I could see.

Nothing particularly striking caused me to erect my tripod till we were opposite the Fortress of El Morro, which, together with my next attempt, the Cathedral, was backed by the interminable blue sky, too dazzling bright and cloudless for the highest photographic results. In the Cathedral, a building in the old Spanish style of architecture, service was going on, and being without a guide, I was unable to find the tomb of Columbus, who lies buried here. Resuming my carriage I exposed a plate on a street view, and, finding nothing else of interest, closed my tripod for the day.

In the afternoon a few of our party visited one of the large cigar factories, and saw the process of manufacturing cigars by rows of operatives, each seated at long tables. After purchasing a few boxes, we returned to the hotel to dine, and in the evening went to one of the theatres, where, between the acts of the drama that was being enacted, some performers gave pleasing representations of Spanish castinet and other dances. The audience, composed almost exclusively of Creoles, was enlivened by the presence of a huge Chinaman, evidently a person of some importance, who, from his private box, seemed immensely to enjoy the performance. Many of us went on board the ship to dine; the row off in the cool evening air was delightful, the oars sending the fiery phosphorescent spray high up in the air.

The next morning, after an early breakfast, a steam launch called for us, and again, through the influence of some of our passengers, we were able to get ourselves attached to a special train, the Capitan General's car being placed at our disposal. At seven o'clock we left the station, on our way to see the celebrated caves of Bellamar, at Matanzas, some sixty miles by rail from Havana. After leaving Havana, we passed through a well cultivated country, the crops looking green and healthy, and dotted here and there were sugar mills of large extent. Cocoanut and date palms were abundant, and everything seemed prosperous and flourishing.

At about ten o'clock we reached the city of Matanzas, where we found an admirable breakfast awaiting our arrival. At eleven o'clock, *volantes* were at the door, and we were soon on our way to the Combre Hills and the beautiful Valle de Yumris. From these hills are to be obtained the best views of Matanzas and the distant sea.

Viewing the cave and the return journey occupied the remainder of the day, and the yacht was not reached till nine o'clock at night, the anchor being raised very shortly afterwards. Stretching away northward we felt that we were, at last, homeward bound. After a somewhat monotonous run of twelve days, we reached the Island of St. Michael's.

Correspondence.

MR. BOTTONE'S PHOTO-MICROGRAPHS.

Sir,—Mr. Bottone has called my attention to a letter signed W. H. Walmsley in your issue of June 5th, in which it is emphatically denied that Mr. Bottone's photograph of a fly's foot was taken with a French quarter, as "no true quarter of French or any other make can possibly cover the foot of a dung-fly in its field of view."

This is a serious accusation, and I as emphatically declare—

1. That I have seen the fly's foot (as illustrated) with Mr. Bottone's French quarter, and also with his English quarter.

2. That I measured the magnification, and found it to be 200 diameters.

3. That my own quarters by Smith and Ross show the whole foot and two leg joints, and that my Ross quarter with B eyepiece, magnifying 400 diameters, shows the whole foot, excepting the ends of the spreading hairs.

4. That these remarks apply to the individual slide made use of by Mr. Bottone.

The field of view depends upon the angular aperture of the objective, and no quarter I have seen has so narrow an angle as to show only part of the foot of this particular slide.—I am, sir, truly yours,

Sydney B. J. Skertchly, F.G.S., M.A I.
Late of H M. Geological Survey.

Carshalton, August 7th, 1885.

OLD AND NEW PHOTOGRAPHIC CLUBS.

Dear Sir,—Surely it seems a great waste of energy and money to endeavour to form so ambitious a club (prematurely) as the proposed "Camera Club," when a small proportion of this same energy and money would suffice to give the world of amateur photography all it could need at present, if spent in putting a little new life into, and slightly extending the scope of, the well established "Amateur Photographic Association."

I see by your last issue that Mr. Bassano, whose accession to the society is a decided gain, has placed rooms and gallery at the disposal of the members, and these, combined with the present system of interchange of prints. the annual exhibition and prizes, and large membership, form a most admirable basis on which to work, and very little extension would give us all the essentials of a central institution, such as is desirable.

Assuming that the Amateur Photographic Association would be ready to open its arms to proper proposals, may I commend this side of the subject to the persons interested.—Yours truly, John Howson.

DULLING METAL FOR PHOTOGRAPHING.

Dear Sir,—Perhaps your correspondent, "R. B. Smith" (page 510), used the "tube lead," which has oil in it. If he will try dry white lead in powder, and drop black powdered fine (using *much more turps* than gold size), I think he will succeed in obtaining a perfectly dull and satisfactory surface.—Yours, &c., Cambria.

COLONEL STUART WORTLEY'S PAPER ON SCIENTIFIC DEVELOPMENT.

Dear Sir,—The enclosed paragraph should have appeared at the end of my paper read at the Photographic Convention in America. You will find it in the original paper.—Yours faithfully, H. Stuart Wortley.

It must always be borne in mind that a photograph is impressed upon a plate by the action of light, and is then developed. Many photographs are spoiled from insufficient exposure, for the following reasons. If the light has not impressed the image on the plate, no modification of the developer can bring out an image; but if too much light has acted on the plate, then a modification of the developer can control the surplus light, and thus produce a good negative. Therefore, bear in mind always that it is better to over-expose then under-expose a negative. In very short exposures, the preliminary wash of ammonia in water will help; but even that is powerless if the light has not acted enough.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 6th inst., Mr. W. E. Debenham in the chair.

The Honorary Secretary announced the receipt of the back and current numbers of "Anthony's Bulletin" (new series) as a gift from the proprietors, and a promise to place the Society on their free list. Applause greeted the announcement, and was followed by a formal vote of thanks.

Several chloride transparencies, developed with ferrous-oxalate, containing a minimum of soluble bromide, were then passed round by Mr. Cowan, and much admired. That gentleman then exhibited two negatives illustrative of Mr. Bottone's contention on behalf of ferrous-oxalate development (page 477); one made according to Mr. Bottone's formula, and the other with normal ammonia and pyro. The details appeared to be identical in each; but the latter, owing to the absence of sodium sulphite, exhibited the well-known pyro stain. Replying to a questioner, Mr. Cowan said he preferred to over-develop his chloride transparencies, and bring them back by the iron perchloride method of reducing.

Mr. Henderson preferred Farmer's ferrid-cyanide reducer, using an old hypo bath for the purpose, and he thought Mr. Cowan's developer rather expensive; but this was denied by Mr. Cowan, because the same solution could be used for several plates—sixty if desired.

The Chairman believed it was generally admitted that ferrous-oxalate development did not allow of the same control as pyro and ammonia; using an old developer for over-exposed plates would be advantageous, but they wanted to know which was the best developer for normal exposure?

Mr. Henderson, speaking on the authority of a friend who used ferrous-oxalate development, said that that developer was an excellent indicator of emulsions precipitated with alcohol.

The Chairman doubted if ferrous-oxalate gave as fine results, taken as an all-round developer, as pyrogallol. It was not amenable to a great amount of soluble bromide, neither was the scale of tones so good. A few days ago, he developed two plates, one according to the formula given by the maker, and the other with sixteen times the normal quantity of bromide. The latter required a longer time in development, but had a far greater scale of gradation in the lights, and much more detail.

Mr. Cowan agreed with the Chairman, that a longer range of tones were obtained by using a full quantity of bromide.

Washing gelatine negatives then formed the subject of discussion. Opinions differed a good deal regarding the time necessary for a sufficient removal of the fixing agent. One speaker thought five minutes' washing quite long enough; and others said that a trace of the salt did no harm to the film. Instances of brown stains after printing were mentioned, and attributed to imperfect fixation, which are, according to Mr. Mackie, removable if rubbed with turpentine.

Mr. Henderson, in referring to a negative shown by him at the last meeting, said he had cut a similar plate in two, washed and heated one portion sufficiently to cause the particles of silver bromide to rearrange themselves; the plate was now four times quicker than before: the resulting negatives were shown.

This gave rise to a discussion on the physical changes likely to take place through crystallization, in which the Chairman, Messrs. Haddon, Henderson, and Mackie, and others took part. Some held that the change was of a chemical nature; others that it was optical as well.

Mr. Mackie had tried the method of soaking plates previous to development in an alcoholic solution of caustic potash, and found no difference at the finish, although the plate so treated made a good start at first.

Mr. Henderson showed reproductions made from Mr. Haddon's fogged plate, by transmitted and reflected light; in the former case the resulting plate was partly positive and partly negative; in the latter it was wholly positive. A portion of the fog was also removed by the fumes of cyanide. He then showed a positive made with renovated emulsion, also referred to last week; treated with ferrid-cyanide the red colour was destroyed, but an opalescence remained. Mr. Henderson also showed samples of Eastman's new films, and a transparent material made by Walter Woodbury, and coated by himself.

The following question was then read: "Is it a recognized fact that all go-and-return shutters convey an impulse to the camera?

The general opinion was that go-and-return shutters produce a jerk more or less according to the construction.

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Talk in the Studio.

Paraffine Stoppers.—M. Chantcaud, the well-known French pharmacist, long ago introduced the use of pure paraffine over the corks used to close the little tubes which contain the dosimetric granules. These corks being of the finest quality, and well impregnated with paraffine, inwardly and outwardly, the contents of the tubes are practically air-tight, and are made so again when corked after opening. This has the effect of thoroughly preserving the medicament for an indefinite period of time. The active substance being, moreover, covered with a thin layer of lactose, when once the granules are placed in the tubes, neither light, air, nor moisture, can possibly affect them, and the alkaloids and their salts can be thus preserved from decomposition for a number of years. Since then, Mr. Kirster, a German pharmacist, has recommended, in the *Pharmaceutische Zeitung*, the use of paraffine in place of corks or other stoppers, for the hermetic sealing of bottles containing liquids which are prone to ferment or otherwise deteriorate by coming in contact with the air. This, he says, is particularly applicable to syrups or saccharine juices of all kinds. They are poured, while hot, into perfectly dry bottles, which are filled nearly up to the lip. They are then allowed to stand at rest until cold, during which time all air bubbles will rise to the surface. Finally, a small quantity of melted paraffine is poured over the top, when it forms a firm solid coat on cooling, about the tenth of an inch thick. Such a paraffine stopper is easily removed when the contents of the bottle are required for use, and by collecting the paraffine it can be used again. But the paraffine cork of M. Cuanteaud appears preferable, since the same bottle can be opened and closed several times without the trouble of re-melting the paraffine.—*Burgoyne's Magazine.*

Measurement of the Intensity of the Sun's Rays.—M. Morize, of Rio Janeiro, has applied selenium to the measurement of the solar rays at different hours of the day. It consists of a cylinder composed of discs of copper separated by leaves of mica, and connected electrically at their edges by selenium. It is insulated on a glass support, and is fixed so that its axle is parallel to that of the earth. Under these conditions, the rays of the sun strike it approximately at the same angle throughout the day. It is interposed in a circuit of constant force, along with a galvanometer, the variations of which show those of the intensity of the solar rays.—*Cosmos.*

New Method of Filtering.—The filtration of turbid liquids sometimes presents great difficulties and no little annoyance. These liquids, which are difficult of clear filtration, may, according to Mr. Pape, be treated by a novel method, which will be found to have the desired effect. No play is intended on the author's name, but he tells us it should be called the "Pape-method." In fact, turbid liquids may, in most cases, be readily and cheaply filtered by beating into pap about half the quantity of the paper which would usually be required for filtering the same quantity of liquid, and running this pap into the filtering funnels, the stems of which have been previously fitted with small plugs of cotton wool, care being taken that the latter is quite free from fatty matters. Such is the medicated cotton-wool supplied for surgical purposes. The funnel is, therefore, closed at its lower end with this pure cotton-wool, over this is placed the more or less fluid or pasty paper pulp, and over this again the ordinary conical filter paper.—*Burgoyne's Magazine.*

Peruvian Iodine.—According to an article which has recently appeared in the French periodical, *Le Génie Civil*, about 3,000 lbs. weight of iodine are produced monthly at the works of Peruana, in the province of Tarapaca (Peru). This iodine is obtained from the mother-liquors which result from the manufacture—or rather the refining—of nitrate of soda. The forms of apparatus constructed by Messrs. Harvey and North in 1881 are employed for the preparation of the sulphite of soda which is used to precipitate the iodine from these liquors, and afterwards distilling it. The sulphite of soda is obtained by saturating a solution of soda with sulphurous acid gas. The soda for this purpose is prepared on the spot by furnacing an intimate mixture of nitrate of soda and coal-dust.—*Burgoyne's Magazine.*

Photographic Club.—The subject for discussion on August 19th will be "On Sulphite in the Developer, with Experiments." Saturday out-door meeting at Hampstead Heath; meet at railway station at 2.30.

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To Correspondents.

⁂ We cannot undertake to return rejected communications.

One in Need of Help.—1. The process is not very suitable for the purpose, as very prolonged exposures would be required; but perhaps you will not consider this a serious objection. 2. See the article by Ashman and Offord, which will shortly appear in our paper.

Duffer.—1 and 2. Citric acid should be tried first, beginning with equal parts of a saturated solution and water. If there is a tendency to frill, replace the water by a solution of alum. Should the stains not disappear, you may venture on the use of dilute sulphuric acid, gradually increasing the strength, if necessary, to one of acid, and perhaps five or six of water. Remember that when sulphuric acid and water are mixed, heat is produced, and the mixture must not be used until cold. The remark about replacing the water (whole or part) by alum solution also applies in the case of the sulphuric acid. You may also try the preparation recommended under answer No. 4. 3. It is not correct; you must have made some mistake. 4. No, perfectly satisfactory; but in some cases improvement has resulted by a second treatment with the fixing bath, followed by a thorough washing, and final treatment with the following:—

Saturated solution of alum	1 pint
Nitric acid	1 ounce

A. Z.—Probably they arise from traces of grease in the gelatine; this is generally on the surface of the flakes, and is very unequally distributed.

C. H. E.—The case is a difficult one, and we have sometimes found it better to go through the whole series of operations again, washing thoroughly after each stage. This will, of course, make the negative very dense, but you must either put up with this, or make a lighter negative by copying.

Capt. Montague.—On the contrary, it is a very bad plan, and for this reason it is not in use. If you require further information, we shall be pleased to furnish it.

Spencer Nicholl.—"Glycerol" is merely another name for glycerine.

Ebbw Vale.—The general arrangement seems to us to be excellent, and you are certainly well advised in making such good provision for warming the studio. We would, however, suggest bringing the fire-places of dark room and studio a little nearer to the door. When you consider the proximity of the fire to the table on the one hand, and the backgrounds on the other hand, the reason of our suggestion will be obvious. The additional door into the studio should be at the end of the main passage, and exactly opposite the front door; and this would be of much value as relieving the traffic through your laboratory and dark room. Suppose, for example, that you wish to bring a number of heavy and bulky articles in from the street to serve as "properties," and consider the advantage of a direct road, rather than one with two bends. As a general thing, this door would doubtless be kept closed and bolted. The whole could be built for £400 in the neighbourhood of London, and should cost less in your district.

Amateur.—You cannot do it afterwards without damaging the gloss. Still, you can always soak them in water, and re-enamel.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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PHOTOGRAPHY AT THE INVENTIONS EXHIBITION.

Although several notices of the more important exhibits in the photographic department have appeared in the columns of the Photographic News, it may be well, now that the awards of the juries have been made public (see our number of last week, p. 513), to call further attention to matters connected with the exhibits, and touch on a few points that have, perhaps, not been sufficiently considered.

As to the awards, it is possible that few will doubt that they are well merited; except, perhaps, some of those exhibitors whose inventive merit has been unrecognized. That Tailfer and Clayton should be awarded a silver medal for the step they have made in the early introduction of excellent isochromatic plates into the market is reasonable enough, and the other awards which have been made for plates (bronze medals) are undoubtedly well deserved, as we understand that a sub-committee of the jury took samples of the bulk exhibited, and thoroughly tested them. Of those who take awards in connection with photo-mechanical printing, W. B. Woodbury takes the highest honour, and we imagine that no one will feel otherwise than that he richly merits the gold medal awarded; while Dallas, Ives, Sprague, and others, as originators of methods, receive suitable recognition. Camera makers have exhibited excellent work, and it will be noted that the Jury has evidently had the strength, durability, and stability of the work in view, in specially recognizing the merits of the cameras and apparatus designed and made by G. C. Collins, George Hare, F. W. Hart, Marion, W. W. Rouch, and others. Among the apparatus medalled may be specially mentioned the roller slide of Eastman and Walker, exhibited by the Eastman Dry Plate and Film Company, of Rochester, New York (silver medal). This apparatus may (without any detraction from the merits of those who have previously worked in the same direction) be regarded as the first roller slide adapted to the every-day requirements of the photographer. Well deserving of a gold medal is A. A. Common, who has identified himself so much and so successfully with astronomical photography; while E. W. Foxlee, in his series illustrative of the continuating action of light, has produced something which might be regarded as a synoptical view of the principal difficulties which beset the work of the carbon printer. The metallic spectra photographed so successfully by Professor Hartley represent much labour and care, and it is to be hoped that he will continue his labours.

The importance of photography in its most satisfactorily permanent form—as vitrified on enamel or ceramic ware—is well recognized by a silver medal to A. L. Henderson, and a bronze medal to O. Walery: while in connection with the production of unfading photographs (other than photo-mechanical) the award of one gold medal to G. W. Swan, and another to W. Willis, will be looked upon with satisfaction. Another pioneer, whose gold medal is well deserved, is B. J. Sayce, who, together with W. B. Bolton (member of Jury and disqualified from recognition), originated the collodio-bromide emulsion process.

The historical exhibit of the Photographic Society has been already mentioned several times, and a complete list of the objects shown has appeared in our columns, so we need do no more than say that the diploma of honour represents the highest award the Jury could give. G. Poldireff, of St. Petersburg, who takes a bronze medal for his excellent—although somewhat strange—studies taken by the light of a petroleum lamp, might perhaps have had a silver medal without going beyond the justice of the case. Nothing less than a gold medal could have been given to Ross and Company, as a recognition of their high position as makers of photographic objectives from the earliest time. It seems that no other award was made in connection with optical appliances for photography, but it should be mentioned that Dallmeyer did not exhibit. A. Spiller takes a well-deserved medal for his method of developing with hydroxylamine, a method likely to come into general use when this base is manufactured on a large scale.

Horne, Thornthwaite, and Wood, as a firm that has borne much of the heat and labour of the day in connection with photographic apparatus, take a medal, while L. Warnerke, who has made such excellent progress in many matters photographic, is honoured by a silver medal.

Some other matters in connection with the Exhibition must stand over for future mention.

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COMPOSITE PHOTOGRAPHY AND CERAMIC IMAGES.

Interesting remarks on this subject are made by W. Cave Thomas in a recent number of *Knowledge*, and as the matter is very suggestive, we reproduce it here. There is, perhaps, a larger future for composite photography than is thought of by either Galton or Thomas.

It was stated in a former letter (1,739) that at the Antwerp Art Congress, about the year 1860, I proposed to demonstrate, by the presentation of a number of individual images of the same kind, in rapid succession to the eye, that the resultant generic impression would be more pleasing than any individual instance —to demonstrate by experiment, in fact, that the mean is the measure of the ideal, of the beautiful. To prove this, however, it is not absolutely necessary to have recourse to human forms: the fact can be as well illustrated by the use of geometrical figures. Knowing the limits of differentiation of the ellipse, we are enabled to experiment with a series of ellipses, or even with colours, instead of portraits. At the Congress referred to, I proposed to use—nay, did use—similar means to those which have been adopted, time out of mind, for demonstrating, by rapidly rotating a disc before the eyes, that the prismatic colours, being successively excited on the retina, produce a mean impression, or the sensation of white. As the subject of the production of generic images has been again broached in these pages, I beg leave to suggest to experimentalists, to photographers, means for perfecting the process. To this end a zone of portraits should be mechanically constructed to gyrate round the camera, and to pass steadily and evenly before the lens. This would permit of a series of portraits being nicely adjusted prior to their presentation to a sensitised plate. A number of sitters might even be posed and presented in succession to the camera, but to accomplish this successfully the camera itself should be contrived to revolve. The subject of generic images was treated in a paper of mine read some years since, at a Congress of the British Association for the Advancement of Science.

◆

IN AND ABOUT THE ARDENNES.

BY T. G. WHAITE.

I do not remember seeing in any photographic exhibition pictures from the Ardennes; it is evident the British photo-tourist has not given this part of the continent the attention it deserves. No doubt the opening of the Exposition at Antwerp (if they ever get it completed), and the extra facilities offered for touring in Belgium, will do much to make this charming and picturesque country better known and much more appreciated by the host of what Andrew Pringle calls "Globe trotters."

There is, to the photographer in search of the picturesque, the great charm of variety in the scenery. In the vicinity of Antwerp, the scenery is very flat. After leaving Brussels, some well-wooded country is passed, but little worth doing photographically. On approaching and leaving Namur, the railway runs alongside the river for a considerable distance, in many parts weird-looking rocks rising to a great height, overlooking both the rail and the river.

The river boats are very artistic-looking affairs, both in form and colour; their gondola-like stern, and immense rudders, with a bent tree counterpoise, form most agreeable lines, and are very useful as foreground objects in river scenes. The numerous bends of the river; the rocky cliffs close by on one side, and the generally open country on the other; the clusters of trees, with here and there a village by the riverside—these give the tramping photographer plenty of scope for exhibiting his artistic selection.

The inevitable steam tug is occasionally seen towing a string of heavily laden barges up the river; but it looks so utterly out of harmony with the surroundings, I do not expect it will tempt any one to expend a plate on it.

To reach Antwerp from any part of England, perhaps the most agreeable route is by the Great Eastern Railway and steamers *viâ* Harwich; the boats are well appointed, and the sea passage of about 90 miles. Leaving Harwich in the evening after 9, they usually land their passengers in time for breakfast in Antwerp, and almost at the entrance of the Exhibition; the cab fare to most parts of the city is a franc; but the cabbies speak sufficient English to charge "a shilling."

Photographers who desire to see Rubens' masterpieces in the Cathedral should avail themselves of the free "show" on Sunday morning; the charge at other times is not much, but there is the inconvenience of waiting until the exhibitor has collected what he considers a sufficiently large audience to pay him for withdrawing the curtains that conceal the "Descent from the Cross" and its companion.

It is a difficult matter to obtain a satisfactory close view of the Cathedral; the narrow streets, and the small shops that are built in the recesses, necessitate a more distant view being selected. The best view to be had is from the "Place," and almost opposite the Post Office, looking diagonally across the square, taking in the immediate foreground the monument that stands in the centre of the "Place," just to make the head and shoulders of the figure break the straight line of the roof against the sky.

Of old Antwerp there will soon be very few of the picturesque buildings left; they are improving them off by hundreds along the quays.

A convenient train to leave Antwerp for the Ardennes is one between 10 and 11 a.m., *viâ* Brussels. I think this is the only one going through, for which there is no necessity to change stations at Brussels, thus avoiding the necessity of a cab across the city. A short stay in Brussels may induce the architecturally inclined photographer to go in for such buildings as the Palais de Justice (a magnificent pile), the King's Palace, &c.

On approaching Namur the scenery entirely changes, the hitherto flat landscape giving place to wooded heights, ruined castles, and strongholds on the rocky prominences. From Namur the journey may be continued either by rail or river; a small steamer plys daily between Namur and "Dinant sur Meuse." The river journey is a very pleasant one; there are numerous locks that require much time in passing through; these enable the photographer to get ahead of the boat, and there are plenty of good views to be had on the river to expose what plates he may have ready in slides; but I found it a better plan to proceed by rail to Dinant, and afterwards take the morning boat from Dinant to Namur, returning the same day; by this means the best lighting for each view may be selected. It would not be much trouble to rig up a changing room in the little cabin, if plates are plentiful, as there are so many tempting bits on the river.

On arriving at Dinant by train at 3.15, very few minutes are required to "put up" at the hotel, the town being built nearly all on one bank of the river, and close to the station. As the "supper" time at the hotels is 7 o'clock, there is ample time to secure a series of pictures of one of the most important subjects of Dinant, viz, "La Rocher du Bayard," especially as the only time to get this subject properly lighted is between four and five o'clock p m.; in the morning's light it is very disappointing, looking flat, and without the relief given to it by the afternoon sun. This profitably fills up the intervening time till supper (which is, in fact, a dinner). A stranger will have some difficulty in finding a really good stand-point to take this "Rocher" from, as apparently there is no choice, a wall running down to the river just when you feel you require to be on the other side of it.

After a good deal of exploring on five successive wet days amongst the backs of houses, &c., I found the finest view to be had from a spot on the bank of the river reached only by a bit of trespassing. After passing through the cleft in the rock, the road is kept until a small coal-dealer's yard is reached; passing through this the river bank is reached, and either a little up the river, or a little down, capital views are made, either with trees for an immediate foreground, or without. Unless this point of vantage is known, the photographer will surely throw away several plates, as there is apparently no choice but at the foot of the wall mentioned. Having five wet days here, I had plenty of time to explore every part of Dinant before photographing a single view.

About half a mile further up the river is the village of Anseremme; on passing through this village, and looking back down the river, some good cottage and river scenes are to be had. At the foot of the hill stands an auberge, styled "Au Repos des Artistes," generally filled in the summer with German, Bavarian, or French artists. The road up the hill behind the auberge leads to the Chateau de Wallzin, a very important subject. The distance from the "Hotel de la Tete d'Or" is about four miles. On ascending the hill, four roads meet; the one directly opposite and leading down the other side of the hill is the right one to take ; this leads into a charming amphitheatre of hills, with the river Leese winding almost entirely round the base. A fine modern chateau on the left is soon reached, and about two miles further on the same road, Chateau de Waltzin stands on its rocky eminence. On arriving at a notice board near the chateau, the down hill road must be taken until the farm and river are reached. The farmer is ever ready with his boat to ferry you over above the falls for a few sous, and return for you any time, as the castle cannot be seen until the river is crossed, being perched on a quite perpendicular rock of great height. There are six good pictures to be made of this, each one presenting entirely different features, and the morning's light is most suitable for five of these. I got the six between breakfast and dinner (which at the hotel is one o'clock), walking both ways, carrying a 7½ by 5 camera and six double slides ; the other six plates can be utilized *en route*.

The river-side houses near the bridge at Dinant, with the curious Turkish-like tower of the cathedral, are good subjects, and finely lighted about 11 a.m. The cathedral door (the old one) is fine, so are many old houses in the bye-streets. Down the river, by the gasworks, is a small stream ; following this stream up the valley, there are some ruined paper mills. The road is a winding one, and the valley has a very Welsh look. On the opposite side of the river, the railway side, the village of Bovignes stands about one mile, with the ruined castle of Creveeour ; and almost under the church, a fine old specimen of Spanish architecture.

The ruins of Montaigle, and the caverns of Han, are also reached by this road. Hastieres, one station on the line to Givet (fourteen miles), a good specimen of a French frontier town, by taking the train to Givet, and strolling back by the river, numbers of good views are to be had, meeting the train at some station as soon as the plates are exhausted. The famous caverns of Han are nearly a day's drive from Rochfort, and in the heart of the Ardennes. There are miles of these caverns, with fantastic names, which should be explored with a *guide*, and not a *camera*.

Huy (pronounced Wee) is a town very romantically situated on the Meuse, about twenty miles from Namur. There is a famous old gateway adjoining the cathedral, which every photographer will feel bound "to do." It is necessary to rise early to get this, as the only time the sun tips any of the quaint carving is about 7.30 to 8 o'clock a.m. The carving is very curious, and the figures of the Virgin, Child, and the oxen very well preserved. The best views here at Huy are obtained by proceeding up the river bank on the right, until stopped by walls, then winding through some ill-smelling suburbs, where all the town garbage appears to be in process of sorting and decomposition. After passing here, make for the river side, and the views, both up and down the river, are very fine. Bas-Oba, a village a few miles on here, is a queer little place, with a few subjects.

From Huy the train may be taken to Melreux, and from there by *diligence* to La Roche. La Roche is a veritable artist's home. It is "too delightful," and little known, even to those who think they have "done" the Continent thoroughly ; is quite unconventional, and, moreover, is an exceedingly cheap place to live in ; and though the hotel accommodation is so cheap, it is at the same time good, and everything one can desire when away from home. The best hotels in the Ardennes are not more than 7 francs per day inclusive ; here, at La Roche, 4½ francs per day being the hotel price. As the three hotels are in the hands of one family, they are much alike ; the Hotel des Ardennes being most pretentious, the charge is half a franc more—*i.e.*, 5 francs per day. The situation is more open and airy, and worth the extra five-pence. The valley of the Ourthe, from Melreux to La Roche, is about eighteen kilometres (fourteen miles English). The road from Melreux is an ascent all the way, and on arriving within sight of the town, the road descends, as La Roche stands in a basin, with the river Ourthe running round for about three-quarters of it, so the principal part of the town appears to stand on an island. In the centre of this stands up, dark and frowningly, the ancient castle, a most picturesque ruin, with fir trees shooting out of its upper battlements. Its history is shrouded in mystery ; part of it is said to go back to the times of the Romans. Around this, grouped in excellent form, are cottages and *cafés*, the mountain background and silvery stream completing a series of never-ending pictures, both for photographer and painter.

La Roche and its beauties are practically inexhaustible —not so the space in your columns, so adieu.

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POSITIVES ON GELATINO-CHLORIDE OF SILVER.

BY W. M. ASHMAN AND R. OFFORD.

Seventh Article.

Although we have suggested methods of quickening the speed of toning emulsion films, we do not altogether recommend that the utmost rapidity attainable should be the *desideratum* sought after ; indeed, to obtain a definite tone some measure of deliberation, rather than haste, will prove the more serviceable. Time is required to note changes in colour as they occur ; to remove toned prints from the gold solution, and replace them with others, which in turn require to undergo that process ; and, as a matter of convenience to the manipulator, the highest degree of acceleration is not beneficial. We consider that when the conditions necessitate each print remaining for a period of ten minutes in the toning bath, that operation becomes an agreeable and instructive pastime ; besides which, it may be considered a fair average time for performing the work. This condition may be secured by the addition of auric-chloride to emulsions, which would otherwise tone slowly, as we pointed out on page 467, or it may be achieved by the means previously recorded. When a minute proportion of gold is incorporated in an emulsion, positives printed thereon require to be somewhat darker in order to allow for the loss sustained by bleaching ; a like precaution is also requisite when using some other forms of emulsion, especially those which darken very rapidly and are of a dark grey or inky appearance when printed ; these latter, although not advantageous by any means, we may remark, can be readily procured by converting the silver into ammonia nitrate before mixing with gelatine, as in the bromide process.

For the information of those who wish to test this plan, we may mention that the silver nitrate is dissolved in rather less water than we have formulated, and to about half the bulk strong liquor ammonia (·880) is added, drop by drop, which causes a brown precipitate of silver oxide ; sufficient ammonia is then added to re-dissolve this, after which the strongly alkaline portion is added to the other part, when it is ready for compounding with chloride or tartrate, as directed with plain silver nitrate. The citrate salts do not behave well with ammonia nitrate of silver, since silver citrate is soluble in that agent. The jelly, however, formed by such addition in a solution of gelatine darkens rapidly in daylight, but is altogether too poor to be of service for direct positive printing, unless an acid organifier be incorporated therewith. Emulsions of this description will print of a reddish-brown colour, and yield a rich image without materially slowing the sensitiveness, if the precaution be taken to add an excess of citric acid immediately before coating. This slows the toning considerably, but the image is very little bleached in any of the toning solutions in ordinary use. We have already stated that bleaching takes place more readily under some conditions than others, and that the presence of a restrainer is necessary to check this tendency ; so far as observation has at present shown, the prints most affected are those made with an emulsion containing a minimum of an organic salt, the red colour of this latter silver compound appearing to offer a greater resistance than the violet silver chloride to the reducing influences on the vigour of the image.

In practice it may sometimes happen that from inattention or other preventable causes, positives either on opal or paper become too much impressed by the action of light, and the ordinary routine of toning and fixing does not bring them back sufficiently; they still remain very much too dark. This may be remedied in either of the above instances by putting them into a reducing agent composed of :—

Potassium cyanide ...	... 1 gramme
Liq. ammon. fort. ...	... 1 cubic centimetre
Water...	... 1 litre

The proofs should be agitated in the above solution until the desired reduction has taken place. When it is intended to reduce positives by this means, it will be better not to tone quite so much, since the reducer has a tendency to grey the image somewhat. It is not a matter of so much consequence in the case of prints that are to be mounted on waxed or talced glass plates for stripping, since these do not dry very much colder in tone then they appear in the washing bath; but prints dried in the ordinary manner lose very much redness in that operation. Unfortunately (in some respects, perhaps) hot burnishing is not favourable to any class of gelatine prints; they all succumb more or less to the successive heat of the burnishing tool; they fare very much better, however, with the old-fashioned rolling-press, and it is an open question whether prints passed through an ordinary rolling-press are not as pleasing as those which have been highly glazed. This question it is not our business to answer, but we recommend those who desire highly glazed surfaces to adopt the plan at present used for enamelling; there is an exception to our remarks, inasmuch as paper prepared with a minimum quantity of gelatine stands a better chance of receiving a burnish; the print must, however, be in a dry condition, the burnisher only moderately hot, and the print well lubricated. The best lubricant we have tried is finely pulverized curd soap applied by means of soft rag. Liquid lubricants, whether of an alcoholic or other rapidly evaporating nature, would not answer so well.

A purpose, which we have not hitherto mentioned, to which some of these emulsions on opal (such as we have described) can be advantageously utilized, is worthy of more than passing note; we refer to its suitability as a surface from which to make enlargements. When larger sizes are required from a small but satisfactory negative, it is usual to make the transparency and enlarged negative by transmitted light. Objections to this method have been frequently pointed out, but the remedy was not forthcoming. In this process we gain considerable assistance by making a good positive by contact printing on an opal plate coated with gelatino-chloride of silver, and making the enlargement direct in the camera, using reflected light.

The grainless surface, and the possibility of getting any depth of shade with the printing frame before named, or actinic quality of colour to suit the strength of negative, are considerations likely to aid materially in the production of good enlargements.

The positives obtained by this process may be worked up to any reasonable extent, when the necessities of the case require it, the surface lending itself to that purpose in every way equal to the carbon opal, or the original production with collodio-chloride of silver. When the degree of enlargement does not exceed four diameters, any working up of the positive in monochrome need not appear in the least obtrusive in the enlargement. Altogether, the method offers considerable improvement upon either the transparency modes, or that of copying from paper surfaces. Transparent positives made by the formula we have given are capable of producing very good enlargements provided they are printed sufficiently deep to get all the detail obtainable. This stage is not reached until the image is fully printed through the entire film, and all the tones in the negative can be readily seen on the back of the plate (of course clear glass plates are used for this purpose.) Notwithstanding the extreme beauty of such transparencies, we think them more useful for decorative purposes or the lantern, than for reproducing negatives. Yet we have produced very good enlarged negatives from transparencies of this kind, without showing any more texture than the original contained. We would now draw attention to other ways in which compounds with silver chloride in conjunction with gelatine can be applied to direct positive printing.

The previous articles have dealt with emulsions containing insoluble silver haloids suspended in the gelatine, but now we propose treating of paper more nearly allied to albumen in the method of its preparation and general characteristics; at the same time it is wholly free from that substance. The subject we are now dealing with is one worthy the serious consideration of experimentalists, since it opens the road to a new departure, which we apprehend will exercise a greater influence on the future of silver printing by means of albumenized paper than anything we have hitherto mentioned.

In looking about and experimenting for the purpose of finding something to take the part of organifier that albumen plays in the paper bearing that name, we tried many substances. The majority of them, though very active, laboured under the disadvantage of being soluble in cold water, and not coagulating in the presence of silver. Out of the very few to which we were ultimately confined, that which seemed to add the largest amount of energy to the printing property of the silver salts was starch; the form in which we prefer to use it is that known as arrowroot, and the better the quality, the more perfect the jelly-like product obtained on boiling. The ordinary starch powder procured from the druggist will answer well, but there is a slight grain on account of the minute size of the starch granules composing it. The microscope quickly reveals the character of a proposed fecula, and the clearness and tenacity of the jelly confirms the revelation of the lens. Potato starch, if well washed and freed from impurities, is good for our purpose also; but in this there is a mixture of granules, the majority being large, while the rest are small, sometimes very small indeed. The manner in which we use the starch is to mix it with a hard gelatine, and then to salt the whole; coat paper, and float that paper, when dry, upon a bath of silver nitrate. The details of these processes we now propose to give, prefacing our remarks with the suggestion that there is a wide margin in which to work, it being possible to modify the proportions, and vary the salts employed to some considerable extent.

If paper be thickly coated with plain gelatine and then floated on a silver bath, after prolonged exposure in a good light, an impression will be produced—faint, and of a pink tinge; but if starch be substituted for gelatine, a picture of much greater vigour will result. When silver chloride or citrate is added to a solution of starch, the latter increases the vigour of the former considerably, but plain starch produces insufficient surface, and is too liable to injury, so we find the purpose is answered if a little starch jelly is mixed with dissolved gelatine, and the compound salted, ready for floating on silver when dry. A certain amount of body can be given to such a mixture by the addition of barium-sulphate, but it must be the finest possible precipitate that can be obtained. The ordinary method of taking barium-chloride and gelatine in solution, and sodium-sulphate, also dissolved with gelatine, and mixing the two solutions together in order to obtain barium-sulphate, does not produce a precipitate of sufficient delicacy. Only by having exceedingly dilute solutions in water of the two salts, and well washing the precipitate by decantation, can an absolutely impalpable powder be obtained. This is a very long process, owing to the time taken by such a fine substance to settle; a little barium-sulphate of this fineness, say five to ten per cent. in weight of the gelatine and starch employed, can be added without giving a perceptible grain to the surface. Insufficient washing may be recognized by the paper being off colour, presenting a more or less darkened surface; unless the precipitate has been most thoroughly washed, a white surface will not be obtained.

The proportions of starch and gelatine we have found most suitable have varied between the following :—

Best arrowroot	8 grammes
White hard gelatine	6 ,,
Water	200 c. c's.

and—

Best arrowroot	6 grammes
White hard gelatine	10 ,,
Water	200 c. c's.

Prints produced on the first paper may be burnished satisfactorily, but those made in proportions similar to the second are better suited for stripping from waxed or talced glass. The best plan we find is to melt the gelatine first in about half the water according to proportions used, then heat the arrowroot in the remaining portion of water as in making ordinary starch paste for mounting purposes, and mix it with the melted gelatine, raising the temperature for a moment to boiling point after mixture has taken place.

If it is intended to employ barium sulphate, that substance should be soaked with the gelatine in the proportion of cold water already named, and stirred in briskly during melting. A fine precipitate of another kind is easily obtained during the process of salting, and this lends a little useful opacity to the preparation. The substance in question is barium citrate, and is produced by employing both barium chloride and sodium citrate for salting. It is soluble only in excess of sodium citrate with heat, and from the solution silver nitrate precipitates a salt which blackens freely in the light.

It is rather a matter of prolonged experiment to prove exactly what proportion of the two substances and of a soluble chloride should be added to the gelatino-starch compound as above. We give, however, the following as a practical formula by means of which we have obtained vigorous prints.

Sodium chloride	2 grammes
Barium chloride	1·2 ,,
Double tartrate of sodium and potassium	1·2 ,,

The above are dissolved together in about 20 c.c's. of water, and well stirred into the starch compound; then the following is also dissolved in about 10 c.c.s of water :—

Sodium citrate...	2·5 grammes
Citric acid	1 gramme

This is stirred into the melted starch and gelatine as before, and when the whole is thoroughly mixed, it is well to pass it through a filter composed of cambric or swansdown, and coat the paper before setting takes place. When larger quantities are dealt with it may be advantageous to effect a thorough mixture by a mechanical arrangement resembling a churn. Carbon tissue is prepared in that manner, and the result appears to be quite satisfactory.

Methods of coating paper are set forth on page 426, so do not require repetition here, since all that has been said concerning the modes of coating paper with a sensitive emulsion applies equally in the present instance, with one exception only. We refer to the character of illumination employed. Ordinary daylight unprotected by coloured screens may be used throughout the stages of coating, drying, flattening, packing, &c., up to rendering the paper sensitive to light, for, until the paper has been in contact with nitrate of silver, it is as insensitive as unsensitized albumen paper.

Our suggestion for the use of auric-chloride to accelerate toning can be applied here if thought desirable. To the above quantities we add two cubic centimetres of the gold solution referred to in the previous article, page 467, and thoroughly mix the same just before coating.

The following modification is suited, when, for obvious reasons, it is not desired to form a precipitate in the film, a clear coating rather than that of an enamel-like or egg-shell surface being preferable. Under these circumstances barium, either soluble or insoluble, is not made use of. We take :—

I.

Sodium chloride	3 grammes
Double tartrate of potassium and sodium	1 gramme
Water...	20 c.c.s

II.

Sodium citrate	2 grammes
Citric acid	1 gramme
Water...	20 c.c.s

No. I. is first incorporated with the melted gelatine and starch mixture, after which No. II. is in like manner added.

The tartrate salt can be omitted or the amount of citric acid varied at pleasure. Should potassium acetate be employed in conjunction with barium, the paper will not keep so well after sensitizing, and there is a basic barium acetate precipitated, which adds to the opalescence of the mixture, otherwise energy is slightly added by the use of an acetate salt. Sensitizing and finishing will be dealt with in our next article.

HOW TO SUCCEED IN TAKING GOOD PICTURES ON GELATINE PLATES.—No. IV.

BY S. R. BOTTONE.

By the means detailed in the last two papers, the amateur can form a very good idea of what exposure will give a good picture with his usual apparatus, plates, and conditions of working.

But circumstances alter cases; and it is quite possible that he may not always time the exposure correctly—owing either to excess or deficiency in light, to having changed the make of his plates, or to having been driven by the *restlessness of babies*—and to give an exposure which he dreads may have been too short; or, lastly, by inadventure, to having given one which he feels must have been too long.

It may also sometimes happen that a friend, who has faith in his superior powers, sends him a plate to develop, without any details which may guide him as to length of exposure given, &c.

We may therefore divide these developments which need control, into three great classes, viz. :—A, the under-exposed; B, the over-exposed; and C, the unknown.

Beginning with the under-exposed, we shall find that these fall naturally under two heads: those which are so very much under-exposed that the image is impressed only in the high lights; and those in which the image is impressed in all but the very deepest shadows. The former never make *good* pictures; the latter may, by a little coaxing, be made to give passable results.

A. Having to deal with an under-exposed plate, we pour into a white porcelain dish (or a glass-bottomed one with a sheet of white paper below), a sufficient quantity of fresh developer made in the proportions given before, which I repeat here :—

Saturated solution of ferrous sulphate ...	1 part
Saturated solution of potassium oxalate ...	3 parts

N.B.—The solution *must be saturate*; that is to say, the water used to dissolve the ferrous sulphate and the neutral potassic oxalate must have dissolved all it is capable of dissolving. For this reason it is well to keep stock bottles of each solution, to which sufficient ferrous sulphate in the one, and potassium oxalate in the other, is constantly added, to keep the bottles half full of crystals; the remainder being full of the solution. If not much work is expected, it will be well to place a small crystal of sulphate of copper in the sulphate of iron bottle. This prevents the deposition of the ferric salt; but even this precaution is needless if the solution be used up within a month of making.

Another precaution which must be observed, is to measure out the potassic oxalate first, and to add to that the iron solution, otherwise the liquid becomes turbid through the sudden precipitation of ferrous oxalate. The quantity of solution required for the development of a picture will vary somewhat with the size of the dish used for development, as well as with the size of the plate. The plate must be entirely covered, and for this purpose a quarter-plate will require at least one ounce of developer; a half-plate, two ounces; and a whole-plate, four ounces.

The solution having been poured into the dish, the exposed plate is taken out of the dark back, and *quickly* placed under the solution, gelatine side uppermost. The dish must now be kept rocked continuously, to ensure evenness of development, for about five minutes. The high-lights will now probably begin to appear as hard black patches. When this takes place, rocking may cease, and the dish should be covered over with a slate or other opaque body, and allowed to develop slowly for another five minutes. If, on examination by transmitted light, the half-tones show sufficient density to print, the development may be stopped by washing; if not, the plate should be returned to the developing dish, again agitated, and again allowed to repose for five or ten minutes.

It will sometimes be found necessary to leave a plate for *half-an-hour* in the developer. No harm will accrue from this, provided the developing dish be kept covered, to exclude any adventitious rays of light. The reason why it is better not to agitate the solution during development (as soon as the plate is thoroughly wetted) is, that the resulting picture is less *hard* if the development be thus conducted. An under-exposed picture has a tendency to hardness, as there are only high-lights and deep shadows; but *still* development tends to soften this contrast. If half-an-hour's development should fail to bring out the middle lights, then in all probability the picture has been hopelessly under-exposed. As a last resource, a fresh batch of extra strong developer may be made up as follows:—

Saturated solution of potassic oxalate ..	4 parts
Powdered ferrous-oxalate	1 part

Agitate together for a few minutes, allow to settle, and pour off the clear solution for use.

A picture which will not "come out" under the influence of this developer has not received sufficient exposure to give a negative with any developer.

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CYCLING AS AN AID TO PHOTOGRAPHY.

BY HENRY STURMEY,

(Editor of *The 'Cyclist.*)

So far I have spoken only of tricycles as made for ordinary purposes, and have pointed out, to the best of my ability, the most ready means of rendering them suitable to the wants of the landscape photographer.

I now proceed to treat of machines specially designed and built specifically for photographic purposes, though in this direction but little has yet been done by manufacturers; though I think a little healthy competition in this particular would prove not only useful to the photographic world, but also remunerative to the enterprising manufacturers who succeeded in producing the most practically serviceable and useful article. What is required by the professional photographer is a machine especially designed to fulfil in the highest degree the wants of his profession, and yet be adaptable for other uses, and short pleasure runs at will, and not *vice versa*, as is now the case.

Comparatively few amateurs who go out on photographic tours on the tricycle of a week or more duration develop their plates each evening as they go, the reason being a lack of the requisites wherewith to do the same; and the man who readily provides them with these will reap the benefit. I may here, however, give a hint to cyclists, that may come in useful. It is this: that they need not trouble to carry a special lamp with them, for their regulation "King of the Road" cycle lamp will do as well. I tried the experiment last summer and found it answer admirably, developing several plates at night in a friend's coach-house by its light. What I did was to carry a piece of non-actinic paper and an india-rubber band. When I wished to develop, and had made everything ready by the full light of the lamp, I placed the centre of this paper against the lamp glass, and then passed the rubber band over the bell front, carrying the paper with it; the sides of the paper I folded round the sides of the lamp, so as to intercept any rays that might come from corners or air-holes. I used two thicknesses of paper to make assurance doubly sure. As a matter of fact, the paper I used was that in which the dry plates were wrapped, though that, perhaps, would not be safe in all cases.

To revert to the machines, the "Photographic" tricycle introduced this spring by D. Rudge and Co., of Coventry, is simply an ordinary "Coventry Rotary," fitted with a specially constructed holder for carrying the camera and slides, and with Cusson's patent arrangement in lieu of a tripod. This mechanism is suitable to no other machine, and for one who rambles about seeking what he may devour in the way of views *en route*, it is well suited. It consists of an attachment to the steering handle, in which a brass tube slides up and down, at the top of which the camera, working on a swivel joint, is placed. When in the field the camera is carried thus, and at any moment, without leaving the saddle, the cyclist can halt and turn his lens upon any object that may strike his eye, his plates being all ready to hand in the box at his back. The camera has a considerable range of vision, and can be raised or lowered some inches at will.

The machines shown by the Coventry Machinists' Company, at the Amateur Photographic Exhibition, can hardly be termed special photographic tricycles, as the chief special arrangement is in the sockets for holding tripod, &c. The only other firm that has shown any desire to cater especially for photographers is Singer and Co. (Challenge Works, Coventry), who, in the spring of 1884, placed a machine on the market which was, and is, the best of its kind for heavy work, and professional landscape workers; and my only wonder is that they have not pushed it more than they have, as, after the first one or two shown at the Exhibition at the Agricultural Hall, we seem to have heard but little of it. It belongs to a class of tricycle of which there are now several examples, but which was first introduced by Singer and Co. I refer to the "Carriers," a strong type of machine especially built for the purpose of carrying goods. More than one make of this type of machine could readily be converted to this especial use; and as a class they may be taken as being well suited for photographic work of a heavy nature. "Singer's Photographic Carrier" is a machine of this variety, and of it I hear good accounts, with one of which I will conclude this already lengthy article.

"An ounce of practice is worth a pound of precept," is an old maxim, and I have no doubt that the experiences of Mr. H. Hughes, a professional photographer of the city of Coventry, will speak far better than can any words of mine, not only as to the merits of the particular tricycle under notice, but also of the advantages of a scientific combination of cycling with photography. His experience, which he has kindly given me permission to publish, Mr. Hughes relates as follows:—

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* Continued from page 508.

"At some period of the year I invariably throw off the yoke of studio work, and embrace with delight a respite from the everlasting, monotonous, full-length, three-quarters, and vignette, and spend two or three days in search of the picturesque and beauties of Warwickshire scenery.

"Now I never go more than twelve or fifteen miles out, and within that radius I can always find 'fresh fields and pastures new.' As I cannot always get within easy distance of my subjects by rail, and as I always work 15 by 12 plates, my readers can fancy they are tramping on one of the scorching hot days like we experienced last summer, through woods, over fields, and stiles, carrying a 15 by 12 Kinnear camera, tripod, two double dark slides, and leather case containing several lenses, screws, head cloth, spirit level, and all those little things. I have him in mind's eye now, supposing he has been out several hours, heaping much abuse upon the poor camera-makers for not making that piece of apparatus lighter; hot, tired, and dusty, and wondering if the game is worth the candle, I see him thus, and I sympathize, for I have gone through the same experience myself times without number; but now all that is at an end.

"Residing in the Midlands, the home of the cycle, I think I may venture to say the machine I use possesses every good quality, and everything that professional or amateur photographer could wish for in medium or large size work. The machine is 'Singer's Carrier,' made on a slightly smaller and lighter scale, but still possessing all the sterling qualities of the ordinary 'Carrier.' The rider sits in the exact centre of the machine, and in front of him is the dark tent containing all apparatus except the tripod, which is strapped on the top. The tent is made of light pine, and rides on two light iron bands of square U-shape, which are fastened to the frame each side of the machine. The measurement of the tent is as follows:—Length, 24 inches; breadth, 12 inches; depth, 20 inches; and, when empty, it weighs 10 lbs.

"When I come to my subject I set to work in the following manner. The tent is lifted from the position in which it rides—*i.e.*, lengthways, and placed crossways. There are two light iron rods which fit upright into two sockets, which are placed one each side the machine on the inner side of the framework. At each end of the tent is a small but strong eye-hole, which fits the rods. The tent is placed on the rods and allowed to drop down, when it is at once firm and immovable. It is then unlocked; one part drops down and forms the sink, or what was called a sink in the days of wet plates. Two light iron rods, with folding elbows, are bent out from the top, over which the covering falls, which consists of canary medium inside and black calico outside. You sit on the saddle to change your plates, and do all the inside work just the same as when riding. I can get the whole thing up and have my camera fixed in five minutes, and it takes no longer to pack up.

"To really show what its capabilities are, I will describe a day's work done last summer. Myself and an amateur friend started one lovely morning at half past four, he intending to work 7½ by 5 plates, myself 15 by 12; and I may say beforehand that my machine carried his camera, legs, and plates besides my own, the whole weighing between 160 and 170 pounds. Our first halt was at Kenilworth Castle, distance six miles, where we got two fine pictures. By seven we had finished and adjourned for breakfast. At half past eight we started again; our next stopping-place, Warwick Castle, distant six miles from Kenilworth. We exposed five plates here: from the bridge looking toward the castle; the old bridge across the Avon; from the banks of the river, all of which turned out successful negatives. We then started for Stoneleigh Deer Park, distant about seven miles from Warwick, which we reached about half-past two. The first thing we did after halting was to rest and satisfy our hunger. In half an hour we were ready for work, and exposed five plates from different points of the river, all of which were successful. At five o'clock we started for home, and after a short stay at Stoneleigh Village, reached our destination at about seven, after a five-mile ride. We thus rode twenty-four miles and secured twelve negatives each."

All I can add to this is to say to each of my readers, "Go thou and do likewise."

THE NITROUS OXIDE AND CARBON-DISULPHIDE LIGHT.

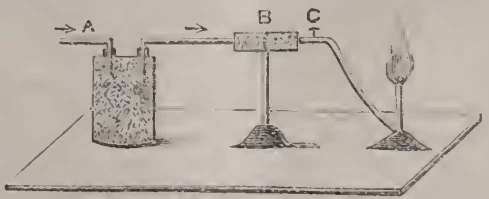
BY WM. THOS. JACKMAN, M.R.C.S., ETC.

The light obtained by burning a mixture of nitrous oxide gas and the vapour of carbon disulphide is well known to be very powerful for photographic purposes. It is of an intensely blue colour, and very active in photographic-chemical properties, being, according to Stein,* twice as powerful as that of the oxyhydrogen flame, and three times as powerful as that of the electric lamp. This able scientist points out that when in full power it illuminates a larger surface than the same sized flame of other artificial sources. Moreover, when the cost and trouble of fixing the apparatus for this light are compared with that of the electric or of the oxy-hydrogen, it seems highly probable that this form of artificial light will be more extensively used than it is at present.

The want of a reliable, cheap, and uncumbersome artificial light has long been felt by photographers; hence I am emboldened to draw attention to this source, and explain shortly the apparatus required for its use, and refer to a few of the experiments which have been made with it, hoping thereby to encourage its more general trial in the art of photography.

An ingenious apparatus for the mixing and burning of the nitrous oxide and carbon disulphide vapour has been invented by Delachanal and Mermet, of Paris, by which a constant light can be obtained, and the danger of an explosion obviated, for it must be borne in mind that carbon disulphide vapour is very explosive under certain conditions.

The apparatus consists of a double-necked flask of about 500 c.c. contents, which is filled with pieces of sponge or pumice, saturated with the vapour of carbon disulphide. Into one mouth, A, a bent tube is fixed, through which the nitrous oxide gas passes into the flask. A second bent tube is fixed into the other mouth of the flask; this passes into a wider tube of metal, B, 20 c.m. long, which is tightly filled with iron filings, the object of this being to prevent the flame passing back into the explosive vapour contained in the flask.



After passing through this tube, B, the mixture of nitrous oxide and carbon di-sulphide is led by means of an india-rubber tube to a modified Bunsen's burner. This burner has neither the usual opening for the admission of air, nor the arrangement for regulating the quantity of gas passing through it. The nitrous oxide enters the flask through A, and after mixing with the vapour of the carbon di-sulphide in the flask, passes through B to the burner, where it can be ignited with safety, and with the production of a very blue flame. The size of this flame depends upon the dimensions of the apparatus. The amount of the mixed gases to be burnt can be regulated by a stopcock placed between the tube B and the Bunsen burner.

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* Das Licht, von S. T. Stein.

E. Sell, of Berlin, produced, a few years since, some excellent photographs with this light, which were exposed a shorter time than when using the electric or magnesium light, and were in every way more perfect. Riche and Bardy, of Paris, also made extensive experiments with this light, and proved it to be twice as powerful as the magnesium, and three times as powerful as the lime-light. They further showed that the photo-chemical power of the light was due to the blue flame of the sulphur in the combination. Oxygen may be used instead of nitrous oxide gas, but the latter is recommended as being safer.

Photographers interested in the use of artificial light for their science will meet with most valuable hints on the various sources of light in Dr. Stein's new work on light, vol. i., referred to above; but I do not think they will find any more worthy of trial, or easier of manipulation, than the nitrous-oxide carbon-di-sulphide mixture.

Notes.

Those who admire the four effective little pictures by T. G. Whaite which form our supplementary sheet this week should not fail to turn to p. 530, and read this gentleman's pleasantly told story of his journey through some of those delightful Belgian holiday resorts where the Britisher has good opportunities of unlearning some of his insular prejudices.

According to the latest advices from the sea side, a new method of livelihood is finding favour amongst some of the cadgers who pick up a precarious living by the margin of the "sad sea waves." It is said that several men are making an appreciable income out of the coppers they receive for *not* obtruding themselves into the family groups taken in such quantities on the sands by the peripatetic photographer at this time of the year. The lazy scamps referred to have learned their power, and now require to be paid, like organ grinders, before they will move on.

A photograph plays a very important part in the new play, "Hoodman Blind," produced with such success at the Princess's on Tuesday. The wretched hero, deceived, as he thinks, by his wife, leaves her, but takes with him a cabinet photograph of the woman he so madly loves, and in his softer moments gazes at it, and kisses it with the passion he cannot wholly stifle. It is whilst so gazing at it that another of the characters chances to catch sight of it, and from this incident the discovery that the original of the photograph has a sister so like her that the resemblance has led her very husband to think her false, directly proceeds.

Incidentally the said hero throws the cabinet on the floor, and stamps on it in his hysterical rage; and it will be at once seen that a considerable portion of the dramatic effect is lost by making the portrait of card rather than a glass one. Had the likeness only been of the old-fashioned kind, the smashing of the glass and the grinding of the fragments beneath the husband's heel, could not but have been much more impressive than the mere stamping on a piece of cardboard.

Perhaps the *Official Gazette* of the United States Patent Office offers one of the best illustrations of the value of photo-lithography as a means of reproducing sketches in black-and-white. The *Gazette* is issued weekly, and each number contains nearly five hundred reproductions, some from very complex drawings.

With respect to this, B. Butterworth, the U.S. Patent Commissioner, writes in his last annual report:—"A few years since it cost from \$2.50 to \$35 to obtain a copy of the drawings of a patent. Under the system of photo-lithographing now adopted, the Office can supply copies of patent, with perfect reproductions of the drawings, at nominal cost, viz., twenty-five cents for single copies, or ten cents when twenty or more are ordered. Not only this, but the entire expense of producing these photo-lithographic copies is more than paid by the proceeds of the sales."

Should those advertisers who seek publicity in the outside sheets of the PHOTOGRAPHIC NEWS follow the example of J. A. Bloomfield, refiner, of Park Ridge, Cook County, U.S.A., whose advertisement in *Anthony's Bulletin* is accompanied by a woodcut portrait, we may expect our supplementary sheets to become a sort of portrait gallery.

For an advertiser to publish his portrait as a part of his advertisement is a practice not altogether unknown in this country. We may instance the late "Professor" Holloway, and allude to the circumstance that many Parliamentary candidates are issuing portraits in large numbers. Doubtless those who make such use of portraits are to some extent followers of Lavater, and have come to the conclusion that their countenances are calculated to inspire confidence.

If photography is dreaded by the wood engraver, it has proved an immense advantage to the artist, peculiarly speaking. In the days of wood engraving the artist did little more than make a preliminary sketch before working on the block. Now he makes a finished drawing on card, which is photographed, and sells the drawing. Mr. Du Maurier probably makes more from the sale of his original drawings for *Punch* than he gets from that periodical, high as his salary must be.

The *Court Journal*, commenting on our suggestion that instantaneous photography should be used to settle the question of unfair bowling, says:—"Every ball delivered must, if this idea be carried out, be recorded on a separate plate, and at eighteenpence a plate this would be an item that would not meet the approval of most cricketing clubs, for cricketers are proverbially careful of their coin." Economy is very commendable, and it is refreshing to hear that our cricketers practise the virtue; but it is to be hoped they will not be frightened by the misleading statement of our contemporary. Plates at eighteenpence *the dozen* would answer their purpose.

Under the somewhat misleading title "Photoscope," an ingenious electrical apparatus, by which a signalman may always know if his distance signal lamps are burning, is described in *La Nature* by M. Laplaiche. The essential part is a Breguet metallic thermometer, which is placed in the lantern, and while this is heated by the lamp flame an electrical circuit is kept closed.

Verdicts in County Courts are not always easy to understand. A Brighton photographer last week sued a person to recover £1 5s. for an enlarged photograph supplied. The defendant denied having ordered the photograph, but admitted that he offered to settle the matter for the sum named. Plaintiff refused to accept this sum, but subsequently, according to his statement, he wrote accepting the offer, but received no answer. The letter, defendant said, never reached him, whereupon the Judge decided against the plaintiff. On the face of the matter, it would appear that although the defendant admitted he would pay the five-and-twenty shillings, yet the Judge ruled that the plaintiff should not have his money. This seems rather contradictory.

The old Queen's Bench Courts at the Guildhall, rendered vacant by the removal to the New Law Courts, are likely to be transformed into a picture gallery for the city. The various curiosities contained in the Guildhall, scarcely known by the public, and never seen, will form the nucleus of the collection, and promises of assistance have been made by some of the rich patrons of art. A photographic section should certainly not be lost sight of. There are already a goodly number of photographs in the Guildhall library, and these could be well added to: the great City companies, for instance, might take the matter in hand. Photographs of the interiors of the various halls into which the public seldom or never gain admittance would alone be of great interest, while the documents and mementoes of a byegone age, in possession of the companies, capable of being photographed, must be very numerous. The City is so rich in *souvenirs* of historical associations that a photographer might almost be kept permanently employed.

Strolling in Brussels a few days ago we noticed in a shop window in one of the arcades a twelve ten photograph of a chiropodist engaged in operating upon the foot of a lady. There was nothing extraordinary in this *per se*, as we had seen similar photographs in London; but what attracted our attention was the fact that the lady was masked. The reason for obscuring the lady's face was not at all apparent. A companion suggested that the operation was probably a painful one, and that it was better the patient should not see it; but this hypothesis was scarcely favourable to the chiropodist, whom the photograph was intended to advertise, and we rejected it. Then there was the suggestion that the lady, from motives of delicacy, covered her face while the operator was gazing upon her bare foot. Neither was this theory entirely satisfactory, and it was only by enquiry that the true reason was discovered. The photograph, so our informant gravely stated, was that of a lady of exalted position who, attracted by the fame of the chiropodist, visited him for the purpose of having a very painful corn removed. So grateful was she to the professor, and so struck by his skill, that she consented to be photographed in the position of being operated upon. Only one condition did she impose, namely, that she should be masked, so that she should not be recognized. Thus ran the story; but we still have our doubts.

The *Pictorial News* reproduces from *Harper's Weekly* a picture from an instantaneous photograph of a "block" in Broadway, New York. Why should we not follow this example, and take instantaneous photographs of scenes in our public streets and places, where, through either the obstinacy or supineness of the authorities, much inconvenience is caused. The annual "break up" of the Strand, which causes dire confusion during the busiest months of the year, would be a good subject; and so would a block at Billingsgate, the maintenance of which seems to be an article of faith with the Corporation. Railway directors, too, might be put to the blush if they could really see what goes on on some of the suburban stations between eight and nine every morning. It is said that when representatations were made to the directors of the London, Chatham, and Dover Railway Company respecting the over-crowding at Walworth Road Station, and the fighting for seats, a couple of these gentlemen paid a visit to the station at twelve o'clock in the day, and pooh-poohed the complaint, because they only saw five persons on the platform. An instantaneous photograph of the scene at eight o'clock in the morning would have altered their opinion considerably.

Already have we received proof positive that the silly season has set in with its accustomed severity. It is true that no photograph of the Sea Serpent has yet reached us, nor, indeed, have we received cartes of the latest gigantic gooseberry, grown at Mangel-cum-Wurzelton; or of the primeval toad, just extracted from the interior of a tree trunk at Padlington Parva; but in other ways, the condition of our waste-paper basket bears witness, evidence of the days through which we are passing is profusely forthcoming. By this very post, in fact, a correspondent sends us, at some length, the details of a plan by which the card-sharper can be baffled and exposed.

"It is well-known," he writes, "that the swindler in question depends for success on the facility with which he accomplishes sleight-of-hand tricks in cutting the pack, altering the position of particular cards, withdrawing kings, queens, aces, and so on, and so forth. But I maintain," our correspondent goes on, "that, by the aid of photography, the sharpest villain of the kind can be found out. All that has to be done is to take care that the suspected man is one night made to play in the club card-room within the focus of an instantaneous photographic camera. The apparatus that is able to give us a striking likeness of a flash of lightning, a faithful portrait of a tornado, and an unmistakable representation of the flash of a pistol, will surely be able to secure a negative of a 'pass,' however swiftly made; of a 'cut,' however deftly managed. Be prepared with plates enough to secure photographs of every distinct operation the suspected player performs with the pack of cards; and, as a result, I maintain it will be possible at the next meeting of the club committee to lay before it a report of the sharper's misdeeds, duly illustrated with 'cuts.'"

We need not quote our correspondent further, and only allude to his letter as a specimen of its misapplied ingenuity rife at this season. It is clear, though, that, according to his contention, the series of photographs in which the various positions assumed by the legs of a trotting horse in completing one stride are exhibited, will soon be supplemented by a novel set of instantaneous negatives illustrating the whole of the manipulative action involved in one performing the "three card trick."

Patent Intelligence.

Applications for Letters Patent.

9575. Walter Bentley Woodbury and Felix Vergara, 35, Southampton Buildings, Chancery Lane, London, W.C., for "An improved substitute for glass to be used for photographic and other purposes."—11th August, 1885.

9623. Alfred Charles Farnsworth, 1, St. James' Square, Manchester, for "Improvements in actinometers for photographic and other uses."—13th August, 1885.

9661. James Yate Johnson, 47, Lincoln's Inn Fields, Middlesex, for "Improvements in photographic apparatus for enabling prepared plates to be readily placed in and removed from the photographic camera without injurious exposure to light."—(*F. H. Mader*, Germany.)—13th August, 1885.

Patent Sealed.

5725. Alfred Julius Boult, 323, High Holborn, Middlesex, for "Improvements in photographic film holders."—(*George Eastman* and *William Hall Walker*, United States.)—9th May, 1885.

Specification Published during the Week.

13,318. James Thomson, of 21, High Park Street, Liverpool, in the County of Lancaster, for "Improvements in photographic cameras."—Dated 7th July, 1885.

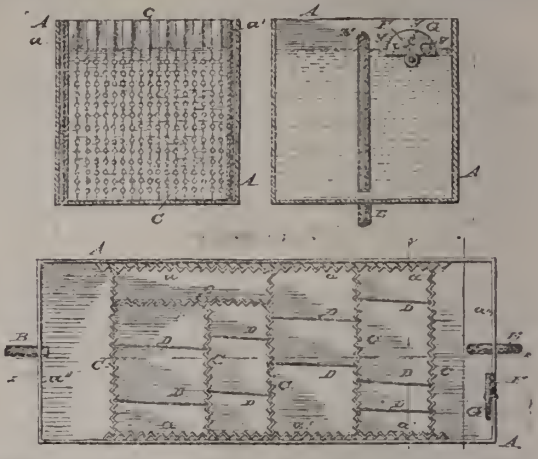
The patentee says—My invention consists in combining one whole camera with a portion of another larger camera, so that when combined each shall be equally available for use, and the smaller camera will fold up within the portion of the larger camera when not in use. The combined cameras will then be of less size and weight than an ordinary camera of the larger size alone, and the larger camera will be obtained at one-third its usual cost.

I carry out the combination in the following way:—A frame forming the back portion of the larger camera for holding the prepared plate is made similar to the back frame of the smaller camera, only larger; say the smaller will carry a plate 10 inch by 10, and the larger a plate 15 inch by 12. The depth of the smaller camera, when packed up, will be 3 inches, and the two together, when packed up, 5 inches.

I declare that what I claim is—The combination of a photographic camera with a camera back frame, substantially as herein set forth.

Patent Granted in America.

323,721. Henry W. Oliver, Rome, N.Y. "Photographic wsshing apparatus."—Filed May 10, 1884. (No model.)



Claim.—1. In a gelatine photographic negative washing apparatus, the combination, with the tank A, having its sides provided with the vertical non-perforated corrugations, *a a*, and *a' a'*, of the perforated and vertically-corrugated partitions, C C, removable from any two opposite corrugations, *a a'*, to any similar two, substantially as specified.

2. A tank for washing gelatine photographic negatives, having its inner walls adapted to sustain partitions which are provided with means for holding photographic negatives, and provided at one end with a water-supply pipe, and at the opposite end with a syphon, whereby the said tank may be automatically emptied at regular intervals, substantially as specified.

3. A tank for washing gelatine photographic negatives, having its longitudinal inner walls adapted to sustain removable transverse perforated partitions, which are provided with means for holding gelatine photographic negatives, and the said tank also having means for receiving and discharging water, substantially as specified.

4. In a gelatine photographic negative washing apparatus, the combination, with the tank A, provided at one end with the water-inlet B, of the syphon, E, at the opposite end of the said tank, the opening F, and the gate G, provided with the holes *g g*, substantially as specified.

ONE OR TWO OUT-OF-THE-WAY PLACES IN WALES.

BY J. MAURICE JONES.*

Out-of-the-way places have a peculiar fascination to the amateur photographer. Well-known beauty spots might enable him to expose more plates in a given time—for by studying the shop windows in the neighbourhood he would be able to judge where the best views could be obtained, and therefore save himself time and trouble. But, alas! the heart of man in every age cries out for something new, and the photographer in search of the picturesque is not an exception to the rule. He has an aversion to the "Carnarvon Castle from the Ferry" sort of views; he is hardly thankful for the information that "it is generally taken from there," and it only increases his disgust to find, after trying to get some better view, or at any rate a more original one, that the spot indicated is the best.

Cemmaes, one of the "out-of-the-way" places I want to tell you about, is not open to the objection of being "well-trodden" ground, for it is undoubtedly "out-of-the-way," being four miles from the nearest railway station, Amlwch, Anglesey. If, however, the spirit should move any of our members to go that way, they would find the walk a pleasant one, provided, of course, that the camera happens to be "one of the lightest made." Cars, however, are easily obtained, and the charge is very moderate. At Cemmaes the photographer will find "fresh fields and pastures new;" he will find it to be a genuine specimen of a village by the sea, with an "odour of brine from the ocean" sufficient to intoxicate the average townsman; while, as regards work for the camera, the photographer will find seascapes of all kinds—glorious instantaneous views of the sea dashing against the rocks, tumble-down old huts, with here and there an old-fashioned cottage nestling amongst the rocks with the sea occasionally "coming in" as a glorious foreground, while picturesque boats and smacks, with the attendant fisherfolk, abound. Cemmaes will probably rise into a "fashionable watering place" at some future day; but, thank heaven, the promenade brass band and nigger minstrels are as yet things of the future, and the villagers still retain their kindness of heart and generous disposition, and they have not learnt to charge the exorbitant prices made at some less favoured, though more frequented, places.

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* A communication to the Birkenhead Photographic Association.

Bull Bay, a somewhat similar village, but not in my opinion anything like so picturesque, is within easy distance; several plates could be exposed there without much difficulty in finding the subjects. The light at these places is very actinic; from three to four seconds at $\frac{f}{44}$ on the ordinary plates in sunshine, is sufficient.

In the neighbourhood of Amlwch there are several little villages which abound in broken bits—old-fashioned churches and cottages. Llanelian Church, about four miles from Amlwch, is well worthy of a plate or two.

I pass round two views taken at a place called City Dulas, also about four miles from Amlwch; they were taken on account of personal associations with the place, but they will enable you to see that sundry pretty pictures could be found there.

Rewharf Bay is another picturesque place, with rocks entwined with ivy, and taking occasionally the shape of castles and other grotesque forms.

The next "out-of-the-way place" I shall speak about is in Denbighshire; but before leaving Anglesey, I should like to again mention the kindness they show to strangers. If you call at a farm and ask for a drink, a glass of splended milk and a plate of bread-and-butter will be forthcoming; and if you should be tramping your weary way along some of the roads, if a car or cart passes you will almost certainly be proffered a "lift," and that without expecting more than "thank you." If any here should be going there, don't forget to have some Anglesey pancakes (the "Anglesey welcome"); they are the next best thing to the scenery.

Bontuchel (High Bridge), near Ruthin, in Denbighshire, I can recommend as another good place for photographic work. To get to Bontuchel, the best plan is to get down at Rhewl, a station two and a half miles from Ruthin, on the Ruthin and Denbigh line. The distance from Rhewl to Bontuchel is about three miles—the whole journey being alongside the picturesque banks of the river. Bontuchel is the resort of several artists and photographers, so that it can hardly be called new ground; still, I think many as pretty a bit as at Bettws-y-Coed can be found; it is the same kind of scenery, and there is plenty of choice, and the photographer will have the satisfaction of knowing that there is a chance of his having obtained an original picture, whereas at Bettws such is well-nigh impossible. Any of our members could spend a pleasant day in Ruthin itself; there are some very nice ruins to be had, old-fashioned houses, &c., and a walk across country from Ruthin to Cerrig-y-Druidion would yield a large number of lovely pictures. My own pictures of Bontuchel scenery are over-exposed. When I was there, it was my first experience of that kind of photographic work; since then I have taken somewhat similar views, and would suggest about ten to fifteen seconds on a rapid plate, at [illegible] good bright light—not sunshine.

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A PAPERETTE ON THINGS IN GENERAL.

BY J. A. FORREST.*

Our worthy Secretary has projected a new word to suit a want—viz., "Paperettes,"—which I think a very happy idea, inasmuch as many a retiring student of our art-science has, in the course of his experience, discovered some happy and convenient plan which may be good enough for a paragraph or two of writing, but to elaborate into a paper for the evening would be more than he would like to encounter, and hence a valuable field of little developments would be lost, not only to the progress of the Society, but also to the photographic world in general.

Another revolution in our art is at hand, and will completely alter—as far, at least, as the amateur is concerned—the material on which we work, and the impedimenta will be reduced to the lightness of a lady's reticule; I allude to paper as a support for the negative. I have a lively recollection of the happy days of the wax-paper process, with its fine delineation, its extreme probability; for a small portfolio would hold fifty or sixty negatives, and be less in weight than a dozen sensitive plates. No need of going down on your knees to a foreign Custom-house official ruthlessly about to open your boxes of sensitive plates. Lady artistes would marvellously increase in number, and no porters would be required. What a gentlemanly style we would exhibit! I have in my mind's eye, during the course of this delightful summer, the perspiring efforts of large-sized cameras, students losing their little opportunities of calm reflection to survey the best artistic point of the landscape. This movement is not novel, but we now wait with tolerable certainty for the perfection of this long-wished for "paper" era.

As President of this Society, I must press upon the members the necessity of contributing to the album, and of directing their attention to the production of as many local views as possible, as time will make them of great historic value. I must also urge upon young members the advantages of joining the workers in the trips into the country as the best means of practically learning the rudiments of our art-science.

The platinotype process gives a maximum of permanency with a minimum of time and labour in producing qualities of the highest importance, if we want to write our names in the sands of photographic progress. With this new phase of our art I have alluded to, new, cheap, and suitable cameras will make their appearance, and every member will have the opportunity of working, instead of being a mere patron and admirer of our truth-producing reflections of nature's magic beauties.

My time, as President of this Society, is rapidly drawing to a close, and I want to vitalise its youth to the vigour of earnest and united action, and obtain, as Goethe said, "more light, more light," into the vista of scientific research.

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PHOTOGRAPHY AND THE SPECTROSCOPE—

LECTURE II.

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.*

In my last lecture, I left off with the use of the slit in the spectroscope, and I showed you, I think, that under certain circumstances the slit which had the form of a ring was useful, having previously demonstrated that it was not necessary that the slit should be straight, but that it was most convenient that it should be so. I will next deal with the subject of the prism. We know that prisms are employed to separate the different coloured rays, as each colour is differently refracted as it passes through the prism, and it is this difference in the index of refraction between the red ray and the violet ray which gives the amount of dispersion in forming the visible spectrum. Of course, if we go beyond the violet, there are invisible rays, while again below the red there are also dark rays, which also have their indices of refraction, but I wish to show you the influence that the material of the prism itself has on the dispersion of the visible spectrum.

I have here a prism of 60° built up of six or seven different triangles of glass. It is apparently homogeneous, but when we pass light through it we shall find that it is anything but homogeneous; in other words, the different portions are differently refractive. The different portions of the prism are all glass, as I have said, but of different densities, and the denser the glass, the more are rays refracted, and the greater dispersion between the red and violet there is. [A slice of light was passed through this built-up prism, and the different spectra thrown on the screen.] You will notice, by the spectra on the screen, that the length of the top spectrum, between the red and violet, is much smaller than that of the bottom spectrum. The glass which gives the dispersion to the latter is much denser glass than that which gives it to the former. Practically speaking, therefore, we may say the denser the glass the greater refraction, and the greater dispersion there is. For most purposes in spectroscopy, it is as well to use as dense a glass as possible, in order to get the maximum amount of dispersion. I will now combine three prisms together, two of a light glass and one of a denser, and we get a combination, in which, although the main beam will pass straight on to the screen, yet the presence of dispersion is also shown by the formation of a spectrum. This is an example of what is called a direct vision prism. The spectrum is given by the differences of the refractive indices for each ray in two kinds of glass. For some purposes this kind of compound prism is very useful, and particularly for lecture experiments; but, as a rule, for photographic purposes I should not recommend it, on account of the internal reflections which take place between the different surfaces of the glass, though they are cemented together. You must recollect, wherever there is a difference in density between two media—in other words, a difference in the refractive indices—there is always a certain amount of reflection, and those reflections, being white light, are rather apt to fog the plate, and give you false notions of what you get in the photograph.

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* A communication to the Birkenhead Photographic Association.

* Continued from page 524.

We come now to a much more important point with regard to the spectrum, and that is, what is the best material to use. In those prisms which I have already shown you, the material was glass. Now glass is, comparatively speaking, a mixture of materials, and has no definite chemical formula; but when we come to a material which has some definite chemical formula, we find that, as a rule, it has certain properties which are invaluable in certain forms of spectroscopy, more particularly when the photographic plate has to be brought into requisition. Quartz is an example of this; it is a definite compound of silicon and oxygen, and we find that it has certain definite advantages which are not to be found in glass prisms. The dispersion is not quite so great as it is with glass, but, on the other hand, it lets through rays which are cut off completely by glass, as I hope to show you on the screen. This quartz prism has very well-worked faces, and we will send a beam of light through it, and then proceed to investigate its behaviour. [Spectrum thrown on screen.]

I may further say, in reference to this, that the condenser in that lamp is quartz, the lens is quartz, and the prism itself is quartz, so that we are dealing with nothing but quartz. Now, the question comes, is there any advantage to photographers in using such a material as quartz. Let us first see the extent of the spectrum. By placing a card which has been washed over with quinine in the ultra-violet part of the spectrum, you are able to see these ultra-violet rays glowing with a pale blue light, and you will notice to what a great length these rays reach beyond the ordinary visible point of the spectrum. Now, by placing a piece of glass in front of the slit, you will see that the ultra-violet spectrum is very much shortened; in other words, the glass has absorbed these rays. I may repeat the experiment with a card which has been brushed over with paraffin oil, and the same result holds good.

I have here a photograph of the electric arc taken in another manner, to which I shall have to direct your attention presently. The light in this case has to pass through no glass whatever. The spectrum was taken by a diffraction apparatus; for the top part of the spectrum a glass was interposed in front of the slit, and we see the difference there is in the spectra, owing to the use of glass in one case and not in the other. The glass apparently cuts off many useful rays; but I will now draw your attention to the solar spectrum taken in the same way, in which there has been a glass placed in front of the slit for one spectrum, and not in the other. Both spectra, practically, reach the same limits. We now can answer as to whether it would be advisable for photographers to use quartz lenses for ordinary photographic purposes or not. Recollect that every ray of light you saw fluoresce on the screen is useful for photographers when they are using a light such as we have in the electric light. You will see, then, from that, if the electric arc light was usually employed, all those rays which are cut off by the glass could not be utilised by them, and, therefore, there would be so much power wasted. Now photographers, as a rule, do not work with the electric light, but with sunlight; we have seen that in the solar spectrum taken under similar conditions, the glass practically cuts off none of the ultra-violet rays; the atmosphere of the earth, or of the sun, or both, cuts off the extreme ultra-violet rays before the light reaches us. We therefore come to the conclusion that, so far as photographic work with sunlight is concerned, there would be no advantage in using a quartz lens over the ordinary photographic lens. Some years ago, Mr. Claudet made an agate lens, which he considered would give him greater advantages over the ordinary photographic lens, simply because he could utilise the ultra-violet rays, but I think you will see from this there is no advantage in using such a lens. Remember, however, if you are photographing the spectrum of the electric light, or using it for illuminating a sitter, there is a very great advantage in using quartz. We may use another definite chemical compound in the shape of Iceland spar. I have here a very beautifully worked prism of Iceland spar, which has a definite composition of calcium and carbon, and I dare say we shall reach very nearly to the same ray limit as we did in the quartz experiment. Iceland spar holds an intermediate position between quartz and glass. It was with such a prism as that that Dr. Huggins took his famous star spectra, and I thought it might interest you to throw one or two of these on the screen. They are very small, but the definition is very beautiful. Many of the black lines in these spectra indicate, probably, hydrogen. It remains to be seen whether Dr. Huggins has attained any advantage in using Iceland spar instead of glass, for if the ultra-violet stellar light is absorbed, as with sun-light, no advantage would be gained. I may mention that he gives the composition of the stars by reference to the spectral lines of well-known elements.

One more point is this: Would it be advantageous to use a mirror instead of a lens? There is a great deal to be said about this, particularly in spectroscopy, where we have to examine everything minutely. The material we utilise most easily in the case of a mirror is silver; that is to say, we get a glass mirror, and silver it on the front surface. Now the question is, does the silver reflect every ray in the same way that quartz would transmit it? Here I have a photograph which should give an answer to that question. The bottom half of the spectrum was taken as reflected from a quartz surface, the top half of the spectrum was reflected from a silver surface, and you will see that at one certain part of the latter the rays are very nearly absent, though beyond that again they are present. Where those rays are wanting is just at the end of the solar spectrum, and therefore, when using sunlight, it is no great advantage to use a quartz reflector over a silver reflector. In spectroscopy it is necessary to know exactly the qualities of all the substances with which you are dealing.

One question in photography and in spectroscopy is, what width of slit you would use—what slice of light you would allow to pass through? Here let me give you a demonstration. In the centre of this black disc there is a fine line of light, and there is a micrometer screw by which we can tell how many thousandths of an inch wide it is. As a rule, about $\frac{1}{500}$ of an inch is the dimension used for ordinary work.

I have been referring to the photographs to two spectra on the same plate, and I must show you how it is managed. For this purpose, it is necessary to have an adjunct to the slit, and that is a shutter which is able to cut off half the slit at one time, and afterwards leave that part open, and close the other half already used. By this means we can get one spectrum adjacent to another. In comparing spectra of different metals with each other, we are able to tell whether we have any two lines coincident one with the other.

(*To be continued.*)

THE CRUISE OF THE *CEYLON*, 1885.

A VOYAGE TO THE SPANISH MAIN WITH A CAMERA.

BY NORMAN MAY.*

The Azores, or Western Isles, a group of nine islands in the Atlantic Ocean, about equidistant from Europe, Africa, and America, were discovered in 1431 by Gonçalo Velho Cabral, and are a possession of Portugal.

Viewed from our anchorage, just inside the breakwater, the chief town of St. Michael's, Ponta Delgada, wore a very picturesque aspect. While lacking the masses of bright coloured flowers and bold peaks of Funchal and neighbourhood, the variety of colours with which the red-roofed houses were decorated, the blue-tiled fronts, and a curious municipal gate on the quay, gave an air of brightness and originality to the town. Rising behind were the abrupt but cultivated hills, their patches of green mapped out by tall hedges and walls.

At seven o'clock I went on shore to make arrangements for the excursion we had decided to make to Las Furnas on the morrow, and landing at the little wharf, wended my way through the Italian-looking streets. Visiting first the post office, a large room up a bare-looking staircase, I found the place closed, and in charge of an old woman as caretaker, so no letters were to be obtained that night, Nearly all the shops being closed, and as, owing to the darkness, we were able to see nothing of the town, I concluded my arrangements for carriages as soon as possible, and went on board the *Ceylon* to sleep.

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* Continued from page 526

My photographic apparatus being packed in readiness, I went on shore in one of the first boats in the morning (March 28th), and leaving my chattels in charge of a butcher, strolled round the town. One of the first things that strikes the visitor landing at Ponta Delgada is a strange cloak and head dress worn by some of the women. The bonnet or *capello* is in shape somewhat like an old-fashioned sun bonnet projecting some four inches in front of the face and coming to a rounded wedge-shaped point at the back: its total length is about two feet, and, combined with the long *capote* or cloak of the same dark blue cloth, it gives its wearer a very strange and weird-like appearance, to be seen at the present time nowhere else in the world; this costume is supposed to have been introduced by the Belgian colonists who emigrated to St. Michael's some 300 years ago. A row of four or five women thus curiously attired, stalking grimly and silently along, one behind the other, on the narrow pavement, presented a very curious appearance.

A favourite head-covering for men seems to be the *carapuca*, a zouave shape cap with large projecting peak, a curtain or valance of dark blue cloth falling from the sides and back on to the shoulders.

We left Ponta Delgada at half-past ten in the morning for Las Furnas, with its world-famed boiling springs and sulphurous baths, reaching Las Furnas at sunset. After quite a sumptuous dinner, we strolled out under the bright moonlight, retiring early to rest.

In the morning we were greatly surprised and disappointed to find the rain descending in torrents, rendering any idea of excursions in the neighbourhood out of the question; so after a rather early breakfast we started by the New Road on the return journey to Ponta Delgada. The rain drove over us in clouds as we ascended the steep zig-zag road out of the crater, and at the summit of the pass it ceased altogether, giving us some delightful peeps of the surrounding country. Soon we came to the beautiful little Lago das Furnas, nestling between the mountains. On the lake we saw a phenomenon new to all of us viz., a horizontal rainbow; rising from the surface of the lake was a light cloud of mist, brilliantly illuminated with the prismatic colours, which, impinging against the mountain side, ran for some distance upwards.

Passing onwards we ran over a capital road, by the water's edge, indented with numerous picturesque bays, and dotted with rocky islets, till we reached Villa Franca, a little town pleasantly situated on the sea. Our drivers here halted for the necessary refreshment for themselves; but quickly resuming their seats, we tore at a break-neck pace to Ponta Delgada, reaching that place about half past two. Our vessel being timed to leave at five o'clock, we had ample leisure to inspect one of the many lovely gardens the wealthier residents of the Azores delight in.

Here we found, sheltered by the tall trees from the northern winds, and open to the sunshine of the south, the products of the semi-tropical zone growing in great perfection. Stunted palms, with stems of three feet in diameter, fan-like bananas, magnolias, some thirty feet in height; camelia trees thick with crimson and white blossom; gigantic aloes and cacti; our own familiar orange blossom, and many trees and plants unknown to me. The nursery gardens contained flourishing vines, carefully trained in well-sheltered vineries. Driving down to the quay we found that, owing to the prevalence of a heavy gale from the north-east, the pilot did not deem it advisable to leave till daylight the next morning; but after a walk to see the pretty Plaza, where the band plays on Sunday afternoon, we went on board.

At seven o'clock next morning, March 30th, we heard the anchor being hauled up, and going on deck after breakfast the south-eastern cliffs of St. Nicholas soon faded from our sight, and our pleasure trip being practically over, Bradshaws came in requisition, and we were soon actively engaged in discussing the merits and demerits of the different trains from Plymouth, at which port we had decided to call.

We were now fairly in what are called, though erroneously, "the roaring forties," where a succession of adverse winds and nasty seas made our passage longer than usual; but running into smoother water, off Cape Finisterre, on Sunday morning early, April 5th, we sighted the coast of Cornwall, and at half-past nine were running into Plymouth Sound, between the Breakwater and lovely Mount Edgcumbe. On our right Staddon heights and Bovisand frowned on us, Batten, with its quaint round tower, the grim Citadel, and busy fishy Sutton Pool. On our left Drake's Island; and in the distance the Hamoaze, full of Britain's wooden walls; Brunel's wonderful tubular bridge, and stormy Devil's Point; while in front of us rose that breezy promenade, the Hoe, bearing on its broad slopes Smeaton's massive tower and statue of Plymouth's benefactor, immortal Drake.

Landing again on England's shore, after our cruise of 12,000 miles, 'mid much handshaking and wishing Godspeed, we were soon speeding swiftly to our respective destinations, all, let us hope, more sound in mind and body for our voyage in the *Ceylon* to summer seas.

Correspondence.

Mr. BOTTONE'S PHOTO-MICROGRAPHS.

Sir,—In last week's number of the News, page 527, Mr. Skertchly's letter contains the following words:—"The field of view depends upon the angular aperture of the objective, and no quarter I have seen has so narrow an angle as to show only part of the foot of this particular slide."

This statement is of such an extraordinary character, and so totally at variance with fact, that a friend and I took the trouble last evening to measure the field of view of some of his object-glasses, and I subjoin a note of these measurements in hundredths of an inch. The micrometer used was one by Smith and Beck. The stand was a fine monocular one, by Crouch, having rotating mechanical stage and sub-stage. We used the B eye-piece, to enable us the more easily to read the divisions of the micrometer.

Maker's Name.	Designation of Object Glass.	Angular Aperture.	Diameter of Field in 100ths of an inch.
Zeiss	B $\frac{2}{3}$	... 40° ...	4·7
"	B $\frac{2}{3}$	... 60 ...	4·8
"	C $\frac{1}{4}$	... 50 ...	3·15
"	CC $\frac{1}{4}$	... 105 ...	2·3
"	D $\frac{1}{6}$	... 75 ...	1·75
"	DD $\frac{1}{6}$	... 105 ...	1·65
Powell and Lealand ...	$\frac{1}{4}$	... 90 ...	2·6
" " ...	$\frac{1}{4}$	... 140 ...	2·0
Wray	$\frac{1}{4}$	... 130 ...	2·0
"	$\frac{4}{10}$	... 60 ...	3·4
"	$\frac{4}{10}$	... 100 ...	3·15

It will be seen from the above table, that in every instance except the BB, the larger angle glass has a smaller field than the low angle one. These object-glasses are every one of them exceptionally good glasses. The reason why the BB, of 60°, has a larger field than the single B, is because it has a lower magnifying power. The opposite holds good in regard to all the other lenses. Their field is less because the makers have given them greater magnifying power than their low angle glasses of the same denomination. It is no doubt almost impossible to get a low angle and a wide angle quarter of the same power, but if such glasses could be procured, Mr. Skertchly would find the field of each of them the same. As another proof of this we put the Iris diaphragm on the microscope above the quarter object of lens by Wray of 130°, and reduced the aperture by the diaphragm till it was almost *nil*, and still the size of field remained the same.

We examined the foot of the dung-fly in the same microscope with the A eye-piece, but none of the quarter-glasses mentioned above showed the foot, and the three next joints of the leg, except the Zeiss C $\frac{1}{4}$ of 50°, which has the largest field and lowest angle. The reason of this is its low magnifying power. Powell and Lealand's quarter of 90° showed the foot and two joints, while Mr. Wray's quarter of 130° only showed foot and one joint.

Mr. Walmsley's recent description of his process is exactly the method I have used for a long time in producing photo-monographs. I have not, however, found it necessary to get glasses specially made and corrected for the actinic focus. I have about a dozen-and-a-half of object-glasses, from 4 inch to Powell and Lealand's $\frac{1}{8}$ new formula water immersion, all chosen for their good qualities as micro-objectives simply. They are by Wray, Zeiss, Powell and Lealand, and I can with any of them produce a micro-photo negative with as sharp and delicate an image as when the object is seen in the microscope.—Yours, &c.,

W. FORGAN.

[*To* SIGNOR BOTTONE.]

DEAR SIR,—I have examined the French triplet with which you took a photograph of a dung-fly's foot, and find, by measurement with the micrometer, that its magnifying power, in conjunction with an A eye-piece, was rather over 250 diameter. The photograph taken was identical with the one published as a supplement to the PHOTOGRAPHIC NEWS in May last, and included the whole foot.—I am, dear sir, yours very faithfully,

3, *Danbury Terrace, Wallington.* FRANCIS CARTER.

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Society was held on Thursday, the 13th inst., Mr. A. HADDON in the chair.

Mr. W. K. BURTON presented a copy of his "Modern Photography," latest edition, to the Society.

Mr. W. COBB drew attention to the quantity of bronze powder on wrappers used for packing gelatine of continental manufacture. He had been much troubled with spots in his plates, and upon examination found numerous particles on the gelatine. Brushing each sheet before use removed the evil. Replying to Mr. Henderson, he said the spots were transparent, with a nucleus in the centre.

Mr. HENDERSON should expect the spots to have been opaque, and absent in emulsion filtered through wash-leather.

Mr. J. J. BRIGINSHAW explained the method of printing in bronze, and said no care was taken to keep the particles strictly on the design.

Mr. BURTON remarked that spots having black centres were often due to extraneous matter on the glass.

Mr. HENDERSON agreed with the last speaker, and had found the spot to remain after the surrounding gelatine had been treated with a stream of hot water.

Mr. COBB had made an experimental batch, purposely adding bronze powder; the plates were riddled with spots.

Mr. HENDERSON suggested a coating of melted paraffine as a protection to bronze surfaces, dragon's blood being used for tinting if required.

Mr. W. H. HARRISON had lately been over some large works where he was shown the process of colouring paraffine. It consisted in mixing a coal tar dye with stearic acid, and adding this to melted paraffine.

Mr. A. COWAN drew attention to the keeping properties of thymol in hot weather, and showed some emulsion containing half a grain of thymol per ounce, which had remained in a firm jelly for the last three months.

Mr. HENDERSON had relinquished its use, believing it tended to reduce the silver. An ounce of emulsion would dissolve half a grain of thymol in alcohol, but more would not be soluble.

Messrs. DEBENHAM and COWAN used thymol, and had found no evil effects from its use.

Mr. HENDERSON made an experiment to prove that silver iodide does not exist in the presence of excess of bromide. Two and a-half grains of silver nitrate were dissolved in one ounce of distilled water, and a small quantity of potassium iodide added thereto; an excess of potassium bromide was then added to dissolve the silver iodide. The experiment, however, was not wholly satisfactory, and will be repeated.

Mr. BURTON said that dissolving iodide of silver in bromide was distinctly different to converting it into bromide.

Mr. HENDERSON contended that even if silver iodide is precipitated in an emulsion it would, in all probability, be in a finer state of division; otherwise, how was it that when a large quantity of iodide was used the plates fixed quicker than when only a little was present? Referring to the Eastman paper containing glycerine to prevent curling in fixing and washing, and to be sure that such a film could be dried, he dissolved twenty grains of gelatine in an ounce of water, added an ounce of glycerine thereto, coated four or five plates, washed one for twelve hours, and put the others in the drying-box. After four days they were as moist as ever, but the washed plate was perfectly hard; which showed that glycerine would wash out of a gelatine film, and certain gummy substances would do the same. These plates were passed round, and after some discussion anent colloid bodies passing out from a body of gelatine (the previous subject), interchange of silver haloids was again reverted to, the Chairman, Messrs. Burton, Cobb, Cowan, Debenham, and Henderson taking part.

Mr. F. Cox was elected a member of the Association.

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting was held on Tuesday evening last, in the Technical Schools, Princess Street, Mr. ROBERT GRAHAM in the chair.

Messrs. Alfred Wilson, William Herbert Norris, Frederick Hilton, and Robert B. Wilson were elected members.

Mr. WILLIAM STANLEY, the Hon. Sec., made a few remarks descriptive of Warnerke's sensitometer. Mr. Stanley exhibited nine plates of different makers which he had tested, and said he thought the Society would serve a good purpose by strongly recommending the manufacturers not to issue gelatine plates without the sensitometer number, as the statement, thirty or fifty times wet plate, was simply illusory and misleading.

Mr. ROBERT GRAHAM gave his experience in ascertaining the equivalent foci of double combination lenses, premising that although a want of knowledge of the question did not prevent the obtaining of the best photographs, it was an interesting point to be assured of the exact equivalent foci of their lenses, and, besides any attempts at enlargement or reduction in the camera, in exact proportions, by making use of the tables of enlargement given by various authorities, would result, to say the least, in much annoyance. Unfortunately, the equivalent foci of lenses were not always correctly stated, even by the best known makers, in their catalogues, and there were many other lenses in the market, about which purchasers could learn but very little with any degree of certainty. There are several methods of determining the equivalent foci of lenses, but the one which he had adopted was by comparing the size of the image projected on the focussing screen of the camera by the lens, whose equivalent focus it was desirous to know, with that of an image of the same object, from the same standpoint, received through a single lens of an exactly known focus. He had used a spectacle lens, guaranteed to him by an eminent firm of makers of these lenses, as being of ten inches solar focus, and as the equivalent focus of a lens was always in proportion to its magnifying power, it followed that if an image of a certain object given by the spectacle lens measured two inches, and that one inch was the size of an image of the same object received through another lens; then the lens producing the one-inch image must be of five inches equivalent focus, and by comparison, in the same way, the equivalent focus of any other lens could be ascertained. In making these comparisons, it was important that the object which was being focussed should be a somewhat distant one—that is, should be at such a distance that anything appearing beyond the object being focussed was also practically in sharp focus with it. In confirmation of his remarks, he submitted to the meeting a number of negatives of the same object, one having been taken with a spectacle lens: the equivalent foci which he had worked out from the sizes of the images were in some instances less, and in others more than those given by makers, and he considered the statement which one hears not seldom of a person claiming for his lens, that it will cover a larger plate than another lens of the same designation by the same maker, is due to its being of a longer focus than the other. The greatest discrepancy he had met with was in two ten by eight lenses of the same type by a famous maker, one being a fraction only over the equivalent focus stated in catalogue, while the other was over two inches longer in focus.

At the exhibition which followed, prints were shown by Messrs. Furnival, Jones, Jumeaux, Shaw, and Stanley.

The tenth ramble of the season was to Marple on Saturday last, under the leadership of Mr. Henry Champ. Gloomy weather prevailed during the morning, and although the afternoon turned out very fine and enjoyable for walking, the presence of a moderate breeze proved a drawback to successful photographic results where foliage formed an important part of the scene. The first pictures taken were views of and from Marple Bridge, after which, retracing their steps, the party made its way along the canal bank and past the celebrated locks, thirteen in number. Reaching the aqueduct, and the no less celebrated viaduct, with its thirteen arches of an uniform span of fifty feet, and a height from the river of 135 feet, views were taken from the bed of the river, with the grand two-fold row of arches peeping through the distance, forming pictures of great beauty, and endless in variety.

The walk was then continued to Romiley, through Chadkirk, and on to Otterspool Bridge, views of which were taken. Then the Hall was reached, and permission was kindly given to photograph it.

Birkenhead Photographic Association.

The ordinary meeting was held on the 13th instant, at the Free Public Library, Mr. J. Alexander Forrest (President) occupying the chair.

A large number of specimens of the summer work of the members was passed round, including prints and negatives taken during the Bank Holiday excursion to Shrewsbury, Stokesay, and Ludlow, by Messrs. Beer, Cornish, and Day. Prints and other objects of interest also were exhibited by Messrs. Atkins, Carruthers, Forrest, Jones, Whalley, and Williams, after which Mr. J. Maurice Jones read a short paper on "One or Two Out-of-the-way Places in Wales" (see page 538), which he illustrated with a few views of the districts described.

At the conclusion of the paper, Mr. Beer remarked that, *apropos* of the paper which had just been read, he would heartily recommend any member who wanted to enjoy a very pleasant day in an out-of-the-way spot to visit Nant Mill, near Carnarvon, where suitable "bits" abounded, and where he promised those who would venture into that neighbourhood a busy time with their cameras.

Mr. Forrest then read a paperette on "Things in General" (see page 539), which was followed by a discussion upon the subject of toning.

Mr. Atkins stated that he had been given to understand that the excessive washing to which the prints were commonly subjected was very much more injurious than was generally supposed, and quite unnecessary; and that the chemicals in the water did more harm than even the small possible residue of hypo remaining after a fairly good washing.

The question raised was considered rather startling, but the general feeling seemed to be that the hypo must be got rid of at all costs, and that an error in over-washing was but a choice of two evils, and rather on the right side, if any.

Talk in the Studio.

Photographic Society of Great Britain.—The next monthly Technical Meeting of this Society will take place on Tuesday next, August 25th, at 8 p.m., at 5A, Pall Mall East. Room open at 7 for the perusal of journals, &c.

Isochromatic Photographs, by Mr. Ives.—We have received from F. E. Ives, of Philadelphia, some remarkable specimens of isochromatic work, the most striking being copies of a chromolithograph; one made on an ordinary plate, and the other on an isochromatic plate. Mr. Ives writes to us thus:—"I have improved my process of isochromatic photography by using alcohol, which is tinted with eosine for making up the chlorophyl solution. It is a remarkable fact that a trace of eosine, when applied with the chlorophyl in this manner, not only produces more yellow and green sensitiveness, but at the same time increases the red sensitiveness, which is due primarily to the action of the chlorophyl. It may be doubted whether the eosine actually increases the sensitiveness to the red of the spectrum; but I have proved conclusively that it increases the sensitiveness to red pigments, which is the most important to know. I now obtain perfect photographs of the most difficult oil paintings with an exposure of less than a minute, and will send you some examples in a few days."

British Association for the Advancement of Science.—22, Albemarle Street, London, W. The next Annual General Meeting will be held at Aberdeen, commencing on Wednesday, September 9th. President-Elect, the Right Hon. Sir Lyon Playfair, K.C.B., M.P., Ph.D., L.L.D., F.R.S.L. and E., F.C.S. Authors of papers are reminded that, under an arrangement dating from 1871, the acceptance of Memoirs, and the days on which they are to be read, are now, as far as possible, determined by organising Committees for the several sections *before the beginning of the meeting*. It has therefore become necessary, in order to give an opportunity to the Committees of doing justice to the several communications, that each author should prepare an abstract of his memoir, of a length suitable for insertion in the published *Transactions* of the Association, and the Council request that he will send it, together with the original memoir, by book-post, on or before August 12, addressed thus:—"General Secretaries, British Association, 22, Albemarle Street, London, W. For Section ——" Authors who comply with this request, and whose papers are accepted, will be furnished before the meeting with printed copies of their reports and abstracts. If it should be inconvenient to the author that his paper should be read on any particular days, he is requested to send information thereof to the Secretaries in a separate note. Reports on the Progress of Science, and of researches entrusted to individuals or committees, must be forwarded to the Secretaries, for presentation to the Organising Committees, accompanied by a statement whether the author will be present at the annual meeting. No report, paper, or abstract can be inserted in the Report of the Association unless it is in the hands of the Secretary before the conclusion of the meeting.

Winter's Fine Art Exhibition at Derby.—An Exhibition of oil paintings, water colour drawings, and paintings on china, terra-cotta, crystoleum, wood, silvered glass, silk, tapestry, and lincrusta-walton, &c.; designs for Christmas cards, wood carving, fretwork, etching, &c., by professional and amateur artists, will be held at the Alexandra Fine Art Galleries, Midland Road, Derby, in the months of December and January next. Numerous prizes are offered, and during the last month of the Exhibition visitors will record their votes in favour of what they consider the best amateur work exhibited; the artist will be presented with a silver badge. *Rules of Competition and Exhibition*—1. The Competition and Exhibition is open to competitors from all parts, excepting in Class IVA and IVE. 2. A charge of one shilling entrance fee will be made on each article sent, and a further charge of 6d. per square foot, or fraction of a foot, for space. Screens are measured as pictures. 3. Christmas cards, sets of vases, series of tiles, and other articles constituting sets or pairs, are charged an entrance fee of 1s. per set or pair, and 6d. each article for space, except when framed, then the terms are as Rule 2. The payment of entrance fees, and for space, must be sent by Postal Orders, together with the forms duly filled in at the time the exhibits are forwarded, thus ensuring the works being received and exhibited. 4. At the back of each frame a label must be attached, giving the name and address of the artist, stating whether professional or amateur, and the subject of the picture (original or copy), and if for sale, the price. To facilitate the hanging, this information must be repeated with great distinctness and accuracy on another label, attached by a string to the top of each frame, or to the ring at the back, and made to hang over in front. The name and address of the contributor should also be given within each packing case. 5. All exhibits must be delivered at Derby, carriage paid, on or before Wednesday, the 4th of November, addressed "Winter's Fine Art Exhibition, Derby." 6. Every care will be taken of the works contributed, but, as in the case of the Royal Academy, Mr. Winter does not hold himself, nor will his agents be, responsible for breakage or damage of any kind. 7. The right of rejecting any work sent for exhibition is reserved. 8. The decision of the judges shall in all cases be final, and power is reserved to withhold the prize when the works are not of sufficient merit. Certificates will be awarded in addition to the foregoing prizes to works of superior merit. The Exhibition will be opened by Sir Henry Wilmot, Bart., V.C., C.B., M.P., on Wednesday, December 2nd, 1885, at 11 o'clock, and remain open until Saturday, January 23rd, 1886.

Identifying the Dead.—The police authorities are, it is stated, about to take some further steps towards procuring the identification of the many unclaimed bodies which are continually being found in the rivers and canals, and in the streets of London and its suburbs. The course adopted hitherto has been to issue a written description of the body, and have it posted up outside some of the police-stations; but instead of this, or in addition thereto, it is proposed to photograph each unclaimed body prior to decomposition setting in, and have the likeness circulated and placed in a frame outside each station. The police of the K division have set the example, and the first photograph of a dead man ever displayed at Bow Police-station was yesterday placed on the black board for identification.—*Daily News.*

Purchasing Hydroquinon.—Three months ago our worthy friend Mr. Brown, who is the fortunate owner of a large pharmaceutical establishment not a hundred miles from Buckingham Palace, was asked to supply a customer with hydroquinon—"not as a medicine, but for photographic purposes," it was intimated, and the writer of the order added, "If this substance is on the list of poisons, I will sign for it." Now Mr. Brown did not remember having ever heard of hydroquinon, and, as we explained to him, this was natural enough, since that substance was not known when he passed his examination. It is even now a somewhat rare "chemical product," but nevertheless has been recently prepared as an advantageous substitute for pyrogallic acid in the development of the rapid gelatine plates now so extensively used both by amateur and professional photographers. The latter gentlemen seem to get on very well indeed with pyrogallic acid, but in the hands of amateurs hydroquinon is said to be preferable, as its action is more under control. At the present moment there is no easy and economical method by which hydroquinon, or even quinon (from which it can be made), can be obtained. But we, who passed our examination long after Mr. Brown, have a note in our book to the effect that the most direct manner of preparing hydroquinon is by oxidising oxyphenylamine. This is effected by means of bichromate of potash and sulphuric acid. But where do you get the oxyphenylamine? some one may ask. This substance is easily produced by the reduction of mono-nitro-phenol. And this substance? inquires another. The starting-point, mono-nitro-phenol, is obtained by acting upon carbolic acid (phenol) by nitric acid with certain precautions which are indicated in the books. This would in all probability be the most economical method of obtaining hydroquinon.—*Chemist and Druggist.*

Luminous trees are reported to be growing in a valley near Tuscarora, Nev. At certain seasons the foliage gives out sufficient light to enable any one near at hand to read small print, while the luminous general effect may be perceived some miles distant. The phenomenon is attributed to parasites.—*American Druggist.*

Photographic Club.—The subject for discussion at the next meeting of this Club, on August 26th, will be "On the Action of Bisulphites in the Developer." Saturday out-door meeting at Thames Ditton; trains from Waterloo at 2.17.

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To Correspondents.

*** We cannot undertake to return rejected communications.

P. H. Davies.—The letter you refer to did not come to hand. You should write to the editor about such matters, not to the publishers.

Alpha Beta.—Fume thoroughly with ammonia, and you will probably experience no difficulty.

B. J. Sayce.—As you say, a gold medal (not a bronze medal) was awarded to you, and this fact is stated quite clearly in the notice you complain of (p. 513). The notice in question is an official one issued by the exhibition authorities, and we suppose that the only fault to find with it is the omission of the name of W. B. Bolton as part inventor; but this omission is a consequence of this gentleman being upon the jury, and, therefore, disqualified from receiving any recognition from this body.

W. H.—It is a very serious fault, and as soon as you have thoroughly proved that it is a general defect running through the bulk of the plates, and that it is not due to the use of an over strong solution, or other carelessness on your side, you will doubtless be in a position to make a claim for your travelling expenses and loss of time. When an article is sold for a certain definite use, there is held to be an implied guarantee that it is fit for such use.

Raby.—1. For such work it is always desirable to use a lens of long focus (one having an equivalent focus not less than double the longest measurement of the plate). 2. It is impossible to give universal rules; but one of the best guides is an inspection of the image on the ground glass. 3. None of these defects are inherent to such conditions. 4. Only in very exceptional cases.

Jas. H. Q.—Perhaps you could do the whole in fairly good style for £500; but if your views are modest, the expense would be less.

J. A. B.—We have no reason to suppose that anything else is intended.

Amateur Beginner.—You can obtain a handbook of the ferrotype process from Elliott, of 36, Jewin Street; or the Stores, of 43, Charterhouse Square.

S. K. Lawton.—1. Thank you for the interesting account of your experiences, which will appear shortly. 2. As a marketable process, the method has probably no value: but its publication would be a matter of interest to our readers. Shall we publish it in the next Year-Book?

C. W. D. Perrins.—The sulphite of soda was bad—that is to say, largely contaminated with sulphate. This may be due to the fact of it having been exposed for a long time to the air. Thank you for the curious specimen of a phenomenon, often met with, but imperfectly understood; we shall have some remarks to make on the subject shortly.

T. B. (Alston).—We do not give advice by letter, only through the Correspondence column. It commenced on January the 2nd, and will terminate with the year.

Photographs Registered.

Messrs. Adams & Scanlan (High Street, Southampton)—Photo. of General Gordon, with Chinese writing, &c.

Mr. Ernest E. White (Weston Villa, Chelthenham)—Photo. of General Gordon.

Mr. J. W. Tattersall (Accrington)—Photo. Group of Accringten Foot Ball Club.

Mr. James Simpson (West Arthurlie, Barrhead)—6 Photos. of David Murdock in uniform.

Mr. W. Barry (7, Park Street, Hull)—Photo. of Professor Galvayne.

Mr. R. Symons (St. Julian Street, Tenby)—Photo. of Channel Fleet and *Great Eastern* Troopship.

Mr. G. Nesbitt (118, High Street, Notting Hill)—Photo. of Statue of a Female.

Mr. T. K. Biddle (High Street, Dartford)—Photo. of Sir J. Spilman's Monument.

Mr. T. R. Braybrook (Church Square, West Hartlepool)—Photo. of Wesley's Chapel, West Hartlepool; photo. of Parish Church, Seaton Carew.

Mr. W. G Honey (Devizes)—Photo. of the Duke of Cambridge and others; photo. of Wilts. Yeomanry Regiment.

Mr. G. Mold (17, Parson Street, Bambury)—Photo. of exterior view of Institute and School of Art, Bambury; photo. of Antique Room of ditto.

Mr. H. P. Robinson (Tunbridge Wells)—Photos. entitled "Dawn and Sunset," "Hope Deferred," "Teaching the Blackbird."

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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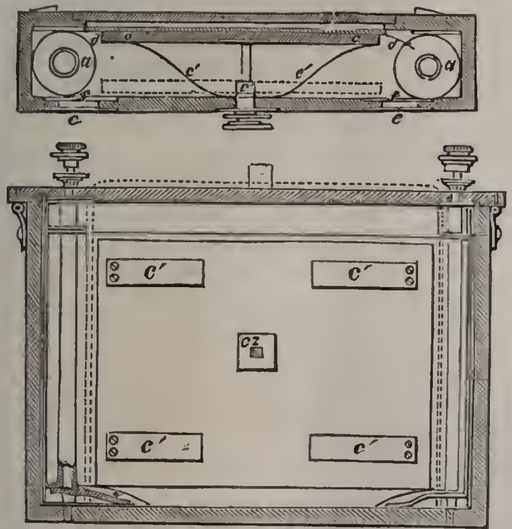
ROLLER SLIDE OF EASTMAN AND WALKER.

Few photographic practitioners of the present day have very distinct recollections of the roller slide which was described in the *Journal of the Photographic Society* nearly thirty years ago (April, 1856), and before describing those mechanical details which make the slide of Eastman and Walker an instrument adapted to fulfil the every-day requirements of the photographer, we give a reproductive sketch which accompanied Mr. Melhuish's paper of 1856.



The paper, after sufficient for a fresh exposure has been wound off one roller and on to the other, is clamped against a sheet of glass by means of the screw, C. The Melhuish slide was, however, without any automatic apparatus for indicating when the proper length of the band had been wound off. This could not be determined by merely noting how much the rollers had been turned, as one roller is continually growing by receiving fresh paper, while the other is diminishing in diameter from the loss of paper.

More recently, Mr. Warnerke constructed a roller slide, by means of which he took admirable pictures on a pellicle built up of alternate layers of collodion and india-rubber, and other flexible materials coated with sensitive compounds; and in this case the passage of enough tissue from roller to roller was indicated by the ringing of a miniature electric bell contained in the apparatus.

The Eastman slide, which now comes from America, differs in essential features from those that have gone before, not only as regards the design and working, but also from the circumstance that the parts are manufactured accurately to guage by machine tools, so that all parts of a given kind are interchangeable among themselves, a system of manufacture common in America.

In arranging a roller slide to work on one of our usual field cameras (8 by 5), we did not avail ourselves of the suggestion of the Eastman Company, to fit the slide themselves, as to have the operation done by them was scarcely worth the delay of half a day or so which would have resulted. The slide as sent out is furnished with a front piece which will generally require cutting down to fit it to a camera, and after about a few minutes had been spent in planing down the face until the surface of the paper corresponded with the position of the rough surface of the focussing glass, there was nothing more to do but to so cut off the excess wood from the edges, by a few runs on a small circular saw bench, that the instrument would slide into the runners of the camera. All this occupied perhaps ten minutes, but without the circular saw it might have taken half an hour.

Before taking the apparatus out, we weighed it, and found that the roller slide, when charged with a roll of sensitive paper for 24 exposures (8 by 5), weighed 48½ ounces, while two ordinary slides with two plates in each (4 exposures) weighed practically the same, or 48 ounces. At this rate, the slides and plates for 24 exposures would have weighed no less than 288 ounces. It is, however, in taking an extra stock of exposures that the value of the tissue becomes more strikingly apparent, as the case holding an extra roll for 24 additional exposures only weighs 5¼ ounces, as against about 7 lbs. for two dozen plates with their packing.

The whole series of 24 exposures were made by the river side in the course of half an hour, and in the case of a procession or regatta, where one adjustment of the camera is sufficient, it would be easy to expose for 24 negatives in a couple of minutes or less. Being close at home, there was no inducement to pack the roll of sensitive paper (or part of it) back in its case, and send it by post; a course which suggested itself as likely to be that which a newspaper correspondent would adopt were he using the apparatus.

The development was effected with a sulphite of soda and soda developer, and a large number of sheets (cut off the roll with a pair of scissors) were developed in one deep dish, no harm resulting from the sheets overlapping, as long as the dish was kept in motion; in fact, the development was much such an operation as toning ordinary prints. Fixing and washing were done much after the same fashion, and then the negatives were squeezed down on very slightly oiled glass plates and allowed to dry, when they could be stripped off, and were quite flat. In order to render them transparent, some were dipped into hot castor oil, as recommended by the Eastman Co.; others were treated on the back with Mr. Ayres' mixture of equal volumes of castor oil and ether, applied cold; while a third series were treated with paraffin. When the hard paraffin or paraffin wax is used, it is necessary to melt it, but when a soft paraffin (vaselin) is used, it suffices to merely rub a little on the back of the negative. All these yield satisfactory prints, and there was nothing whatever in their appearance to indicate that the negatives had not been taken on glass plates. Before passing on to a detailed description of the roller slide, we may point out that each instrument is numbered, so that if any modification in the pattern should take place, the owner can get extra parts suited to his own slide by merely quoting the number.

Fig. 1.

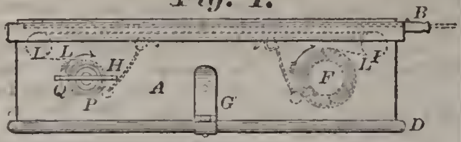


Fig. 2.

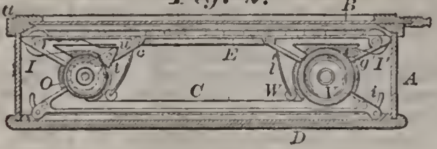


Fig. 4.

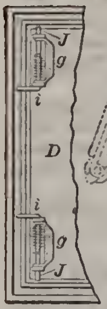


Fig. 3.

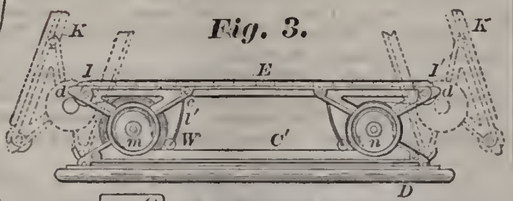
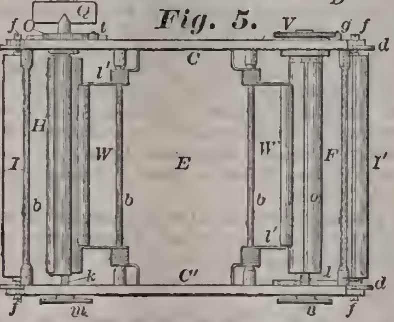


Fig. 5.



Figures 1 to 5 show some of the details of construction. F is the spool or roller, clothed with the stock of paper already wound on a wooden roller, the ends of this roller being so centred that it is quite impossible to put it in at the wrong end of the slide, or at the right end in a reversed position. H is the receiving roller or clamping spool, to which the free end of the paper is attached by a very simple device, and in running its course over the flat table, E, the paper actuates the two rollers, I and I′, one of which acts as a measuring roller, and perforates the paper near the edges at each revolution. At each revolution of the measuring roller a distinct click takes place, this being provided for by a very simple piece of mechanism, and when four ticks have been heard, one knows that all is ready for a fresh exposure. W and W are rollers which trail on the main spools, in order to prevent any escapement or unwinding of the paper while it is being manipulated with a free end. The general structure of the mechanism is built up on two light girders of cast brass, one of which is shown in plan by figure 3, while the frame system of two girders and the connecting pillars is connected to the back-board D by two pairs of spring bolts (one pair shown in fig. 4), which can act either as hinges or bolts, so that either end of the system can be tilted up, as shown by the dotted portions of fig. 3.

Fig. 6 shows the holder with the case partly raised, fig. 7 the movement with the case removed, and fig. 8 the movement raised for changing the spool.

To fill the holder, the movement is raised as in fig. 8, the spool of negative paper inserted in its place under the brake or trailing roller, and fastened with the thumbscrew on the side of the frame, the pawl *g*, fig. 2, on the tension barrel, is thrown off, the band on the spool broken, when sufficient paper is drawn out to reach over the bed or table to the reel; the movement is shut down, fastened to the back, and raised at the opposite or reel end; the paper is then drawn over the guide-roll and slipped under the clamp on the reel, and the reel turned sufficiently to give the clamp a hold on the paper. Now, throw in the pawl on the tension drum, and put on the tension by turning the tension barrel over to the left until the paper is taut; shut down the movement and put on the case,

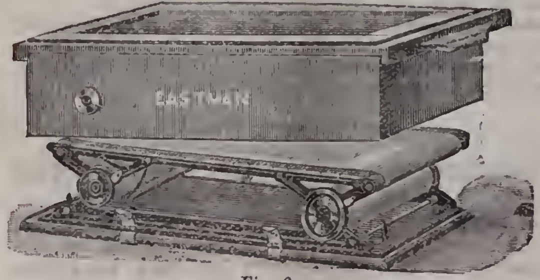


Fig. 6.

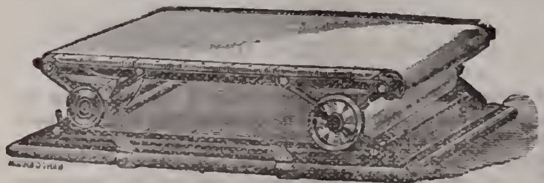


Fig. 7.

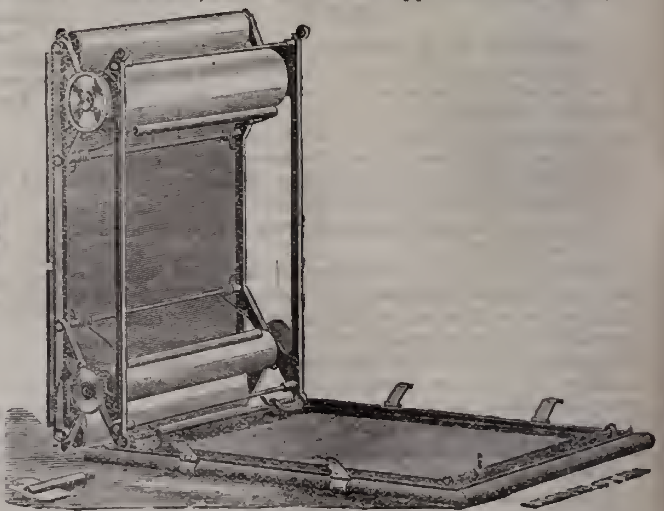


Fig. 8.

insert the key and turn it until the click strikes once. The holder is then ready to attach to the camera. After the first exposure turn the key until the click has struck four times. This brings a fresh sheet on the bed for exposure, after which turn the key and make as many exposures as required. When the required number of exposures have been made, take the holder into the dark room, take off the case, and insert the point of a penknife in the tin-lined slot in the guide-roll, and separate the exposed from the unexposed portion by drawing it along the slot. Throw off the pawl *t*, fig. 2, from the receiving reel, and draw out the exposed paper and cut it off at every fourth mark with a pair of scissors. If any unexposed paper remains on the supply spool, draw over the end and attach it to the receiving-reel as before, and the holder is ready for work again.

If the immediate development of the exposed paper is not desired, the clamping or receiving reel can be removed with the exposed roll, without unwinding, and an additional reel inserted.

Film-carriers, represented by fig. 9, are manufactured by the Eastman Company, and they consist of a thin piece of flat wood made up of strips glued together in such a manner as to prevent warping, and a metallic rim with flanges ($\frac{3}{16}$ of an inch wide) turned on each edge. This metallic rim is laid upon a clean surface with its flanges uppermost; the cut sheet is then placed within it, film side down; the back is then inserted as shown in fig. 9, slight pressure at the four corners being sufficient to cause adhesion, the whole forming a carrier equal in dimensions to an ordinary glass dry plate of standard size.

Fig. 9.

We have had no experience in the working of these film carriers, but the design seems good.

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LECTURES AT THE FINSBURY TECHNICAL COLLEGE.

The programme for the session 1885-1886 has just been issued, and among the evening classes likely to be useful to our readers may be especially mentioned the lectures on inorganic chemistry, on Monday evenings at 8 p.m.; classes for practical laboratory work being held on Wednesdays and Fridays. The Professor of Chemistry is Raphael Meldola. Fee for the course, including one evening's laboratory work, 12s. 6d. the session, or 6s. the term; including two evenings' laboratory work, 15s. the session, or 7s. 6d. the term.

A course on organic chemistry is also held, a lecture demonstration taking place each Monday at 6.30 to 9 p.m. This course is intended to afford systematic instruction in organic chemistry, especially with reference to its technical appliances. It will be suited to the requirements of pharmacists and of those engaged in industries in which organic chemistry plays a part, such as brewing, coal tar distilling, spirit distilling, soap making, vinegar brewing, &c. Fee 15s. for the session, including laboratory work on two evenings a week.

A special course of lectures on optical instruments, by R. M. Walmsley, will be given. One lecture a week, on Thursday, at 7 p.m., during the first term only, commencing October 8th.

This course will deal with the principles of construction of optical instruments, and with the properties of light on which their construction depends.

Lenses.—Burning Glass. Focal Points. Systems of Light Waves converging to Focus or diverging from Focus. Focal Planes. Images. Principal Focal Length. Simple Camera.

Curved Mirrors.—Concave Mirrors. Relation between Curvature and Principal Focal Length. Secondary Foci. Conjugate Points. Conjugate Planes. Focal Lines. Aberration. Parabolic Mirrors. Convex Mirrors. Cylindrical Mirrors.

Plane Mirrors.—Real and Virtual Images. Position of Image. Multiple Reflections. Kaleidoscope. Sextant. Goniometer.

Simple Microscopes.—Reading Lens. Stanhope Lens. Wollaston's Doublet, Coddington Lens. The Eye as Microscope. Magnifying Power.

Simple Telescopes.—Opera Glass. Field Glass. Astronomical Telescope. The Eye as Telescope. Camera Obscura.

Further Study of Lenses.—Wave Theory explains reflection of rays. Velocity-constant and Index Refraction. Relation of Velocity-constant, Curvature and Focal Length. Relation between Aperture and Focal Length. Optical Centre of Lens, or system of Lenses. Aplanatic Lenses. Polyzonal Lenses.

Compound Microscopes.—Systems of Lenses. Objectives. Immersion Lenses. Eye-pieces. Modes of Illumination.

Compound Telescopes.—Refracting Telescopes. Day and Night Glasses. Erecting Lenses. Object Glasses. Positive and Negative Eyepieces. Methods of Mounting. Reflecting Telescopes. Methods of arranging Mirrors.

Prisms.—Effects of oblique incidence on light-waves. Laws of Prisms. Deviation and Displacement of Ray. Minimum Deviation. Minimum Displacement. Total Internal Reflection. Right-angled Prisms. Camera Lucida. Nachet's Prism. Wenham's Prism.

Gratings.—Colours seen at edges of Shadows. Interference of two sets of waves. Grating of wires. Gratings ruled on glass and metal. Photographed Gratings.

Spectroscopes.—(*a.*) Prism Spectroscopes. (*b.*) Grating Spectroscopes. Arrangements of Slit. Collimating Telescope. Observing Telescope. Scales of Measurement. Uses of Spectroscopes. Properties of Long Waves and Short Waves of Spectrum.

Achromatic Combinations.—Conditions of Achromatism. Achromatic Prisms. Achromatic Lenses.

Direct-Vision Prisms.—Amici's Prism. Janssen's Prism. Thollon's Prism.

Polarising Apparatus.—Double-Image Prisms. Properties of Calc-Spar and of Tourmaline. Construction of Nicol Prisms. Hartnack's, Glan's, and other Prisms. Bundles of Glass Plates. Artificial Polarisers. Polari-microscopes. Preparation of Crystal Sections.

Saccharimeters.—The optical properties of Quartz and Sugar. Special apparatus for Polarimetry.

Defect of Eye as Optical Instrument.—Aberration. Astigmatism. Turbidity. Irradiation. Polarisation. Blind spot. Persistence of Vision.

Photometers.—Laws of Illumination. Standards of Light. Carcel Lamp. Standard Candle. Legal Unit. Shadow Photometers. Colour-Photometers.

Fee for this Course, 6s.

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PAPERS WHICH ARRIVED TOO LATE FOR THE BUFFALO CONVENTION.

Two papers of exceptional interest, one by W. B. Bolton, and the other by W. K. Burton, were received too late for reading at the Convention; but they have been printed, and we reproduce them in our columns.

COLLODIO-GELATINE DRY PLATES.

BY W. B. BOLTON.

I may commence by promising you that I am not going to attempt to persuade you to give up gelatine plates for the sake of preparing and using a hybrid description of article, the advantages of which are probably still in dispute. Such is certainly not my intention, for I feel certain that in America, as elsewhere, gelatine has gained so firm a hold upon the public, that we may expect it to retain the premier position for, at least, as long a period as the old wet process did; but while I hold the belief in the present supremacy of gelatine, I have little doubt but that in America, as in Britain, there are many who still continue to employ the old bath for certain purposes, and who will probably go on doing so to the end of the chapter. My object in writing these lines is, therefore, to direct your attention to the possibility, under special circumstances, of so combining the old and the new methods, that convenience of the one and the rapidity of the other may be, in a great measure, brought into conjunction. In other words, I wish to show you how it is possible that peculiar conditions may arise under which a collodion plate, prepared on the spot, or at least by the operator himself, may be a necessity, and, further, how the rapidity of such a plate may be brought within measureable distance of the modern dry plate.

It is not my intention to occupy your time with the working details of the proposed process—those will be found dealt with in the photographic journals—but merely to point out its applications. Suffice it to say here that the principle of the thing rests simply in treating an ordinary washed bath plate with an organifier or accelerator consisting of a rapid gelatine emulsion, and either drying it or not before exposure as circumstances may require. For this purpose, the plate is collodionized and silvered in the usual manner, and then carefully washed to remove the excess of nitrate of silver. The drained surface is next coated with a gelatine emulsion made in the ordinary manner, though it is scarcely necessary to be so particular in the manipulation as when the emulsion is to be applied to bare glass, or to seek to attain so high a degree of sensitiveness as that given by the best commercial plates. The sensitive collodion film acts as an absorbent substratum which keeps the gelatine on the plate and prevents blistering and frilling; it also prevents the crystallization of salts by decomposition formed in the emulsion, and thus, in a great measure, enables us to dispense with the troublesome operation of washing to ensure their removal. An emulsion which may be easily made in an hour—and which, with a suitable addition of alcohol or other antiseptic, will keep for weeks or months—and the ordinary wet plate "fixings" still to be found in most studios, are all that are required to produce plates which, if they do not possess all the rapidity of the best commercial ones, are far more rapid than collodion, while possessing most of the peculiarities and advantages of the latter.

Now, as to the uses of such plates. Of course I know in America no artist ever runs out of plates suddenly, though I have heard of such instances in England, where you can send the boy round the corner and have a fresh stock in five minutes. But the American artist, if he is up to his business, knows well that the sitter will not wait, nor the child retain its sweetness of temper during the time required to send round to the nearest stock house, a few hundred miles away, perhaps, so he behaves differently. But, if an accident should happen, as they will occasionally in the best regulated establishments, drag out the bath, warm up the emulsion, and before baby has put on his first frown, you are ready for him.

Then, again, you may experience a sudden demand for a plate of unaccustomed or unusual size; or you may find yourself compelled to do some viewing away from home, and on plates that are not your gallery size. Rather than drag bath, bottles, and tent with you, you will find it to your interest to leave them at home, and just take with you a few collodio-gelatine plates.

For copying and enlarging purposes the compound films give far better results than any of the ordinary gelatino-bromide plates, or even than gelatine films specially prepared for copying purposes; while for lantern transparencies or transparencies for decorative purposes, nothing can surpass them either in quality or convenience. But, perhaps, the most useful application which the professional artist will find for collodio-gelatine plates, will be the making of opal enlargements; here it is possible to secure all the tone and quality usual with a pyro developed bath plate, as well as nearly the rapidity of gelatine. If you don't mind the trouble of making a special collodio-bromide emulsion to use instead of the bath and collodion, you will get far better tones than with the bath, and just as much rapidity.

But it is useless to go on pointing out possible applications; those I have named are a few which are practically useful, and no doubt others will suggest themselves as necessity arises.

ON DEVELOPERS.

BY W. K. BURTON.

I have defined development in photography as the strengthening of an image made by light. There are, of course, processes for which this definition will not hold good, such as the bitumen process of Nicéphore Niepce, and the carbon process, wherein development consists, so to speak, of "disentangling" an image of full intensity from a superfluity of the material from which it is composed.

The development of a Daguerreotype plate is typical of development by merely *strengthening* an image. As all know, the Daguerreotype film consists of pure iodide of silver or of a mixture of iodide and other haloids. As to what the latent image consists of, that is a question I am not prepared to enter into at present. It is, however, certainly there in some form before development, and is during development strengthened by piling minute globules of mercury on to it.

The development of a salt is precisely analagous to the action thus described. The developer has the effect of reducing the nitrate of silver in the bath solution which adheres to the film to metallic silver in a minute state of division, and this metallic silver deposits itself on the latent image, which is probably of the same nature as that of the Daguerreotype plate.

The action of the now universally used alkaline developer is quite different from this in one respect. There is no free silver nitrate present in the films to which it is applied, and it has to act by reducing the actual haloid to a metallic form. For a long time it was stated that it was impossible to develop an image in silver without the presence of free silver nitrate, and the announcement, in 1861, that this thing was possible was hailed with derision.

By reference to the Photographic News of 1861 (page 518), I find Mr. Wharton Simpson describing a set of experiments which he had made in the direction indicated. He took a bath plate, washed it very thoroughly, dipped it for a quarter of an hour in a strong solution of chloride of ammonium to remove any trace of free silver nitrate which might remain after the washing, washed it again, and was then able, after exposure, to develop an image with a solution of pyro. In this little experiment may be said to be the germ which has rendered the rapid dry plate of photography of to-day a possibility. It is only fair to say that Mr. Simpson's experiments were performed merely to verify a statement made by Mr. J. Mudd, who, in turn, gave all credit for this discovery to Mr. Wardley.

Mr. Simpson, in his experiments, speaks of no addition of an alkali to the pyrogallol solution; indeed, indicates that there was no such addition; but it is probable that the solution was not quite neutral. Captain Abney recently stated that it was impossible to reduce a film of silver bromide by an absolutely neutral solution of pyrogallol, and I have, by an experiment, corroborated this. In any case, it was but a short time after Mr. Simpson's experiment was performed that the desirability of using an alkaline solution was established.

The alkaline developer, consisting of a solution of pyrogallol rendered alkaline with an alkaline carbonate, or a caustic alkali, with, generally, the addition of some neutral salt, which acts as a restrainer, has had but one formidable rival to this day. The rival to which I refer is the organic iron developer discovered by Mr. Carey Lea in 1877. In that year Mr. Lea announced that various organic salts of iron acted, in a neutral state, as powerful developers of the silver haloids. Of the salts which Mr. Lea mentioned eight years ago, only one has come into use, at all general, as a developer for dry plates. Others are, it is true, used for developing gelatino-chloride films, either on paper or on glass, to produce transparencies and prints; but ferrous oxalate is the only iron developer which is at all extensively used as a developer for bromide of silver.

I do not know to what degree of popularity ferrous oxalate has attained in America; but, to judge from the American periodicals, I imagine that there is not much difference in the particular point in question between those on the two sides of the Atlantic. Here, at any rate, there are very few to be found to recommend the use of ferrous oxalate in preference to alkaline pyro in practical work. For my own part, I am very decidedly in favour of the alkaline pyro. I believe that the reason why some prefer oxalate, and prefer to add certain salts to the alkaline developer, is because they make it their first, or, at any rate, one of their first objects, to get a "pretty negative." It only needs to be stated to be admitted, that the object in using a plate is not to get a pretty negative, but to get a negative from which we can get a pretty print. Now, it is certain that a pretty print does not of necessity follow from a pretty negative. Nay, I will go farther than this, and will say that the best possible print with gelatine prints is never got from a very pretty negative; that a negative with an image tending to green, or even to greenish-brown or yellow—not excessively so tending

—will give a better print than a negative showing a pure black image; but more of this anon.

I may say that I have tried the substances which have been recently suggested as substitutes for pyrogallol—hydrokinone, and hydrochlorate of hydroxylamine—but have found them to give results decidedly inferior to our old friend pyro.

Granted that pyro forms the most suitable developer for our modern plates, the next question which arises is, what alkali are we to use with it? On this side of the Atlantic we have clung with remarkable tenacity to caustic ammonia. Our developers have for the last few years consisted of mixtures in various proportions of the pyrogallol, caustic ammonium, and a soluble bromide—generally bromide of ammonia and water. There has been no change in the substances used, but in the proportion in which they have been used there has been great variety, as also in the subsidiary substance used to prevent the pyro from turning very brown in an aqueous solution. Even greater has perhaps been the variety of manners in which different plate makers have continued to make confusion worse confounded by the extraordinary manner in which they have stated the formulas that they recommended. Each maker appears to be vicing with his neighbour in the task of making it as difficult as possible for the user of the plates to know in what proportion the ingredients of the developer are present in the solutions actually poured over the plate.

Pyro, with caustic ammonia, being the developer in this country, I, some few months ago, carried out a series of experiments with the view of discovering what relative proportions of the three materials mentioned would give the best results in actual practice. The experiments were described in the *British Journal of Photography*. The following is an abstract of the descriptions there given:—

"Forty-eight plates were exposed under a standard sensitometer screen. The exposures were made at three feet from a duplex paraffin lamp, each lasting for twenty seconds. As the experiments were intended to be comparative merely, it was not necessary to use the phosphorescent tablet. As all the exposures were made within an hour, it may be assumed that no appreciable variation in the intensity of the light took place, and, as a matter of fact, a plate exposed before those to be used for experiments, and another after, showed no appreciable difference when developed side by side.

"My object was to develop these plates, each with a different developer, so that there should be one developed by each of all the variously proportioned developers commonly in use.

"The annexed table will give an idea of the variations which existed between the various ingredients

TABLE No. 1.

Half grain pyro.

	¼-grain bromide of ammonia.	½-grain bromide of ammonia.	1 grain bromide of ammonia.	2 grains bromide of ammonia.
Half minim ammonia ...	1 ...	2 ...	3 ...	4
One minim ammonia ...	5 ...	6 ...	7 ...	8
Two minims ammonia ...	9 ...	10 ...	11 ...	12
Four minims ammonia ...	13 ...	14 ...	15 ...	16

TABLE No. 2.

One grain pyro.

	¼-grain bromide of ammonia.	½-grain bromide of ammonia.	1 grain bromide of ammonia.	2 grains bromide of ammonia.
Half minim ammonia ...	17 ...	18 ...	19 ...	20
One minim ammonia ...	21 ...	22 ...	23 ...	24
Two minims ammonia ...	25 ...	26 ...	27 ...	28
Four minims ammonia ...	29 ...	30 ...	31 ...	32

TABLE No. 3.

Two grains pyro.

	¼-grain bromide of ammonia.	½-grain bromide of ammonia.	1 grain bromide of ammonia.	2 grains bromide of ammonia.
Half minim ammonia ...	33 ...	34 ...	35 ...	36
One minim ammonia ...	37 ...	38 ...	39 ...	40
Two minim ammonia ...	41 ...	42 ...	43 ...	44
Four minims ammonia ...	45 ...	46 ...	47 ...	48

"The quantities are in the somewhat unscientific form of grains to the ounce. It will be seen that pyro was used in quantities from half a grain to two grains, ammonia from half a minim to four minims, and bromide from a quarter of a grain to two grains.

"I do not profess to have observed any very refined degree of accuracy in the experiments. I have, however, kept well within the degree of accuracy commonly observed by photographers; that is to say, I have employed with care, the usual druggist's scales and weights, and the ordinary glass measures. The pyro was not made up with any preservative, lest such, acting as a restrainer, should disturb the results. A four-grain solution in distilled water was made immediately before commencing the experiments. The ammonia solution was used in the form of one part of commercial ·88 ammonia to nine parts of water, the ammonia bromide in the form of a ten per cent. solution. When very small quantities were to be measured out, each of those solutions were first diluted in considerable quantity to one-tenth of its strength.

"In mixing each developer, solutions containing twice the quantities marked in this table were poured into a glass measure, and the whole was made up to two ounces. I imagine that no one will have any difficulty in understanding the tables; but, lest he have, I give an example:

"If we take No. 24, we find at the head of the table No. 2, in which it is, '1 grain pyro.' At the beginning of the line in which it is, we find '1 minim ammonia,' and at the head of the column in which it is, we find '2 grains bromide of ammonium.' This means that plate No. 24 was developed with a solution containing 1 grain pyro, 1 minim ammonia, and 2 grains bromide of ammonium in each ounce.

"In making a series of experiments with various developers, it is, of course, necessary to determine what shall be the limit of development. A time limit would be by far the easiest to work with, but I cannot see that any useful results would come from experiments performed with such a limit. For example, suppose a limit of four minutes was taken—that is to say, that each plate was to be developed for four minutes. At the end of that time a developer which, at the end of ten minutes, would have produced a better result than on another in four minutes, might at the end of four minutes have shown scarcely any result at all; whilst another, which would show an excellent result at the end of two minutes, might have entirely destroyed the plate at the end of four.

"On thinking this matter over, it appeared to me that, were it practicable, the best limit would be one of density; that is to say, that each developer should be allowed to act till it showed the first square of the sensitometer tablet of a certain fixed density, which should be about the greatest wished for in ordinary negatives. According, then, to the highest number visible, and the clearness or the reverse of the unexposed parts of the plates, would the developer be judged.

"Although this criterion of density appeared to me by far the best one, I gave it up as impracticable. The judgment of density is at all times a very difficult matter, and, moreover, inaccuracies are liable to be introduced by variations in the thickness of the film.

"I decided, therefore, on a less scientific but more practicable limit. I developed in each case, either until the developer appeared to have long ceased to produce any further change on the plate, or till fog became apparent. As life is short, I had to set, besides this, some time limit to the experiments. I therefore fixed the maximum time of development, in any circumstance, at half-an-hour. This I considered to be as long as it was likely that any development should be continued in practice.

"The plates used were of commercial make. The brand is fairly rapid, and in ordinary working gives very brilliant negatives, with exceedingly clear shadows.

"The difference in result produced by developers containing extremely different quantities of the ingredients is less than I should have expected. Thus, a developer containing in each ounce half a grain pyro, half a minim ammonia, and two grains bromide, which I should have expected to show scarcely any trace of image, shows one with the first few figures of great density, and shows only eight figures of the sensitometer less than one containing two grains pyro, four minims ammonia, and a quarter grain bromide."

Increase of pyro has, as might be expected, wrought increase of density. Increase of ammonia, when accompanied by increase of bromide, has had the same result, but without increase of bromide has resulted, as a rule, in decrease of density. Increase of ammonia has also resulted in increase of detail up to a certain point, after which, except when increase of bromide has accompanied it, actual falling off in detail has accompanied the increase of alkali.

The following is the result of taking "averages" from the reading of the different plates:—

"The average of the highest figures of all the plates developed by the developer's table No. 1 is 20·81. In table No. 2 it is 20·80. In table No. 3, 21·56.

"It will be seen here that there is really very little difference between the average figures got from the three tables—that is to say, that the result of altering the quantity of pyro is neither to increase nor to decrease detail to an appreciable extent. It has, however, as I have already said, when increased, the effect of causing development to take considerably longer. In other words, pyro acts as a retarder, not as a restrainer. My impression on first looking at the plates was that those developed with the larger quantities of pyro showed a little less detail than the others; but this general impression is shown by the precise figures given to have been wrong.

"The other averages that I have worked out are not the results of the one of absolute quantities of ammonia and bromide, but of relative quantities. Thus, I have taken all plates developed with ammonia and bromide in equal quantities of ammonia and bromide in the ratio of two to one, and so forth. The results are as follows:—

"With bromide 4, ammonia 1, the average figure is 17·66. With bromide 2, ammonia 1, it is 19. With bromide and ammonia equal, it is 20·66. With bromide 1, ammonia 2, it is 21·72. With bromide 1, ammonia 4, it is 22·23. With bromide 1, ammonia 8, it is 22·16. With bromide 1, ammonia 16, it is 21·33."

It will be seen that here detail increases very decidedly till the ratio of ammonia to bromide becomes as 2 to 1. It then farther increases slightly between that ratio and the next—viz., 4 to 1—after which it falls off with farther relative increase of ammonia.

It will, of course, be understood, that the figures given are relative, not absolute. Thus, under "ammonia 1, bromide 2," are included plates developed with quarter grain bromide and half minim ammonia, those with half grain bromide and one minim ammonia, those with one grain bromide and two minims ammonia, and those with two grains of bromide and four minims ammonia.

The total increase by altering the ratios of bromide to ammonia from four bromide to one ammonia, to one bromide four ammonia, will be seen to be less than five figures. Certainly an amount of compensation for over-exposure—which the thing practically resolves itself into—is less than I should have expected.

Having got out so much more than I expected by developers when the ratio of bromide was so high as compared with ammonia, I tried the effect of developing for a great length of time with the following somewhat peculiarly constituted developer:—

Pyro	¼ grain
Bromide	4 grains
Ammonia	½ minim
Water	up to 1 ounce

This developer was allowed to act for the whole night on a plate exposed with the others, at the end of which time the figure 20 was visible, and the density was ample, although the image was of a peculiar orange-brown colour.

You, in America, have led the way in the adoption in practice of various alkalies, besides the caustic ammonia, still, as I have said, almost universally used here. I tried a set of experiments some time ago, using caustic soda, caustic ammonia, caustic potash, and the three corresponding carbonates.

I failed to perceive any particular advantage in either the caustic potash or the caustic soda. In fact, after giving a very fair trial with various brands of plates, I concluded that, if a caustic alkali is to be used, it had better be our old friend, ammonia.

The carbonates, on the other hand, offer, in my experience, a very great advantage for certain work. It is more easy by their use to get density or pluck than with ammonia. On the other hand, they are considerably slower in their action. One, for example, who has been accustomed to the use of ammonia, and who adopts carbonate of ammonium, is likely at first to conclude that from the carbonate no good will come at all. By the time that development would have been complete with ammonia, the carbonate has produced only a thin phantom image of the highest lights of the picture. It is, however, extraordinary how steadily density continues to increase with the carbonate, till, before long, it has become greater than could have been got with ammonia through any length of time.

Of course, in many cases, it is no advantage to be able to gain excessive density. For example, where slow plates are used on landscape subjects, and in portraiture with suitable plates, density is, as a rule, gained with the greatest care, using ammonia, and I can see no particular use in replacing it with the carbonate. It is when we have to use plates of excessive rapidity, for instantaneous or other work, when, as all know, the difficulty in getting density is usually the greatest we have to contend with, and when subjects deficient in contrast have to be treated, that the carbonates become useful.

The following are the relative quantities of the three carbonates mentioned, which are necessary to produce solutions of the same alkalinity:—

Sodium carbonate (cryst. as washing soda) ...	1·0
Potassium carbonate (cryst.)	6·1
Ammonium carbonate...	3·36

Using of the washing soda 25 grains to the ounce, and of the other carbonates quantities giving the same alkalinity to the solution, I found sodium carbonate to be considerably the most rapid in its action; next to it potassium carbonate, and slowest of all ammonium carbonate; that is to say, using in each case no restrainer at all. The ultimate density which could be gained I found to be inversely as the rapidity of development; that is to say, the slow carbonate of ammonium would, if time was allowed, give a denser image than any of the others. For this reason I prefer to use it when I use a carbonate at all; that is to say, when I know that with ammonia there will be difficulty in getting density.

I fear that I am making a statement which will appear heretical to some of you when I say that I can recognize no advantage arising from the use of any additions to the developer beyond the simple pyro and carbonate of ammonia, except such small quantity of acid as may be necessary in the pyro stock solutions to preserve it.

It is true that by using sulphite of soda, sulphurous acid, or one of the various other substances which have been from time to time recommended, I might be able to dispense with the alum baths; but I very considerably prefer the slightly greenish image got by the use of the simple pyro and carbonate developer, followed by the alum bath, to the pure black image got when sulphite is used. As I have said, I believe a better print is got, and one reason of this is, I believe, that without the sulphite a greater range of light is correctly registered on the film.

* * *

RED PRINTS FOR THE DRAFTSMAN.

An innumerable quantity of red photographs are made daily in the city of New York. These red prints are termed silver prints, and although they in reality do not deserve to be called silver-prints *par excellence*, there is a certain reason or excuse for that generally adopted name.

Hardwich's theory of substitution—that is, gold substituting the silver of the photograph in the toning process—does not find any application here, as the prints in question are simply silver proofs, fixed, without being toned, in a pure and plain solution of hyposulphite of soda, washed, and dried. A majority of the illustrations of our daily newspapers, trade journals, price lists, and various other publications, when printed on the ordinary press from relief plates or zinc etchings, have for a base the photographic silver, or red prints. Such prints, taken from the ordinary negatives, are placed in the hands of a draftsman, who reduces the photographic half-tone, or stipple—in fact, breaks up the original photograph into a system of lines, destroying its original character altogether. The photograph, having so far served the purpose of being a sketch to the finished picture, is now removed from the paper. A strong solution of bichloride of mercury is poured over it, and in the manner of the so-called magic photographs, the silver deposit on the paper is bleached out, leaving visible only the India ink work upon a white ground.

Such pictures are, or ought to be, a correct representation in like manner of the photograph employed. In portraits the likeness can be kept well, and in landscapes, in machinery, and other inanimate objects, the most intricate details can be rendered sharp and distinct as in the original photograph.

The drawing in its present condition is handed now again to the photographer, who reproduces from it a negative of extremely strong intensity, fit to make from it a relief plate, or to print it on a bichromated albumen or asphaltum film upon a zinc plate, preparatory to the etching process.

Photographs for red prints are mostly always enlargements of the originals in the proportion of one to three. By reducing the drawing afterwards to the original size, the lines are rendered extremely sharp and delicate. Etchings and relief plates managed in this manner are frequently of a beauty equal to any well executed wood engraving.

The making of red prints for the engraver or draftsman, simple as it may appear, has its difficulties, as well as any other photographic process. The tone of the print is of great importance; if inclined to be black, or when printed too deep, the draftsman is unable to see the ink lines, especially when very fine. The negative must also be of a certain quality; all details must be visible, and great contrasts between light and shade must be avoided; still the plate must be able to give a well-defined and somewhat brilliant print. Negatives for red prints, which are mostly made on collodion, are somewhat over-exposed and slightly intensified. Ordinary Rives paper is used for printing, salted with chloride of ammonium or barium, from 10 to 30 grains to the ounce of water. Citric acid, the same quantity as the chloride, may be added to the salting bath, or the salted paper, when dried, may be floated for a minute, before silvering, upon an acid solution of the same strength. The strength of the silver should be regulated according to the strength of the salting bath; weak solutions are, however, preferable. After the proof has been printed to the desired depth, it is washed in water acidulated with citric acid, and after all acidity has been washed away, fixed in a fresh hyposulphite-of-soda solution, 1·8. Organic matter, like gelatine or boiled starch, in the salting-bath, assists in keeping the red colour.

A brick-red or a muddy yellowish tone is probably caused by too strong a silver solution or impure hypo. The quality of the negative has as much to do with a good tone of the print as in any other process. The washing of the print must be done quickly and thoroughly. Hypo in the print prevents the perfect bleaching of the print with mercury; too much washing softens the paper and makes its surface woolly; hence, the addition of gelatine or starch is advisable also to impart strength to the paper. The red tone of the print is of great importance; it assists greatly the engraver's work. The fine lines he draws upon the photograph are more distinct and more visible to him than when made upon a bluish-black ground. There is a great demand for silver prints in the engraving district of New York, and when they are made in the manner described, or by a similar process, they are always satisfactory to the engraver. These prints find a practical application.

How to obtain beautiful and decided red tones has been described repeatedly. The methods with bichromate, grape sugar, and silver development, and many others, give splendid results, and are highly interesting to the student as well as the practitioner, but neither of them has gained such a popularity as the simple so-called silver print.—C. E., *in the Photographic Times.*

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PHOTOGRAPHY AND THE SPECTROSCOPE—

Lecture II.

BY CAPTAIN W. DE W. ABNEY, R.E., F.R.S.*

Photographic spectroscopy is the easiest thing in the world when you know how to do it, but it requires a deal of patience to learn every dodge. As a rule, a photographer is a patient man; indeed, there ought to be no class of men who have more patience than photographers; hence spectroscopy should not be difficult to them.

Here is another piece of apparatus which is very useful in the spectroscope. It is an apparatus by which you can take a great many spectra on one plate. I need not enter into its details; it is simply a dark slide, by which a rack and pinion motion can be raised, so that the plate gives a fresh surface at each exposure. The only light accessible to the plate comes through an opening of about three-quarters of an inch wide, cut longitudinally in the shade. By this method we can get about sixteen different spectra of different materials on the same plate.

Here is another piece of apparatus which is also useful in investigations with photography. It is a slide in which you can expose plates in different gases or liquids—that is to say, in water, in alcohol, in nitrogen, and so on. It is essentially a glass cell which slips into a dark slide especially adapted for it; on the top there is an air-tight junction, which is screwed down, and there are two little tubes through which you can fill the cell with gas or water, or whatever other material you wish to use. This is very useful in investigating the behaviour of different sensitive salts under different conditions of moisture, pressure, &c. This cell has been used in a great many hundred experiments, and I hope it will be used in a great many more. Those who are going in for spectroscopy should not be without such an apparatus as this, for I do not believe much real investigation can be done without something of the kind. The sensitive salt of silver acts differently when isolated from its atmospheric surroundings, and the only way to ascertain how it does so is to expose it with other surroundings, and to differentiate the results one from another. There is no such thing as a perfect vacuum; you cannot say you expose a plate in vacuo, and, for this reason, I say you have to differentiate between the different media in which you expose a plate, in order to get at the true result which would happen supposing you could expose the plate in vacuo.

You saw last time how you could recombine a spectrum by means of a lens, to form white light.

Now, I want to show you that it is not impossible to develop a plate in white light. I expose a plate behind a negative to the electric light, and in the cell which is placed in the patch of white light is some developing solution (which is quite colourless). The plate is dipped into it. The image comes out into it, although exposed to white light, without fog, which was supposed to be an impossibility. I have another plate placed behind the same negative. I expose half of that plate for half a minute to the white light on the screen, and the other half to apparent darkness, but in the same position on the screen for a couple of minutes. The plate on development shows that the half which was exposed to what was presumably white light gives no image, while the half exposed in the dark shows a perfect picture. I dare say many of you have guessed my trick, for it is merely a trick; but for those who have not, I will show you how it is done. It is perfectly easy, by mixing two elements of light of different refrangibility, to produce a colour which, at all events, to our eyes is a white light. But you must not take it for granted that wherever you can see white light you can photograph with it, because it is quite possible you may not. It is only a trick, but some of these tricks bear fruit in a very practical manner. I will re-form white light again, and we will examine it by means of the colour-chart I showed you last time. You will see that when the red is placed in the white light there is blackness—no colour whatever—the yellow looks bright, as does the blue; all the other colours are gone, except some few which are of a nondescript colour. The meaning of it is this: we have simply a combination of yellow and blue, which gives us the appearance of white light. [The blue and yellow rays were shown to be coming through two slits placed at the focussing screen of the camera.] The blue has no power of acting on the iodide or chloride of silver, neither has the yellow, and, therefore, the white light, which is made by the combination of those two colours, is powerless to act on films made of such materials as those. We can also produce a white light, practically, by a red and green, and if we examine this (which is a very good imitation of white light) in the same way, you will not see the whole series of colours in the colour chart any better than you did before. The red comes out perfectly, but the blue is no longer visible; the blue becomes green, and the violet becomes red; the yellow is also not intense. This is because we have only two colours present, viz., the red and the green. The apparent darkness to which we exposed the one-half of the plate was in reality the dark ultra-violet light, and I need say no more regarding that.

I told you last time that this was a very interesting way of studying the spectrum. You see how, by combining two lights together, you may have a light which is perfectly safe for certain salts of silver. On the screen is the spectrum taken on the three ordinary salts of silver—chloride, iodide, and bromide. The iodide stops exactly at the violet. Below that light we have no action whatever, and we therefore may expose an iodide plate with impunity to any rays below the violet. A bromide plate, you see, is sensitive down as far as the yellow, and, therefore, it would be impossible to develop a bromide plate in such a light as I showed you just now, whereas iodide is perfectly capable of being developed in such white light; the chloride again stopped very nearly with the limits of violet, so that it would be safe to develop a chloride plate in such a light.

[The lecturer concluded with a brief explanation of the diffraction spectrum.]

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* Continued from page 549.

Notes.

The Photographic Exhibition authorities say they will not receive exhibits after Thursday, September 24, thus leaving a clear time of less than four weeks from to-day.

A dinner to celebrate the coming of age of the emulsion process in photography. On the 9th of September it will be just twenty-one years since Sayce and Bolton published their collodion emulsion method, and the majority of the process is to be celebrated by a dinner, to be held under the auspices of the Photographic Club, at Anderton's Hotel, Fleet Street, on Wednesday, Sept. 9th, at 6.30. Anyone wishing to attend should immediately notify the fact to the Secretary of the Club, E. Dunmore, 1, Beacon Hill, Camden Road, N. Dinner to cost 5s. 6d.

Several attempts were made to obtain comprehensive negatives of the great mass meeting held in Hyde Park on Saturday last, on behalf of the protection of young girls. How far these efforts proved successful we shall doubtless see in due course; but meanwhile the presence of a photographic artist in the Park afforded at least one scoffer a chance for making a poor joke. "If I'd my way," he exclaimed, pointing to the apparatus, "I'd have the whole of the speeches made *in camera!*"

What is the best varnish for negatives? One who has had much experience—W. M. Ashman—says that he finds most satisfactory negative varnish made by mixing 1 part of commercial white hard varnish with 3 parts of methylated spirit; but 5 drops of castor oil must be added to each pint of the diluted varnish, as otherwise the film will be too brittle.

People who keep valuable dogs should have them photographed, and keep plenty of copies for distribution at the police stations, in case the animal is lost—or stolen. It is very difficult to describe a dog accurately, whereas no mistake is likely to be made over a photograph.

A greyhound has sometimes been put forward as the personification of grace and beauty. It is a pity that photography should upset this cherished idea, but it certainly did so, if we might judge from a collection of photographs of famous racing dogs which we saw the other day in the office of a well-known sporting publication. Small, mean-looking heads, enormously-developed hind quarters, and a certain scragginess of outline, were what the photographs showed. But perhaps the photographer was in fault—let us hope, for the sake of the reputation of the greyhound, that he was. Most of the animals were vignetted, and not very skilfully; and the celebrated "Wild Mint" appeared with a bit chopped out of its neck, the equally celebrated "Mineral Water" with a mangy-looking tail and the shape of its nose altered, while to the renowned "Honeywood" was given a shaggy coat, making it at a distance look only like a cross with the retriever. The moral to be drawn from these photographs is, that if you can only vignette clumsily, it is best not to make the attempt.

Eccentricity and false art can go no further than in the decoration (?) of photograph frames with stuffed kittens and mice. What fun there can be in a couple of kittens popping up their heads from behind a plush frame containing a portrait it is difficult to tell, and still more difficult when a stuffed mouse is on the frame at one side of the face, and a kitten pursuing it on the other! Are such things really popular, or are they exhibited simply to draw a crowd to a shop window?

Mr. George Smith, of Colebrook Row, writing to the *English Mechanic* on the subject of lantern slides, points out the desirability of allowing an interval of darkness between the exhibition of each slide. He asserts that "most people are heartily tired of dissolving views." Without going so far as this, we are inclined to hold with Mr. Smith that the separation of the slides is the most artistic method of exhibition, as well as being less fatiguing to the eye of the spectator. The melting of one view into another, when first introduced, no doubt caused a pleasant surprise, but the public are now well used to it, and it may well be dispensed with, save in instances where sequence is a necessity. Mr. Smith also protests strongly against the practice of making all sorts of slides with uniform masks for the sake of uniformity of shape on the screen.

The identification of the supposed murderer of Mr. Preller—a mysterious tragedy which is causing great excitement in the United States—appears to have been brought about by means of a photograph of a pair of magic lanterns. Some time before the murder a young man named Brooks disappeared from the town of Hyde, in Cheshire, taking with him a pair of magic lanterns, which he had borrowed from a Dr. Sidebotham. After the Preller murder, Dr. Sidebotham received from America an illustrated police paper containing several portraits of criminals. One of these he recognized as the portrait of Brooks, and mentioning the circumstance of the lanterns, he was asked to give a description of them, which he did, in the best way possible, namely, by sending a photograph, which he happened to have, of the lanterns. The identification of these lanterns, which were made by the Sciopticon Company, Colebrook Row, Islington, would seem, so Dr. Sidebotham has told a correspondent of an evening paper, to be conclusive evidence against Brooks.

We have never been able to discover the reason of the connection between photography and the music hall stage. It was a common thing, in the old glass positive days, for a man who practised cheap photography in the daytime, to appear at night at a music hall, generally in the capacity of an acrobat. The comic singer, Leybourne, who died recently, was at one period of his career a photographer's "doorsman," and now we have a biographer of Lulu, who made a name years ago as a female gymnast—but who in reality was a young man—telling how the "splendid athletic fellow has thrown aside the catapult and the cannon, the net and the trapeze, for the brush and palette and the photographic camera." Lulu, it seems, has lately been on an expedition in Africa, and has taken "hundreds of photographs (which he is now busy developing in the North), from a waterfall rivalling Niagara, to a lion battening on a poor giraffe."

Of ingenious mechanical contrivances for protecting property from thieves we hear much from time to time—safes, any tampering with which by an unwarranted hand, involves the discharge of pistols, the descent of a deluge of water, the opening of a man-trap, and other automatic surprises – but an American diamond merchant, who keeps his stock at night in a brilliantly lighted strong room, is said to have gone a step further, and has rigged up an apparatus, cunningly concealed from sight, in the wall, which, when set to work by the opening of the door of the said strong room, not only subjects any intruder to an electric shock, sharp enough to disable him, at any rate for the time, but, furthermore, sets in action an automatic photographic camera, which, in the course of a few moments, is guaranteed to secure a large assortment of photographs of the nocturnal visitor from different points of view.

Thus, even should the unauthorized caller contrive to make off, unmistakable evidence of his identity would be unwittingly left behind by him, and the public would have an excellent clue ready to their hands; that is to say, if all is true.

The latest outcome of instantaneous photography is a series of eight photographs of professional boxers in the various positions of attack and defence. These photographs have been taken as the men were really boxing, and are far more valuable to the aspiring pugilist than pictures of mere posing. Lawn tennis players who emulate the prowess of the brothers Renshaw should prevail upon those renowned champions to be taken while playing. The task would be a difficult one, as a tennis ball is not the most accommodating of objects, and it is impossible to say where the striker will be standing when he hits it; still, this obstacle might be overcome with a little ingenuity.

It is probable that photography will never have rendered a greater service to art than in the choice volume on "Japanese Enamels," just published for private circulation by Mr. J. L. Bowes, a gentleman who has devoted his life to the collection of specimens of Japanese art pottery. The Japanese are thoroughly imbued with the true artistic spirit, and they have never shown this more forcibly than in the desire to bring back to Japan all the fine specimens of enamel work which were distributed some twenty years ago by the sale in Europe of a number of ancient and modern specimens to supply funds for carrying on the war against the Mikado. Considering how high a position Japanese art now holds, one is apt to forget that not until the exhibition of 1862 was any specimen of Japanese lacquers seen in London. Since 1874 the choice examples of Japanese pottery have been finding their way back to the home of their creation, and so jealous is the Japanese Government over the matter that no more fine specimens of any of the old art crafts are allowed to leave Japan if they can by any possibility be secured for the State Museum. This it is which makes Mr. Bowes' book so valuable, as he has had photographed his collection of Japanese enamels, which is singularly complete, and will every year, owing to the cause we have stated, become more rare. The photographs are spoken very highly of by the *Athenæum*.

The proper spelling of the word "photograph" is evidently a *crux* for the uneducated. A friend who advertised for a young lady assistant, received an application which wound up in this way: "A good refrance from my last situation, being their jest on 3 yrs; I will send my fotoe if required"!

The Berlin Chemical Society has been sorely troubled by an outbreak of spots on the marble statue of Liebig, erected in Munich in 1883. The spots were brown in colour, and refused to change when treated by ordinary methods of cleansing, mechanical or chemical. At last, a special commission of *savans* was appointed to enquire into the nature of these blemishes, and after much labour it was discovered that they contained permanganate of potash and nitrate of silver. The nature of the complaint once known, it was, of course, easy to find a remedy in sulphide of ammonium and cyanide of potassium; but the *savans* are still as much puzzled to account for the presence of the silver spots as George III. was to understand how the apples got inside apple dumplings. Nitrate of silver, everybody knows, has a most singular knack of getting to the most unexpected places. Is it possible that at some time a photographer set up his tent near the statue?

Those photographers who believe in beautifying their portraits by means of retouching, may find some valuable hints on the subject of wrinkles in an article by M. Mantegazza in the Italian scientific journal *Natura*. As a rule, wrinkles are normal at the age of forty, but of course may appear much earlier. The vertical wrinkles between the eyes indicate thought or worry. The arched wrinkles of the forehead above the root of the nose, and between the vertical wrinkles just mentioned, and the straight lines which go horizontally across the forehead, are caused both by intense physical pain and acute mental torture. The crow's feet tell of the passing of the fortieth year—a fact to be especially borne in mind by the retoucher when engaged on the portrait of a lady. The wrinkles of the nose are the results of old age, those which descend from the nose to the corners of the mouth being the first to appear. The small wrinkles in the lower part of the cheeks near the ears come also in old age. The wrinkles in the upper eyelids are the results of hard living, grief, or anxiety. The causes of wrinkles it may be well to bear in mind when going over a negative, but the intelligent retoucher must use his judgement how far to go in the whole or partial obliteration of these lines of age and ugliness.

Patent Intelligence.

Applications for Letters Patent.

9779. S. D. McKellen, 18, Brown Street, Manchester, for "Improvements in camera metal fittings."—18th August, 1885.

9966. Henry Charles Braun, 119, High Road, Kilburn, London, N.W., for "A portable stand for cameras and other apparatus."—22nd August, 1885.

Patent Sealed.

15,887. William Middlemiss, Holmefield Mill, Thornton Road, Bradford, Yorkshire, for "Improvements in photographic cameras."—Dated 3rd December, 1884.

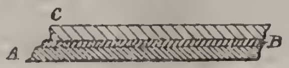
Specifications Published during the Week.

13,596. Alfred Julius Boult, of 323, High Holborn, in the County of Middlesex, Engineer, for "Gelatine plates, films, or tissues for use in photography, and process of manufacturing and using the same." (A communication from George Eastman and William Hall Walker, both of Rochester, New York, United States of America, Manufacturers.)—Dated 14th July, 1885.

The claims are :—

1. A sensitive photographic film, consisting of a coating of insoluble sensitized gelatine, a paper or equivalent support, and an interposed soluble coating.

2. In a photographic film, the combination of the support A, the insoluble sensitive gelatino argentic emulsion film C, and the soluble interposed gelatine layer B, substantially as described.



3. In a film for photographic purposes, the combination of a backing sheet or support of paper or like material, the film of sensitized gelatine adapted to withstand the solvent action of water, and an interposed film of soluble gelatine.

4. The process of making photographic films, consisting in applying a coating of soluble gelatine to a suitable support, drying the same, and subsequently applying a coating of insoluble sensitized gelatine to the soluble coating, and drying it thereon.

5. As an improvement in the art of manufacturing photographic films, the process consisting in applying to a paper or equivalent support a coating of soluble gelatine, and permitting the same to dry thereon, subsequently subjecting said coated sheet to a calendering or burnishing action, and finally applying to the first coating a film of gelatino argentic emulsion, and permitting the same to dry thereon.

6. The film for photographic purposes, consisting of the paper or equivalent support, the film of insoluble gelatine applied to its back, the film of soluble material applied to its face, and a gelatino argentic film applied to the soluble film, substantially as specified.

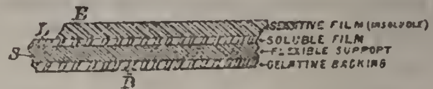
7. As an improvement in the art of photography, the process of producing photographic images, consisting in exposing and developing a sensitive gelatino argentic bromide film, affixed to a suitable support by a layer of soluble material, attaching the developed film while upon its support to a rigid plate, and finally detaching the support from the film by the aid of heat, leaving the image upon the plate substantially as specified.

8. As an improvement in the art of producing photographic negatives, through which to print upon sensitized surfaces by transmitted light in the usual manner, the process, consisting in affixing a film of insoluble sensitive argentic gelatine emulsion firmly to paper or equivalent support, exposing and developing said film, to produce a permanent image therein, and finally attaching said film face down to a plate of glass, substantially as described, the paper support being subsequently removed.

9. As an improvement in the art of photography, the process consisting in first providing an insoluble sensitive gelatine film, fixed by a soluble material to a supporting sheet; second, exposing and developing said film; third, attaching the developed film to a rigid plate by means of wax or its equivalent; fourth, detaching the support from the film; and fifth, stripping the film from the waxed surface.

10. As a new article of manufacture, an insoluble sensitive gelatino-bromide film, having glycerine incorporated therein, substantially as and for the purpose described.

11. The herein-described photographic film, rendered flexible by means of glycerine, and consisting of the support A, having a layer of insoluble gelatine emulsion, C, attached thereto, substantially as described.



12. As a support for the film of sensitive gelatino argentic emulsion, a flexible sheet coated with a layer of soluble gelatine, and calendered on the coated surface, substantially as described.

7422. Charles Wells, of 18, Walker Terrace, Plymouth, in the County of Devon, Gentleman, for "A method of recording by photography the degree of accuracy in aiming ordnance."—Dated 18th June, 1885.

The patentee claims the combination of camera with reticulated or marked field or plate, and a shutter capable of being operated by the act of firing the gun, the whole for the purpose of photographically registering the degree of accuracy of the gunner's aim.

3581. Alfred Peter Sharp, of 17, Great Brunswick Street, Dublin, Marble Mason, for "A photographic dark slide for negatives on paper."—Dated 15th July, 1885.

The claims made by the Patentee are as follows :—

1. In a dark slide for photographic purposes, the arrangement of a coil of paper, whereby the same can be used with or without a loose roller, substantially in the manner herein described and set forth.

2. The use of the spring roller, in combination with the measuring roller, substantially for the purpose and in the manner specified.

3. In a photographic slide, the method whereby a perfectly flat surface of the paper is obtained without tension, substantially in the manner herein described and set forth.

4. The method of fixing the free end of the paper to the receiving roller, by threading through a slot formed in roller, substantially as herein specified.

5. In a dark slide, the method of causing the paper to be automatically marked by means of a spring in the act of opening or drawing the cover of the slide, substantially as described and set forth.

14,951. Lewis Wright, 7, Beaumont Road, Hornsey Rise, Middlesex, Gentleman, and Herbert Charles Newton, 3, Fleet Street, London, E.C., Optician, for "Improvements in oxyhydrogen and other lantern microscopes."—Dated 3rd July, 1884.

The claims of the patentees are :—

1. In a lantern microscope the general arrangement of the lenses, substantially as described, whereby we are enabled to convey nearly the whole of the light falling from the "radiant" on to the object to be shown.

2. In a lantern microscope, the use, in combination with an alum trough, of a plano-concave lens, such lens being, by preference, balsamed to the trough, all substantially as and for the purpose set forth.

3. In a lantern microscope, the combination, with a stop diaphragm, of spring fingers, or clips, or other suitable holding device, whereby the use of a stage for carrying the object is dispensed with, substantially as set forth.

4. In a lantern microscope, the use of a coned or prismatic lens or series of lenses, substantially as and for the purpose set forth.

IN SEARCH OF THE PHOTOGRAPHS AT THE ANTWERP EXHIBITION.

"Ought we to go to the Exhibition, do you think?" said my friend Boscombe, doubtfully. We are on the Scheldt in the early morning. We have congratulated each other on the smooth passage from Harwich mercifully vouchsafed to us, and are standing on the deck of the Great

Eastern Railway Company's steamer *Princess of Wales*, as she placidly glides up the lazy river.

"I don't know; one international exhibition is very like another—all more or less huge bazaars."

"But the photographs—*they* should be seen."

Yes, of course; it was clearly our duty as photographers to go and see the photographs. But, apart from the photographs, I think we both "funked" the Exhibition, and when I suggested we should "do" it on our return journey from Brussels, Boscombe agreed with a look of intense relief. For the next twenty-four hours we resolutely discarded the subject of photography. We knew we should have enough of it and to spare in the Exhibition, and the "shop" was sunk completely and absolutely.

A saunter through the Musée Plantin, by far and away the most interesting thing to be seen in Antwerp, and yet generally missed by the tourist; a stroll in the cathedral, where all was activity, preparing for the grand religious fêtes which were to begin on the following day; a visit to the old prison on the river bank, with its noisome dungeons and blood-curdling collection of ghastly instruments of torture; and a delightful lunch near the Place Verte (*mem.* always try native dishes, wherever you may happen to be; in nine cases out of ten they are good; we had *goulasch*, a species of beef *sauté*, flavoured with a suspicion of garlic and a peculiar kind of pepper), made up a good morning's work.

To Brussels in the afternoon; a drive through the higher part of the city, where the elastic air gives one a new zest for life; an excellent *table d'hôte*, with one dish at least which will live in our memories—hot boiled fresh beef, cucumber salad, and tomato sauce (try it, and you will say there is not a more perfect combination in the whole range of gastronomic art); a capital open air orchestral concert at the Wawx-Hall (*fort suivis par le monde élégant*, as the guide-book has it); a peep into a couple of the *cafés chantant* (a little of these go a long way), and then to bed.

We are somewhat grave the next morning. The journey back to Antwerp, and the serious business of the Exhibition, have to be undertaken.

"We shall get to the Exhibition a little after eleven," says Boscombe; "and as the boat doesn't start till four, we shall have plenty of time to examine the photographs thoroughly."

We are both quiet and resigned. Having made up our minds to do our duty by the photographs, of course there is no more to be said. We arrive at the Station du Nord, and somehow miss the express. We take the next, a slow train, timed to reach Antwerp at a quarter past eleven. It starts at the very tick of the time advertised—a quarter to ten. How admirable is the punctuality of the Belgian railways, we say; so much better than in England!

Naturally, we are prepared for the train stopping at all the stations, but scarcely so for its stopping *between* them as well. After several of these gratuitous delays, we reach Malines, an hour late. A mile or so from Malines comes a good long rest of three-quarters of an hour. The train is full of holiday folk, and they take matters very easily. Most of the passengers turn out of the carriage, and we get a little insight into continental manners, to which instantaneous photography alone could do justice. Just as a few are beginning to contemplate picnicing—notably one old lady who has had thrown to her a *pistolet* and a couple of hard boiled eggs—the engine gives three warning screeches, and instantly there is a stampede into the carriages. This long rest is only the precursor of other rests, and every time the train pulls up, half the passengers take little excursions. One adventurous lady, who attempts to descend from the carriage unassisted, meets with a disastrous check. Her dress catching in the step, which is shaped like a pear, on purpose, it would seem, to cause catastrophes, she describes some wild convolutions in the air, and is neatly deposited on her back, with a disclosure of a good deal of violet-coloured stocking. Luckily she is not hurt, and doesn't seem to mind the laugh at her expense. Then there are rumours that seven trains from Antwerp must pass us before we can get into the station. We count eight of these trains, and still we are resting.

"Twelve o'clock," says Boscombe; "we shan't have much time for the Exhibition. Must go direct to the photographs as soon as we get in."

"Yes," I answer faintly. I am very empty, the tedious journey is exhausting, and two gentlemen in high Belgian caps and capes have smoked Belgian cigars all the way. Even the pleasure of imbibing a tiny drop of brandy and water, which happened to be at the bottom of my flask, is alloyed by a whisper which reaches us from the other end of the carriage, that "these English cannot travel without drinking."

At last we get within the fortifications, and every time the train pulls up, a certain number get down and come back no more. They have set out to walk, as being the more expeditious way. At about half a mile from the station, we have a most tantalising stoppage. We make small bets whether we shall start in two, in five, in ten minutes. At the end of a quarter of an hour we give up betting as useless. By this time the exodus has amounted to two-thirds of the passengers, and finally we steam into the station at half past one, with about fifty people.

We cab it to steam-boat quay, to deposit a box we have with us on board the steamer. The *cocher* coolly demands four shillings. We have nothing between a franc and a five-franc piece, and no energy to dispute the matter. I hand the rascal the five-franc piece, and depart. We set off for the Exhibition. Luckily it is near the quay, or human nature, with a pair of new tight shoes, could never have survived a long walk on the abominable bakers' loaves with which Antwerp is paved. I firmly believe this method of paving dates from the Spanish occupation of Antwerp, and was devised with fiendish ingenuity by the Inquisition, on purpose to torture the unfortunate Flemish heretics.

The air of Antwerp is always close, relaxing, and fever-suggesting. It is especially so at two o'clock to-day.

"Boscombe," I say hoarsely, when we have passed through the turnstiles, "food or photographs?"

He does not hesitate a second.

"Food," he gasps, "and *bocks*—plenty *bocks*."

There is a big restaurant on our left. We make for it. A huge crowd is dining, but we find a vacant table. An etiolated visaged *garcon*, diminutive in stature, bears down upon us with alacrity. He sees we are English, and therefore liberal in *pour boires*. We order soup, and, true to our policy of national dishes, *carbonade Flamenge*, of the nature of which we are profoundly ignorant. The soup is weak, vapid, and lukewarm. No matter, we have that hunger in us, we would not take five pounds for it. *Carbonade Flamenge* turns out to be extremely like *goulasch*, but a little coarser. It is very good, and we marvel at the inconsistency of human nature which leads our Flemish neighbours almost to a man to choose *biftek aux pommes*. The *bifteks* are worthy of a passing word. They are dabs of meat, devoid of fat, browned to about an eighth of an inch each side; the interior is a mixture of the French colours—a reddish blue interspersed with minute specks of white. To eat a *biftek* in true Flemish fashion, you must grasp the fork firmly, dagger-wise, plunge it into the meat about the centre, and hold the *biftek* with all your strength against the plate. Then, with your knife, you proceed to hack the *biftek* into little pieces. So far as we observed, this is an operation demanding much muscular exertion, and I would advise no one not possessed of great strength to attempt a *biftek aux pommes* at the Exhibition Restaurant.

I draw a veil over the number of *bocks* Boscombe consumed, and hasten on to the photographs.

We enter through the chief portal—a most imposing erection constructed on a barbaric scale of magnificence. We are in the Exhibition, and involuntarily assume the aimless, helpless aspect of all sightseers. We keep our eyes open for any indications of a photographic collection, but see nothing. We wander into Austria, are drawn by stress of crowd into France, get hopelessly pushed into China, meander through Russia, and are stranded in Tunis. Still no photographs, and the time is getting on. Frantically we seize upon an individual in uniform, and, in the best Stratford French we can muster, beg to be directed to the photographic section. He knows nothing of it; how should he, when he's only a member of the Exhibition fire brigade? In the Belgian Court we catch sight of some framed photographs. We rush towards them. They are only enlargements of very fourth-rate calibre. "This cannot be the photographic section," we both murmur.

Boscombe, who has a gift for topography, suggests one more effort. I agree feebly, for all plans are alike to me, and I don't seem to be able to grasp the plan of the building at all. We try again, but with no result whatever.

We go out into the grounds. There is a large building outside devoted to the *Beaux Arts*. Can the photographs be there? we ask ourselves; but we have no time, even if they are; besides, it is a franc admission. We decide not to try the *Beaux Arts*.

We pass a kiosk devoted to Cook; an inspiration seizes me, I rush in and accost two amiable and polite young—very young—gentlemen from England.

"Oh, yes, you can get plenty of photographs of Antwerp," says one in reply to my question.

"But that is not what I mean," I explain; "I want the photographic section of the Exhibition—a collection of photographs from all countries, you know."

A light breaks in.

"Oh, yes, I know what you want. What is the man's name? Brown—Brine—Braun—ah! that is it."

"No, indeed," I reply, goaded beyond endurance, "I do *not* want Braun's photographs. I want *the* collection of photographs of all nations. Is it in the *Gallerie des Beaux Arts?*"

"I never heard of any photographs being there. The paintings are very fine, and I should recommend you to see them."

"My good young sir, I do not wish to be recommended to see paintings. I want the photographs. Why, they've been noticed in the Photographic News."

The matter is becoming serious with the two young gentlemen. Clearly, it will not do for them, the representatives of the ubiquitous, the all-powerful Cook, to be ignorant of anything.

"Ah, yes!" says at last one, with a pitying smile, "I remember all about the collection of photographs. Yes, I think there was one, *but it's been scattered.*"

Scattered! This is the last straw. I give an inaudible howl of anguish, and rush away to join Boscombe, who is anxiously awaiting me outside. We have but a quarter of an hour before the boat starts. We cease to think of photographs, and fly. Wide-Angle.

P.S.—I have since examined the account of the Antwerp photographs which appeared in two numbers of the Photographic News three months ago. I find now that the photographs are not placed together, but distributed each in the section of the country to which they belong. At least, so says the special correspondent of the P.N. It may be so. All I can say is, that I couldn't find any evidence of this. If anybody does not believe me, let him ask Boscombe.

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ORTHOGRAPHIC PROJECTION.

There are certain items of outdoor photography, the importance of which is never clear to the neophyte in photography, but which experience will show him the importance of if his taste grows more exacting as he acquires experience. Amongst these may be mentioned the use of the swing back, where architecture, no matter how simple, enters into the view, and the efficiency of which is, judging from the photographs sold, rarely appreciated to the full extent. It is very commonly the case that views of buildings, even by the best known photographers, have the perpendiculars of the architecture converging upwards or downwards. Photographers generally consider that they can see on the ground glass any incorrect inclination, and are content to get the lines satisfactory to their eyes; and as to most modern buildings it is perhaps of slight importance, as, except for the use of advertisers, the generality of photographs of the constructions of our time are not worth much. But the photographer of taste and culture goes in more for views of buildings which have an established reputation as standards of architectural excellence, left us from the time when there was such a thing as inspiration in the construction, such as the old cathedrals and temples, and antique structures of all kinds which, from their excellence or historical interest, have a value in modern times.

Now, in most of these buildings there are structural peculiarities, the exact delineation of which is necessary to the value of the photograph, and this requires a greater exactitude than the eye is capable of giving; besides which, there are sometimes deviations from parallelism and perpendicularity, unintentionally made by the architect, which the photographer does not notice, and which he misrepresents in getting his lines "correct" on the screen. This is often the case in the great cathedrals and in the Greek temples. The only security, therefore, in architectural photography is the use of the plumb-line to secure the absolute perpendicularity of the focussing screen. As the slightest variation from this perpendicularity produces a convergence of all really parallel vertical lines, so it may produce an apparent parallelism in lines which are really convergent, and made so intentionally by the architect; and in the one case as much as in the other, this falsifies the building.

We had not long ago to photograph an old English manor-house, in which not one of the corners was absolutely vertical, and in which there was a curious inequality from the divergence from the vertical, in consequence of which the building had a singularly picturesque aspect. The very irregularity of these lines, which is the most interesting characteristic, makes it impossible to fix on the focussing screen the true degree of inclination; what makes it worse is, that the corners of the building fall away from the spectator like the columns of a Greek temple, and the degree of this recession from the perpendicular plane complicates the perspective in a most perplexing way. But the absolute perpendicularity of the focussing screen being secured by the plumb-line, we can recognize all these variations in the photograph, as well as in the building itself.

A level on the top of the camera has not the same certainty or the same delicacy of indication as the plummet, to make which we use a common conical pistol bullet in which, at the point, a hole is made, and a thread of saddlers' silk fastened in the hole. This costs next to nothing, and saves time and perplexity, as any one will find by trying to get the perpendiculars by the image on the screen, and then correcting its position by the plummet.

Another cause of perplexity, not only to the beginner, but apparently to many writers on photography, is the perspective of the lens. Of course the single lens used for landscape pure and simple cannot be brought into the question, as its perspective is always false, as it renders no straight line correctly, except those which pass through the axis of the lens. The correctly compensated compound lenses, such as the symmetrical, render all straight lines straight, and if the screen be parallel to the plane of any number of parallel lines, the image will show all the lines as parallel. This is a truthful representation so far as one plane goes, and relatively correct for the various planes, but it is not the actual perspective appearance which is only rendered by the pantascopic camera, in which the lens only delivers that part of the image which is on its perpendicular axial line, and, by sweeping round, gives the whole view with each object recorded at the same distance from the lens, and therefore correct in the relative size as due to the distance of the object from the lens. That this is the true projection, as seen by the eye, may be shown by two experiments. Firstly: place yourself opposite the central point of a façade with parallel horizontal lines, such as a column or church front, and notice the extreme ends only of the long horizontal parallels. They will be found to converge, as is natural, as they are receding parallel lines which must appear converging, the façade receding each way from the spectator. Secondly: plant a camera, fitted with a rectilinear lens, at a similar point far enough from the façade to have the entire image of it on half of the plate. Now, if the image is on the right hand half of the screen, the lines will converge to the left—*i.e.*, the middle of the screen—but if you turn the camera round, so that the image moves towards the left hand side of the screen, you will see the lines all parallel when the image is central to the plate, and when it has passed over to the left of the centre the lines will all converge to the right—*i.e.*, to the centre of the plate again—those which were shortest in the first position being longest in the last, and *vice versa*. These are evidently both wrong. Now move the camera up until the façade fills the whole field, when it will be seen that the extreme perpendiculars and the central ones are of the same height on the screen (if really so in the building). But this again is false, as if the extreme columns are farther from the eye than the central, they must really subtend a smaller angle, and they only impress us as equally large, owing to the knowledge we have acquired that the columns are all of the same height.

Now this is equally the case whether a short focus or long focus lens is used, as will be shown by measuring the dimensions of a long-focus lens image, and comparing the measurements with those of that part of a short-focus lens image which corresponds with it. Any lens, in fact, which throws the whole view on a flat surface presents the same distortion of the true image, and the single lens will show, besides, the barrel or hour-glass shaped distortion. The pantascopic camera gives the exact relative height of every perpendicular in any given plane, and this alone.

But why is it, then, it will be asked, that the ordinary long-focus photograph is not felt to be false? Simply because, knowing the lines of a building to be straight, we accept the photograph as correct, if it renders them so, and because we see the photograph under the same conditions, *i.e.*, the perpendiculars in the photograph vary in height, according to their distance from the eye, just as those of the view do, and this will be seen if we hold the photograph at such a distance from the eye as to make it coincide exactly with the view, *i.e.*, if we look at the photograph from a distance equal to the focal length of the lens with which it was taken.

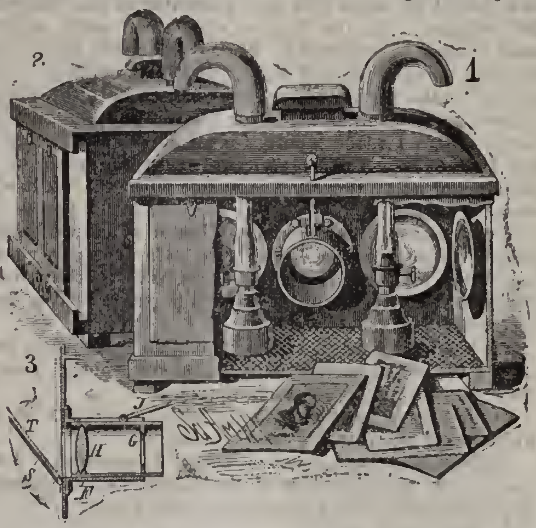
The true explanation, therefore, is that while the record of the pantascopic camera is optically correct, our way of seeing the photograph taken by it is not so; while the photograph taken by the symmetrical or rectilinear lens is optically incorrect, but is reduced approximately by our way of looking at it to correctness; the error in the photograph being compensated for by that in the manner of looking at it. To see the image produced by the right-lined lens with entire optical exactitude, it must be held at the same distance from the eye as the plate was placed from the lens, when the plane surface of the photograph is subject to the same illusion as that produced by the camera, and the two falsehoods make a truth. The photograph produced by the rotating camera, on the contrary, to be seen correctly and produce the illusion necessary, must not only be seen at the distance of the focal length of the lens, but must be curved into a circle of which the focal distance is a radius, conditions which are almost impossible of realization to ordinary vision.

Practically, therefore, the symmetrical or rectilinear (that is, corrected for the curvature of straight lines) lenses are correct in perspective, and the short focus lenses are only apparently exaggerated owing to their giving more in one view than we are in the habit of seeing.

Another point of practical interest for out-of-door work is the focussing of the image. If a lens is properly constructed, the focus given with its full aperture is identical with that obtained with a smaller diaphragm, and the proper way to focus is to use the full aperture, and then stop down to the requisite degree. This has the double advantage of showing the view with great brilliancy, and of determining within smaller limits the range of focus. To focus with the working aperture, as some writers recommend, is not only useless, unless the lens is imperfect, but it is practically impossible with the small apertures required for the rapid plates now used.—*The Photographic Times.*

DAVENPORT'S MAGIC LANTERN.

On the inside of each end of the front, and on the inside of each end of the box, is a concave reflector; these are so placed as to concentrate the light upon the picture at the centre of the back of the box. In a tube, F, projecting inward from the front, between the mirrors, is arranged a sliding tube, G, holding a convex lens, H. This tube is moved for focussing by means of a rod, J, extending up to the top of the back of the box. In the box, two lamps or other lights—such as calcium or electric—are placed between the mirrors at each end, as shown in fig. 1. Above each light is placed a detachable funnel. The top of the box is curved, and the under side is polished to reflect the rays of light. In the top is a ventilating opening provided with a hood to permit the hot air to escape; the supply of air is admitted through the perforated bottom. The pictures are held in a sliding apparatus moving between two longitudinal grooves (fig 2) secured on the outside of the back of the box, and having two apertures which can be closed by hinged doors. The pictures are held in place by closing the doors, and can be shifted to appear in an opening in the back of the box. The light from the lamps is reflected by the mirrors upon the picture, and from the same through the lens upon a screen or wall. By means of a mirror, T, on a door, S, hinged to the front of the box below or at either side of the tube, the light can be reflected upon any desired surface. Any opaque object, such as a photograph, chromo, or drawing, can easily be reflected upon the screen in any desired size, all parts being clear and distinct. The pictures do not become heated sufficiently to injure them, and may remain in the apparatus for hours without being destroyed.—*Scientific American.*



SOLUBILITY OF PARAFFIN WAX IN ALCOHOL.

BY A. HADDON.*

From the discussion that took place last Thursday, it seemed to me that very little was generally known about the solubility of paraffin wax in alcohol. On referring to Watts' Dictionary of Chemistry I find this: "It is soluble in 2·85 parts of boiling alcohol, but separates completely on cooling in snow-white needles, which are soft, friable, and greasy to the touch." No temperature is mentioned at which this complete separation takes place, and therefore I thought it would be worth investigating, and giving the members of this Association the benefit of the results obtained. Every one knows that it is perfectly insoluble in water, and therefore the stronger the alcohol the better the chance of dissolving the maximum quantity. I consequently chose absolute alcohol in one experiment This solvent is much stronger than would be generally employed by photographers. I took about 30 c.c. of absolute alcohol, and added about 3 grammes of paraffin wax cut up into shreds. I then heated the two in a flask till the alcohol commenced to boil, and the whole of the paraffin dissolved. I then filtered it twice into a warmed flask, and allowed it to cool to the temperature of the room, which was 18° C. (64·4° F.) I weighed a porcelain evaporating basin, and poured into it 9 grammes of the filtrate, and evaporated the alcohol over a water bath. On re-weighing, the residue was found to amount to ·0145 grammes, *i.e.*, ·161 per cent., or ·753 grains of paraffin per ounce weight of alcohol. In order to ascertain whether this was due to any small amount of impurity that might be in the sample of paraffin used, I washed the paraffin which was left on the filter from the last experiment, and re-dissolved it in some fresh alcohol, cooled it rapidly to 18° C. (64·4° F.), and then obtained a residue of ·017 from 10 grammes of alcohol, *i.e.*, ·17 per cent., or ·816 grain per ounce weight of alcohol. These numbers, I think, may be considered as practically the same. In the first case the alcohol was allowed to cool slowly to the temperature of the room, being left all night. In the second case the cooling was hastened by immersing the flask in cold water. This difference in the cooling might account for the difference of ·01 per cent. between the two results obtained.

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* Read before the London and Provincial Photographic Association.

As absolute alcohol is too expensive to be used in ordinary photographic manipulations, the above results are of little value. In order, therefore, to find what is the solvent power of alcohol such as is generally to be found in studios, I took alcohol of sp. gr. ·838. In some of this I dissolved the deposited paraffin from the previous experiments, heated it to the boiling point, filtered, and cooled rapidly to 18° C.; I then evaporated as before 10 grammes of the solution, and this gave a residue of ·003, *i.e.*, ·03 per cent., or ·144 grain per ounce weight of alcohol, which would give ·12 grain per ounce measure. Absolute alcohol dissolves about ·593 grain per ounce measure.

From these experiments it seems that alcohol is but a feeble solvent of paraffin wax. Methylated alcohol, whose sp. gr. is about ·83, would, I presume, dissolve about the same percentage as the weaker sample of alcohol I employed.

Correspondence.

MR. BOTTONE'S PHOTO-MICROGRAPHS.

Dear Sir,—I have read with considerable interest Mr. Forgan's letter in your last issue. As he is an entirely unbiassed witness, I suppose we may take it for granted that his statements are correct. He says:—

Zeiss C¼ shows foot and three joints. Powell and Lealand's ¼ of 90° shows foot and two joints. Wray's ¼ of 130° shows foot and one joint. And this with a B eye-piece, which generally has a smaller field than an A.

This proves, then, that not only the *whole foot*, but that one or more joints, can be easily seen with an ordinary quarter-inch objective. This being the case, Mr. Walmsley will perhaps "gracefully acknowledge his mistake."

Should any of your readers care to try one of these French triplets, I shall be happy to choose one for him, and send it by post for 10s. I will guarantee that the magnifying power shall not be less than 200 diameters with the A eye-piece.—Yours sincerely, S. Bottone.

Stanley Road, Carshalton, Surrey.

[Although Mr. Bottone has thoroughly established his case, and further evidence is not needed, we may mention that we have seen the objective he used, and can state that the triplet in question shows the foot and two joints of the dung-fly's leg when an A eyepiece is used; the magnifying power, under these circumstances, being about 250 diameters.—Ed. P.N.]

Proceedings of Societies.

Photographic Society of Great Britain.

A monthly technical meeting was held on Tuesday last, the 25th instant, in the Gallery, 5a, Pall Mall East, Mr. John Spiller in the chair.

At the commencement of the meeting, Mr. F. E. Freshwater showed a light waterproof cape—something like the kind occasionally worn by bicyclists—so made as to serve well either as a cape or as a focussing cloth.

The Chairman referred to the advantage realised by employing a focussing cloth which, like that now shown, could be firmly attached to the camera. The Chairman then referred to the circumstance that the Shakespeare Society are now making arrangements to reproduce an extensive early edition by photography, and he mentioned that Mr. Prætorious, of the British Museum, is engaged on the work. The Chairman having turned the conversation towards hot weather difficulties,

Mr. Ashman remarked that a friend of his who is working at Kimberley, where the heat is often no less than 130° F. in the shade, finds that only plates of English make are workable without trouble from frilling.

A question having been asked respecting the best method of testing the damp-resisting properties of varnish,

Mr. Ashman said, that the most satisfactory course is to varnish a negative and put it in water, when the film will soon star and crack if the varnish is bad.

The Chairman then referred to the circumstance that many persons print from gelatine negatives without using any varnish or protective coating whatever; but the general sense of the meeting appeared to be that a protective coating—if only of collodion—is very desirable, even though only a few prints are required.

The meeting then discussed varnish in general.

Mr. Ashman said that he ordinarily uses a mixture of one part of commercial white hard varnish with three parts of methylated spirit; an addition of five drops of castor oil being made to each pint of the diluted varnish.

Roller slides and paper negatives were then talked of, and then the conversation turned upon the methods of making paper negatives transparent,

Mr. Ayres said that he had used equal parts of castor oil and ether with advantage. This can be brushed on the back of the negative, and no heat is required.

How to best hold the paper during exposure was next discussed, and

Mr. Ashman referred to the use of the ordinary adhesive plaister sold by the druggists. A sheet of this is made to adhere to a rigid surface, such as a board, and is then stripped off so as to leave some of the composition on the rigid surface. A sheet of paper pressed into contact with this will adhere, but can be stripped off at pleasure, after which another can be placed in position, and so on. Mr. Ashman could not say who had originated this method, but he was under the impression it was due to Mr. Stebbing. Mr. Ashman then mentioned that the essential parts of such a roller slide as might serve very well for experiments could be bought for about a shilling in the form of a perpetual calender, the dates, &c., being printed on a long band of paper which is rolled from one cylinder to another.

The Chairman then called the attention of the meeting to the circumstance that the Photographic Exhibition will open shortly, and that the last day for sending in pictures is Thursday, September the 24th.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 20th inst. Mr. A. L. Henderson in the chair.

Mr. Cox exhibited, on behalf of the Eastman Company, a remarkably fine series of silver prints sent from New York. The negatives—some of which were of large size—had been made by Mr. Kent, of Rochester, N.Y., on the Company's new negative paper, rendered transparent with castor oil. Mr. Cox stated that the sensitometer speed, with soda development was 22, but ammonia did not give such a high reading. He promised a demonstration shortly.

Mr. A. Cowan inquired the difference in printing speed against glass negatives, and was informed that it was equal to a coating of matt varnish or tissue paper over a glass negative.

The Chairman remarked that the paper was very evenly coated—a difficult operation—and the negatives were very fine indeed. He noticed some slight blemishes which might have been caused in transit. He inquired if those marks would affect the print, or could they be removed?

Mr. Cox replied that it was merely necessary to pass a warm iron over the negative to remove the marks referred to. The surface gave a splendid tooth for retouching; portions could be scraped away, and any amount of work could be put on from either side. In the case of interiors there was an absence of halation.

Mr. Sutton had reproduced water-colour and chalk etchings by rendering the original transparent, and using it to make a negative in the printing-frame, but it needed considerable pressure to get the entire image sharp; this would happen, too, with paper negatives of large size. Japanese paper he considered the very best material to use for negatives.

Mr. Mackie inquired why a sort of halation was met with in prints, no matter whether from paper or glass negatives.

The Chairman doubted if any material would overcome the difficulty, as a similar effect was observable when looking at a dark object against a bright sky.

Mr. W. H. Harrison said the phenomenon might be explained by Lord Rayleigh's investigation, that an atmosphere of dust surrounded all bodies.

Mr. A. Haddon then read a paper on the "Solubility of Paraffin Wax in Alcohol" (page 557).

Mr. Mackie thought Mr. Haddon should have included methylated alcohol, since there was still a doubt regarding the solvent power of that liquid.

The Chairman had for years dissolved paraffin in hot methylated spirit for lubricating purposes.

Mr. Harrison thought the wax must have contained stearic acid, or weak alcohol would not dissolve more than a pure sample.

The Chairman then repeated his former experiment of dissolving AgI in KBr, using a smaller quantity of silver than last week, and applying heat to effect his object; the result was quite satisfactory.

The following questions were then discussed :—

"What is the best form of camera dark slide?"

"To what temperature is it safe to raise washed emulsion without producing any detrimental effect?"

Regarding the first question, the Chairman thought Samuel's safer than any pull-out shutter.

In respect to the second question, 120° F. was said by Mr. Cowan to be the best: beyond 150° F. he noticed a thickening in the shadows.

Mr. Cobb, when using very hard gelatine, found it safe to use a temperature of 200° F., or even boiling point.

St. Helen's Association for the Pursuit of Science, Literature, and Art.

Photographic Section.

The annual meeting of this Section (postponed from July 13th in consequence of the decision of the Council to close the premises) was held on the 13th inst., at the Association Rooms, 4, Salisbury Street, Mr. Heather in the chair. Minutes of last meeting were read and confirmed.

The Hon. Secretary then read the annual report, and submitted the balance sheet, which showed a balance on hand of £2 10s. 1d. The following resolutions were then carried unanimously :—"That the balance sheet, as now presented, be adopted, and that the Secretary be instructed to pay over the sum of £2 5s. to the Treasurer of the Association as a contribution to the general fund." "That the Photographic Section of the Association for pursuit of Science, Literature, and Art, be hereby dissolved." "That, with a view to forming a photographic association, a preliminary meeting be held on the 27th inst., and, in the meantime, those present be requested to canvass for members."

After passing a hearty vote of thanks to the Chairman and Secretary, the meeting closed.

Manchester Photographic Society.

On Saturday, August 15, the eighth out-door meeting of the above Society was held at Wortley. A good muster, together with a beautiful day, rendered the gathering a most enjoyable one, marred only by the disappointment of not being able to gain admission to the Old and New Halls, owing to the presence of the families of the Earl of Ellesmere and the Hon. Algernon Egerton.

On arrival at Wortley the party at once made for the lake, or, as it is called in local parlance, Wortley Dam, the road thereto running parallel with the railway for a short distance, which it then crosses by a neat iron bridge, at the extremity of which is a subterranean passage, and as we emerge therefrom the lake bursts upon our view, framed in a leafy setting, through which the summer sun darts its golden rays, forming a picture unequalled within many miles of our smoke-begrimed Cottonopolis. The umbrageous trees, the soft greensward, with aviary and boathouse mirrored on the bosom of the placid lake, have oft and oft been limned by pencil and camera, and the veteran brother, often though he has had a shot in times gone by, cannot resist the temptation of having another shy at it.

Our next view is a cottage nestling in the shadow of majestic trees, which whilst some of our friends are busy with, others are trying to secure a shot (but not with powder) at our feathered favourites on the lake below; but who, like many of the *genus homo*, have to be decoyed and bribed to get them within range of our guns. Pursuing our ramble, we come to the entrance to the famous underground canal constructed by Francis, second Duke of Bridgwater, which extends for a distance of nearly six miles in a straight line in the direction of Bolton, and, including all its ramifications, is nearly forty miles in extent. A short distance from this stands the Court House, a picturesque building, and for an exposure on this we were only just in time, before the serenity of this quiet village was disturbed by the advent of a number of scholars to a demonstration which was to be held during the afternoon. This, of course, put an end to our work in this locality, and we decided to march for Kempnough and Wardley Halls. Our route lay along the road by which part of the procession marched to the *rendezvous*, and which appeared to be led by some of our brethren, with cameras on high doing duty for banners and standards for this temperance army, rendered the more amusing by their having so recently emerged from a well-known hostel.

Kempnough Hall was next visited, but its sequestered position rendered it difficult for the camera. Crossing Doe Green, our road leads us to Wardley Hall, an ancient and venerable pile, the former seat of the Wortleys. Through the kindness of Mr. Gardner, the members were allowed to inspect the interior of the Hall. All cameras are brought to bear on this charming and picturesque building, its image reflected in the waters of the moat, with here and there a water-lily for a foreground, tinged by the rays of the setting sun, forming a picture which well repays a visit for this alone.

On Wednesday, August 19, there was a good muster of members for the day's excursion. The choice of Ingleton as the district to be visited had the special recommendation that it opened up a comparatively new district; and, from the experience gained by the members who were present on this occasion, there is no doubt that the visit will be repeated at some future time; if not to the same spot, at any rate, to one not far distant from it.

The beauty of the weather went far to compensate for what would otherwise have been a very tedious journey. The party had no sooner alighted at Ingleton, and were scarcely outside the station, when they found occupation for their cameras. The viaduct, which here crosses the valley, with the village itself spreading out on both sides of it, and the massive form of Ingleborough for a background, made up a very suitable picture as a preliminary to the day's operations. Under the guidance of a local photographer who kindly volunteered to lead, the party at once sallied forth through the village. It may be mentioned here, for the benefit of future visitors, that Ingleton has been hitherto, comparatively speaking, a closed book to the tourist in search of the picturesque. The two glens which furrow, as it were, the sides of Ingleborough and Whernside, and through which run the Doe and the Greta, tributaries of the Lune, were practically inaccessible. But in the spring of the present year, some of the enterprising spirits of the locality formed themselves into an Improvement Committee, and the work they have done so far is very creditable to them in every way.

The approach to the glen of the Doe (the only one visited on this occasion) is over a stile on the right-hand side of the road. A signboard, placed here by the Committee, intimates that the chief points of interest in the glen are the "Swillabottom Pool," the "Pecca Falls," and "Thornton Force." For the privilege of viewing these places and exploring the glen throughout its entire length, the modest sum of twopence is charged. Progress along the bank of the stream was easy enough at first, but soon the inequalities of the ground became evident by a pathway with here and there steps cut out of the solid rock. At convenient distances also, and particularly after a slight ascent, seats were placed, both for rest and for enjoyment of the scenery. Soon the ascent became somewhat precipitous, and even toilsome, calling forth energetic adjectives from some of the party more heavily burdened than the rest. At length a small terrace-like platform was reached, and the toil was forgotten in admiration of the prospect revealed. The glen here assumes a graceful curve, in form of an amphitheatre, with dense woods on one side and rocky precipices on the other, and from the midst issues forth the first of the falls, of a horse-tail shape, and forming altogether a most charming picture. The distance, however, was too great for any but long-focussed lenses to attempt. A closer approach, although it did not improve the picturesque effect, enabled all to direct their cameras upon it, with, it is hoped, the best results. Beyond this point the scenery increases in grandeur and sublimity until the second fall is reached, or, rather, it should be called a succession of falls, three of them forming one very beautiful and effective picture. As time was passing all too quickly, it was found impossible to do more than reach the next fall, which proved the crowning feature of the day. In this case the full beauty of the fall could only be taken in on a near approach to it, forming in miniature a combination of Stock Ghyle and the Staubbach.

Thornton Force, as it is called, may be roughly described as of crescent form, the rocky wall which bounds it being from forty to fifty feet high, splintered and cleft in many places, mottled over with a rich growth of fern, moss, and lichen, and tinged with many a hue. The water pours over the summit at one place in a broad attenuated sheet, in another it issues from a deep fissure with a graceful bend, and at various other points in jets which literally sparkled as the full blaze of sunlight shone out at intervals, lighting the whole up into a perfect fairy-like scene. Some few feet above the rock recedes, leaving a broad ledge with room to circulate behind the whole series of falls, which are received into a basin dotted over with boulders and fragments, among which the water foams and gurgles as it pursues its course in a gradually narrowing bed.

It was now time to beat a hasty retreat, but in the brief epitome of what was seen and done during this short ramble (under two miles in length), enough was gathered to feed the imagination for many a day; and if it be true, as our guide averred, that the other glen was no less beautiful, and with a beauty all its own, then it may be said, without exaggeration, that Ingleton possesses charms which will not fail to attract the members of this and kindred societies to its hitherto little-known and well-nigh inaccessible recesses.

Talk in the Studio.

The Anthropological Congress which is shortly to be held at Rome will have a curious feature in the shape of a collection of seven hundred skulls of criminals, numbered and classified. To these will be added the photographs of 3,000, and the brains of more than 150 convicts, thousands of autographs, poems, sketches, and special instruments, the work of criminals; an album containing a record of 700 observations, physical and moral, on 500 criminals and 300 ordinary men. There will also be graphic maps of crime in Europe with reference to meteorology, food, institutions, suicide, &c.; tables of the stature of criminals in relation to the length of the arms, and of crime in towns compared to that in the country. M. Bertillou will exhibit the graphic curves of 23,000 *recidivistes* examined in twelve parts of the body, and the practical results obtained. Photographs of Russian political and other criminals, especially of those from Moscow, and wax masks of a large number of celebrated criminals, will also be exhibited. All the notabilities in the science of criminal anthropology will take part in the Congress.—*Nature.*

Errors in the Exhibition Official Award List:—Suter's Lenses and Eastman's Exhibit.—Mr. Gotz writes as follows:—"Suter's lenses have been awarded the silver medal at the International Inventions Exhibition, his name having been accidentally omitted in the list published by the *London Gazette.*" The Secretary of the Jury Commission has forwarded the following to the Eastman Company:—"South Kensington, S.W., Aug. 17th, 1885.—Gentlemen,—The words 'and for films' were accidentally omitted at the end of the subject of your award, and the error shall be corrected in the next edition of the award list.—I am, Gentlemen, your obedient servant, H. T. Wood, *Secretary to the Jury Commission.*—The Eastman Dry Plate and Film Company, American Section, No. 2588, I. I. E."

The Queen and Photography.—Sir Henry Ponsonby, by the commands of the Queen, has forwarded the subjoined letter to Mr. W. J. Anckorn, Photographer, Arbroath, thanking him for photographs received. "Sir Henry Ponsonby has received the Queen's commands to thank Mr. W. J. Anckorn for sending the photographs which accompanied his letter of the 10th inst. Her Majesty is unable to accept these photographs, but will purchase them, and Sir H. Ponsonby is desired to ask Mr. Anckorn to be good enough to send three more copies of each photograph, mounted on thin cardboard, and an account for all the copies."

Photographic Club.—The subject for discussion at the next meeting will be on "Halation in its Different Forms." Saturday afternoon outing at West Drayton, train from Bishop's Road at 2.6. See page 552 for the notice of dinner to celebrate the coming of age of emulsion photography.

To Correspondents.

⁂ We cannot undertake to return rejected communications.

J. H. G.—1. The name of the maker is not familiar to us, and we cannot give you any definite notion as to the value of the telescope—but probably more than a sovereign. 2. A mixture of the finest jeweller's rouge and alcohol, applied with a soft wash-leather. 3. Cyanide of potassium solution—20 grains to the ounce of water; but as there is some risk of completely spoiling the negatives, you should make as good a transparency as possible before treating with the cyanide.

James Bamforth.—We have no additional information to give you except to mention that the forms are one penny each.

J. V.—The picture will enlarge very well indeed, and is a very striking and successful one. We shall be pleased to use it as a supplement, if you will let us have a short account of your expedition, to issue in the same number of the News. For reproduction, we require a rather less vigorous print, but including all the details; and, moreover, the print should not be on tinted paper. We have not your address.

T. E. H. B.—No reference to the article has appeared in the editorial part of the News, and we cannot admit a discussion as to the statements which have appeared in the advertising pages. If you consider the matter of sufficient importance, you should insert it as an advertisement.

H. Howard.—1. In an acid solution it will speedily make the gelatine insoluble. 2. Dilute ammonia. 3. Yes; but as far as our experience goes, there is no advantage in doing so.

F. J. B.—It shall be done.

Enquirer.—It is difficult to judge without knowing all the circumstances; but your best way will be to write to the Exhibition authorities on one hand, and to the Secretary of the Photographic Society on the other hand.

A. R.—Thank you very much. Do not think we have forgotten the matter; but it, like other things of interest, stands over for the present.

F. W. E.—Perhaps you can get it from Marion, Soho Square; but there should be no difficulty in preparing it yourself if you follow the directions in Abney's "Instruction in Photography," published by Piper and Carter, price 3s. 6d.

Wm. M.—The idea may be a good one from a business point of view; but do you really think that you are justified in calling any kind of silver prints permanent?

W. S. (Zinco.)—We know of no method in which the necessity for making a negative is done away with; but you will find the best information on p. 770 of our volume for 1882. You can refer to it at our office.

W. N.—It is an oxidation product of pyrogallic acid, which is slowly formed, even in the presence of the alkaline sulphite. Notwithstanding all that has been said, it is better not to keep the solution very long after mixing. 2. It is advisable to make it slightly acid, as in the other case, because under these circumstances the solution will keep much better.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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A FEW REMARKS ON PAPER NEGATIVES.

Now that paper negatives are again engaging the attention of photographers at home and abroad, it might be well to point out one or two likely rocks upon which a novice may stumble.

Our first consideration, were we about to prepare a flexible film of this kind, would have reference to the paper itself; and putting aside just now various methods of rendering the same transparent before coating, we should content ourselves with seeking a material possessing some degree of strength when wet, as well as fineness of texture and hardness, since these conditions lend considerable aid in the production of a good negative. This will very probably be provided for in a little while to our complete satisfaction by those who have undertaken the manufacture of negative films. Indeed, we have seen very perfect negatives made on several occasions at photographic societies' meetings and elsewhere, upon papers emanating from commercial sources.

Assuming that a reliable material can always be obtained, and that the basis of the film is paper, it becomes a question whether printing should be conducted through the paper in its opaque condition, or made translucent by ordinary means. We do not think there is an enormous advantage apparent in using mediums which in course of time dry out, and of these castor oil alone, or dilute ether, with ether or turpentine, stands pre-eminent; neither is there any doubt about the messy condition of silver prints made from such negatives, unless the most scrupulous care has been exercised by the printer. The mixture sometimes used for rendering photographs transparent in the crystoleum process has certain advantages in this respect, since it does not so easily affect paper in contact therewith, and this is really a matter of great importance. It is composed of white wax two ounces, solid paraffin two ounces, Canada balsam five ounces. These are melted together on a water bath, and the mixture must be applied warm, or by means of a heated iron plate, as in the old waxing process. Those who do not like the trouble of waxing, can, in a great measure, supersede that process by the use of vaseline, applied cold, as recommended last week. Heating, however, in order to effect greater translucency, is liable to cause this substance to dry out in opaque patches; moreover, it is somewhat greasy.

Linseed oil is one of the best mediums that can be used, but under ordinary conditions it takes too long to dry. Boiling improves it in this respect, but not sufficiently to be of practical value; still, if the method suggested by Mr. J. Sutton at the last meeting of the London and Provincial Association be adopted, paper so treated will dry in three or four hours. His plan is to boil linseed oil of good quality until it has the consistency of treacle. During the period of boiling he applies a lighted paper to the top, and by this means burns off a good deal of the grease. Ordinary litharge (driers) and soap are then added. Mr. Sutton uses pieces of each about the size of a walnut with every pint of oil, after which the mixture is ready for use when required. It may be applied to any kind of paper when cold by means of a sponge, and yields when dry a very perfect result. The object of adding soap is to kill any grease that has not been burnt, and the proportion of litharge determines the time of drying.

At the same meeting, it was a matter of discussion how best to secure sharp prints from paper negatives, and many ingenious ideas were forthcoming, but they have yet to be proved by practice. We know the difficulties experienced in obtaining perfect contact with glass negatives, and some of us remember instances of fuzziness and double images with Calotype negatives, notwithstanding that pressure frames were at least as well made then as now. Perhaps the manufacturers of negative papers will settle the point, as they appear to have done with exposing arrangements in the camera. In the meantime, we advise any one who finds it difficult to print large paper negatives, to put on as much pressure as the front glass will stand, and print a small negative of equal density for the purposes of examination and guide to depth of printing, thus rendering it unnecessary to open the frame during printing.

◆

SOLID ELECTROLYTES.

Shelford Bidwell, writing in *Nature*, says :—

"In reference to Prof. S. P. Thompson's letter dated August 17 (*Nature*, vol. xxxii. p. 366), may I be allowed to say that I too have observed the secondary currents which are produced by cells containing sulphides of silver and copper after being disconnected from a battery? I mentioned the fact at the meeting of the Physical Society on June 27, in a communication which will probably be printed in the *Philosophical Magazine* next month. Indeed, the observation of these secondary currents preceded and led to the construction of the primary cells with solid electrolytes which I have recently described.

"I should be glad to know whether Prof. Thompson can explain the curious effect produced by passing a battery-current for a moment through a cell containing a mixture of sulphide of copper and sulphur between silver electrodes. When the cell is first connected with the galvanometer the usual secondary current appears, but in a few minutes, or even seconds, this current falls to zero, and is succeeded by a third, which is in the same direction as the battery current, and generally continues for some hours.

ACTION OF LIGHT ON SILVER CHLORIDE.

S. B. Newbury has published some details in the *American Chemical Journal*, and his remarks have been abstracted in the *Journal of the London Chemical Society*.—The author worked as follows:—In each experiment the quantity of silver nitrate necessary to produce 0·1 gram of silver chloride was dissolved in 100 c.c. of water, and a very minute excess of sodium chloride, dissolved in the same quantity of water, added. The finely suspended precipitate was exposed to light for varying periods, a current of air being continually drawn through the liquid to hinder subsidence and carry off any chlorine liberated. The precipitate was then collected on a Gooch filter and dried at 140°. Blank experiments (where light was excluded) yielded 0·0996—0.0997 gram silver chloride. After weighing, the exposed precipitate was treated with hot ammonia. and the residual silver weighed. Four experiments, where the exposure was continued for several days, gave :—

	Weight of precipitate.	Loss beyond experimental error.	Metallic silver.	Metallic silver calculated from loss.
1.	0·0967	0·0029	0·0054	0·0085
2.	0·0979	0·0018	0·0076	0·0054
3.	0·0969	0·0027	0·0078	0·0081
4·	0·0982	0 0015	0·0062	0 0045

When small quantities of stannous chloride are added to the mixture, before exposure to light, blackening takes place more rapidly, and subsidence is much slower and less complete. The grey precipitate obtained consisted almost wholly of finely-divided silver.

All attempts to isolate a subchloride from the blackened silver chloride precipitate proved unavailing. Ammonia, sodium thiosulphate, potassium cyanide, and sodium chloride were employed as solvents for the silver chloride, but in each case metallic silver only was left.

The author also endeavoured to prepare silver subchloride by Von Bibra's method of reducing silver citrate in hydrogen, and treating the residue with hydrochloric acid; but the resultant compound, when treated with a dilute solution of sodium chloride, only yielded metallic silver.

The author considers that these results support the view of the non-existence of the subchloride, as otherwise it must be assumed that subchloride is decomposed into silver and silver chloride by the action of a cold, dilute solution of sodium chloride, which is highly improbable.

◆

HOW TO SUCCEED IN TAKING GOOD PICTURES ON GELATINE PLATES.—No. V.

BY S. R. BOTTONE.

B. We now have to deal with the over-exposed. For this purpose we must have at hand two solutions, viz., weak ferrous oxalate, and aqueous solution of potassium bromide. The stale solution of ferrous oxalate, which has been used to develop other pictures (and which should always be set aside in small phials filled to the cork), serves very well for the weak oxalate. Should, however, no stale solution be at hand, the following will be found to answer admirably :—

Saturated solution of potassium oxalate	3 parts
Saturated solution of ferrous sulphate	1 part
Mix, then add water...	4 parts

Enough of this solution to cover the plate should be poured in the developing dish. Before immersing the plate in this developer, the solution of potassium bromide must be at hand. This is made as follows :—

Potassium bromide	2 parts
Water	100 „

If the picture be known to be only slightly over-exposed (say that the exposure has not exceeded twice the normal), no addition need be made to the weak ferrous oxalate except water, should the image appear too quickly. It must be borne in mind that a picture that develops rapidly is nearly always thin, and lacking in contrast. To obtain a good printing negative, the development must not be rapid, but slow and steady.

[In a paper recently written by Mr. Burton, while advocating the use of alkaline pyro, that gentleman speaks about ferrous oxalate giving "pretty" negatives, and then warns his readers not to be led astray by "prettiness" in the negative. "Handsome is that handsome does," holds good for negatives as for people, and no negative is worthy the name of "pretty" unless it will give a bold, vigorous, print, with plenty of detail, as well as contrast. All these qualities can be easily obtained with ferrous oxalate as a developer.]

On the other hand, close attention must be paid to the picture during development. The eyes must not be taken off the plate for a single instant, for it is surprising how quickly an over-exposed picture "greys" all over at a certain point of the development. Keeping one's eye on the shadows, as long as they remain clear, any amount of intensification of the high lights may be allowed, until the picture has attained its full printing density. Should, however, the slightest greyness be seen to come over the shadows, then the developer must be instantly restrained by the addition of the bromide of potassium solution in the proportion of 2 drams to each ounce of developer. This should check the greying at once; if this be not the case, another 2 drams may be added, and the solution kept rocking. This addition will retard the development very materially; nay, may even stop it entirely. If at this point the density be not sufficient, it may be necessary to add (a few drops at a time with continuous rocking) some fresh ferrous oxalate, made of the normal strength, viz., 3 parts of potassium oxalate solution to 1 part of ferrous sulphate. By these means a clear vigorous negative can be obtained from a plate which has received double the correct exposure.

When the exposure has been very much prolonged—say from 5 to 20 times what it ought to have been—a different mode of procedure must be adopted. To the weak developer above described must be added an equal bulk of the potassium bromide solution *previous* to the immersion of the exposed plate. The image will probably appear very slowly indeed; nay, with such a large amount of restrainer, may require the addition of fresh oxalate to bring it out at all. This is no disadvantage, and it is well not to be in too great a hurry to add fresh oxalate, nor to add too much at a time. A picture thus treated ought to take at least five minutes before it shows the barest outline of an image, and then gradually darken up to full intensity without any veiling of the shadows.

It must be remembered that, although a *thin* negative can be easily intensified by after-treatment, *if the shadows be clear*, and free from deposit, no amount of coaxing will ever produce a good printing negative from a plate in which the shadows are veiled. Intensification in such a case only intensifies the veiling, and the resulting print is as flat and poor as it was before intensification.

The chief point, then, in the development of over-exposed gelatine pictures, consists in restraining the development by means of a weak developer, if the picture be only slightly over-exposed; or by means of bromide of potassium added to the developer, if the over-exposure is very pronounced, the dose of bromide increasing with the increase of exposure, and in arresting the development by means of a large excess of potassium bromide *directly* the shadows show any tendency to "greying."

The "bromised" developer should not be mixed with the ordinary stale developer after use, but should be set aside in labelled bottles, for plates *known* to be over-exposed.

ARTISTIC FEELING IN PHOTOGRAPHY.

BY A. H. WALL.

Part V. (*Continued.*)—Figures in Landscapes.*

Where I find my own ideas forcibly expressed, I am always strongly tempted to quote, for it seems to me that my argument is thereby strengthened, and its effect increased. In this way I turn now to some comments on the present subject, picturesquely given by one who is in one artist with both pen and pencil, Mr. W. W. Fenn, but who is now, alas! blind.

In an article on looking for a landscape painter's subjects—before the infliction of that awful calamity he has so manfully born and courageously battled with, Mr. Fenn was himself a very clever landscape painter—he says:—

"Of late years, the blending of figures with landscapes has assumed a somewhat new phase, and its importance has most rightly been insisted on by such masters and founders of schools as Frederick Walker, George Mason, P. R. Morris, and J. C. Hook. These and their followers have shown that your true artist is an artist all round, who, if he desires to paint figures out of doors, must go out of doors to paint them; therefore, though we be searching for landscape subjects, such figures as are incidental must have more weight accorded to them in the composition, than sufficed in the days when a little old woman in the red cloak, or an ill-drawn ploughboy, were made to do duty for the human interest in the landscape. When rightly treated, too, what additional delight figures give! Those reapers, for instance, when we are among the corn—how interminable their combinations, and varied their actions! . . . . And that waggon, again—what a feature it is in the landscape if faithfully rendered! See it creeping over the brow of the hill, the hind wheels, as a sailor would say, 'hulled down,' and the foremost bay Dobbin of the team, gaily caparisoned, with worsted-fringed horse-collar, putting out all the strength of his great shoulder as he tugs vigorously, sharp and clear against the sky line. Cattle likewise cannot be overlooked, so long as our artist deals with field and farm, meadow, hill side, or leafy glade. . . They are made to look important, strong, and real, not merely as points of dark or light necessary to the balance of the landscape, but as part of it, and are studied and drawn with as much care as the herbage they browse, or the trees under the grateful shade of which they cluster. And sheep, or cows, oxen, horse, or dappled deer, are painted with force and truth. . Every incident of rural life, agricultural or marine, has now-a-days due weight given to it. . . Every operation of the field, as we see it going forward in ordinary daily country life, is now found to have treatable elements in it, and beside the stock, 'Hay-making,' 'Reaping,' 'Blackberry-gathering,' 'Hop-picking,' 'Ploughing,' &c., such unlikely and prosaic subjects as hoeing potatoes, pulling turnips, hooking beans, clearing the copse, hedging and ditching, cider-making, and a variety more, have all received due attention."†

Mr. Fenn points out, moreover, with equal truthfulness, that artistic treatment will give pictorial charms to such things as "the hideous iron-clad *Devastation*," or modern mowing, hay-making, reaping, and threshing machines, "the clod-crusher," and "the scarifier;" and characteristically adds: "The more difficulties these throw up in the painter's advance, the more merit in his victory over them, since it is one of his first duties to paint the manners, habits, uses, and customs of his time."

With regard to cattle, they may serve the purposes of a composition in a large variety of ways. As dark against light, they will give luminosity to a sky, or relief to a lighter object (as the dark horses do placed against a light one in fig. 1); as a herd in a more or less straggling line they catch the spectator's glance, and carry it into the picture, give emphasis to distance, or convey an idea of space where some accident of tone or colour would destroy it. Foreshortened, they give themselves and objects associated with them a more forcible appearance of relief. This may be seen in fig. 2, copied from an etching by a famous French artist, wherein a flat country and low line of the horizon have a tendency to lessen the appearance of space. The cows in this etching serve also in giving variety of line and expression.

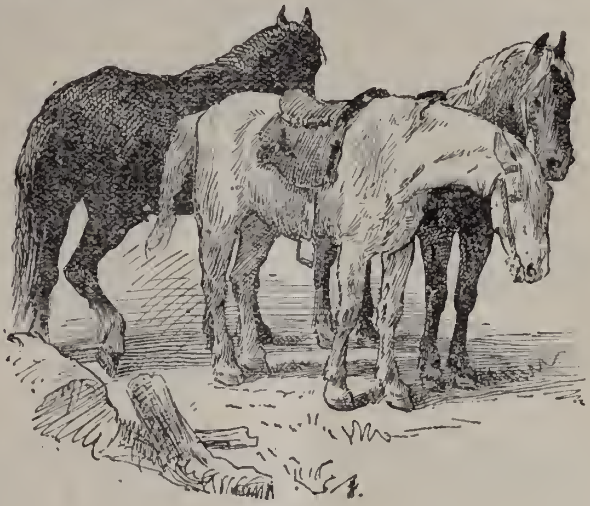

Fig. 1.

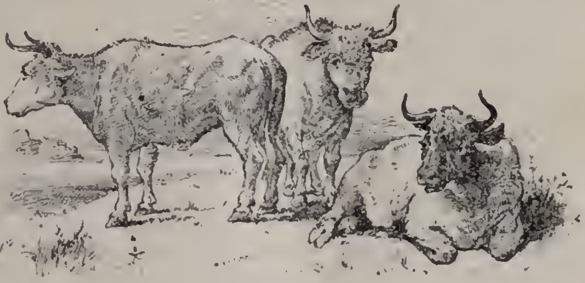

Fig. 2.

The photographer cannot well make separate studies of animals, as a painter does, to introduce into landscapes produced under the same conditions of light and shade; but it is therefore the more necessary that he should be watchful and observant. Cattle and horses, deer, birds, &c., are constantly in movement, and it will be hard indeed if his patience does not ultimately find its reward in some accidental grouping, which the utmost art of the most imaginative artist could not equal or surpass. The chief aim is to catch the different members of a group in sufficiently varied positions, on the right spot, where the light and shade upon them aids the general effect; or, in other words, composes well. Dogs belonging to the operator, and trained to obedience, may often be most advantageously made use of. I have even seen a well-stuffed animal made use of by a Welsh amateur photographer, whose landscapes were admirable examples of good art. I have quite forgotten his name. Specimens of his work were shown me either at Presteign or New Radnor, in Radnorshire, where some extremely beautiful scenery invites the camera.

As an example of how dogs may be used to create a point of interest for the eye, I add a sketch of a couple of deer-hounds (fig. 3) coupled, and rising against a mountainous background on a crag softened by grass and heather. These are from one of Sir Edwin Landseer's slight sketches, still, I believe in the possession of John Fowler, Esq. The vivacity and brightness of a landscape may be considerably increased by the judicious introduction of light and dark figures; and again, they are particularly useful where a scene otherwise good, and suitable chances to be spoilt for pictorial purposes by some portion of it which is prominently blank or empty, and uninteresting, representing, as an old artist friend of mine says—space to let.[*]

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* Continued from page 518.

† From an article in *Good Words*, November, 1875.

Fig. 3.

Some excellent examples of well-used landscape figures may be found in the works of old Dutch masters. Some of Nicholas Berghem's pictures are specially remarkable in this way; and if a photo-art student, in the course of his travels, should have the opportunity of seeing any of them, he will do well not to miss it. We are told that Berghem acquired that art of grouping figures in his landscapes, for which he was conspicuous, while studying under Peter Grebber (as he obtained his knowledge of colour by studying, under his father, flowers, fruit, and fish), the historical and portrait painter. The hot panting sunlight which lives on one of his canvases owes its expression largely to the positions of the cattle, which are wonderfully expressive of heat's exhausting influence; and no man better knew the value of a black or white horse, dark or light cattle, in the composition of light and shade. The skilled critical observer often marks, with delight, what increased value they were often made by his knowledge to give the delicate and subtle gradations of aërial perspective. His etchings are, from our point of view, quite as valuable to the student as his paintings are, and, like the rest of his productions, have more of the Italian feeling in their treatment than the paintings of his countrymen generally.

The landscape figures of Jacob Ruysdael—Berghem's contemporary—will also be found very suggestive, especially in the way in which they are made to convey the proportionate sizes of the objects associated with them. In some of his forest work, the figures are not his own, but were painted in by Berghem. This was the case in a picture of which many engravings exist—his "Forest Crossed by a River." Some of the figures in his pictures were put in by Wouvermann.

By way of final illustration in this section of my subject, I append a fourth sketch (fig. 4), one of my own Epping Forest series, in which figure some of the numerous wild deer now once more to be found in its sylvan depths. It is seldom that these picturesque animals, so thoroughly in keeping where a bit of wild woodland is concerned, do not group themselves effectually for pictorial purposes. Their timidity prompts them to make curious investigations, and if you want to catch them in their natural attitudes and haunts, you must carefully plant yourself and your camera so that the wind blows not from you to them. Directly this is the case they abruptly disappear. You must also approach their haunts with extreme caution and quietude, for they are quick to hear as to scent your presence, and cunning enough to go about and test by their more critical sense of smell any suspicious sound or sight which has disturbed their confidence. In Epping, if you want to catch a glimpse of these deeply interesting relics of the old deer the Romans first introduced, your better plan will be to consult one of the keepers, who will tell you at once where you are most likely to meet with them. So far as I know, they are all courteous and civil men; I can, however, only speak from personal experience of one, the elder Luffman, who is certainly one of the most genial and sympathetic of forest keepers, and the descendant, I believe, of a race of bold and hardy Hampshire foresters.

Fig. 4.

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AN AMATEUR AFIELD WITH CAMERA—HIS MUSINGS.

BY J. GALE.

The clouds hang heavy on the adjacent hills, shrouding their tops in a cloak of mist; they now and then roll down and envelop the lower slopes on which I am in a fine rain, and presently a steady downpour.

Fitful gleams of light (almost sunshine) anon break out, and the near landscape—all among the trees, and gables, and gardens of the village—is bathed in a delicious soft light, charming to the artist's eye, and perfect for near photographic studies.

The wind lulls; and but for the sighing and soughing in the trees on the higher ground, it would appear to promise an almost perfect day for the camera.

I would away towards the hills, where the shepherd will be taking his flock through the sheltered gorze of the downs about this time; or to the meadow, where the herd will be reposing, half of them lying down, and the other half contemplating it; or to the adjacent millpond, where are lovely foreground studies of docks, and arrowhead, and tangle, with stretches of the water-ranunculis at the far end, giving the horizontal lines just wanted for the picture; there, may be, advantage could be taken of occasional lulls in the wind. But I have other and set work to do, and both time and plates are limited for getting it done.

That bent old man whom I saw last evening in smock frock, climbing to his cottage door, with a fagot on his back, and a stick in his hand, has promised to "oblige" me, and stay at home to be ready to be in the group at the neighbour's doorway up the village. The little damsel, who almost blushed when told by her mother she was to go with the gentleman to have "her likeness took," and is already dressed in attire suitable to my mind, if not to her's or her mother's, and has peeped over the garden wall from among the roses and tulips and wallflowers twenty times at least, would be sadly disappointed if she saw my camera disappear from the shelter of the neighbouring porch; the pail and broom are already in position, and the inverted porridge-pot and other inanimate accessories.

---

[*] I shall return to this subject some day in connection with a power for combating such defects, which the photographer acquires in some cases by raising or lowering his point of view, and consequently the line of the horizon, whereby a scene undergoes some remarkable and important alterations, not only in one respect, but in many, especially where water is concerned.

But the elements are not yet sufficiently settled to bring my group together; a breath of wind would sway that bit of clematis which is so important in the foreground, and those budding leaves of the walnut overhead must be absolutely still. So I stroll away quietly and unobserved to have a look round, for there are other subjects in the neighbourhood claiming my attention. That turn in the road at the bottom of the village, with its background of trees, would make an exquisite setting for a foreground group.

I turn to look. Yes; it wants but a laden timber waggon with a team of rustic horses just halting that the carter may see that the skid is all right, and the picture would be a perfect one.

I have already made enquiries, and nobody knows when it is likely a timber waggon will come along this way, nor can they say when any other traffic will pass, except the butcher's cart from the neighbouring town twice a week, and the postman on his tricycle every morning at seven o'clock. I begin to regret not having taken the dairy-farmer, whose cows go through the village daily, at his word, and who offered to drive his herd that way, or to do anything else to oblige a stranger. Such is the natural politeness of the folk hereabouts.

But what are these on the wet chalky bank, by the roadside? Footmarks, and of sheep, evidently! The flock must pass here, probably daily, on its way from the fold to the downs. I enquire, and ascertain my surmise to be correct. The shepherd must be interviewed, and negociations entered into for arresting the progress of the sheep; the landscape will be charmingly lighted at the time when they pass.

But I must hie me back, not, however, to photograph—for the weather does not improve—but to keep the best faith I can with the people left in the village.

There is my little lassie, craning her neck over the tulips, and the pansies, and the big peones, more disappointed than I am, perhaps, at the unpropitiousness of the weather; and there in the chimney corner still sits my bent old man, stick in hand and bundle by his side, gazing into the embers of the fire on the hearth, which the old-fashioned brightened iron dogs, and the quaint 17th century chimney back, still adorn—apparently wondering, as I left him, why the gentleman should want to take his "loikeness" and make him a present, too. "I be'ant got no money," had been his remark, on making overtures to him in the first instance.

Ah, me! the little lassie, if not my bent old man, must put up with disappointment for to-day.

I will leave the camera in charge of the cottager, and take my way home to lunch by the copse, where is a charming view of oak, and beech, and larch, if only suitable figures could be introduced; without them, like most photographic landscapes, it will be tame and pointless.

I indulge my imagination once more in the timber team, which is hardly likely, however, to be hereabouts at this time of the year. But there on the ground is a bit of oak bark. What brought that there? Another piece, and evidently fresh dropped; horses' hoof-marks in the wet ground, and wheel tracks; there has been bark carting here.

I pursue my way in search, and presently, all on a carpet of blue bells, come across the stacks of bark stood on end, ridged with half-round lengths of bark to throw off the wet, ready for carting away; and there are evidences of other stacks having been recently cleared; but no bark waggons with rusty grey horses, and carters in smock frock and gaiters, and slouching hats. A woman at the cottage back in the road tells me, however, they are only gone to the town with a load, and will be back in a couple of hours. The sun begins to shine and the wind to lull, or apparently so in these enclosed woods.

I would return to the group in the village, but the sun would now be just at my back, and what landscape or view would be worth taking under such conditions? So I arrange for having the camera on the spot in time for the return of the waggon. It arrives in due time; not, however, "the broad wheeled wain" with wide sweeping curvilinear sides, smock frocked carters, and rusty grey horses, but the squire's trim waggon and team, and two neatly clad and round-hatted farm servants.

The poetry of the thing departs; the lighting is unsatisfactory, the horses won't be managed, the men want to stand their way instead of mine. I am disheartened. I expose a plate on the view, but shall probably never care to develop it. I certainly make no promise to let my sitters see a "draft" of it, as they call the finished print. The day is a blank, as far as photographic results go; but I hope for a better day on the morrow, and retire for the night.

I awake early—very early—with the perfume of roses, which grow in great clusters over the front of my cottage abode, and repair to the open casement. A sight greets me which dwellers in a hilly country only can witness. The sun—scarcely yet above the horizon—illumines with a pale green tint the sky, studded with grey chequered clouds lighted only feebly on their under sides. My near valley below, where the opposite hillside is clothed with a beech wood, is now filled with a dark mass of cloud, above and beyond which just the tops only of the trees can be seen against the pale sky. It is rolling down perceptibly towards the weald.

The higher downs, now presenting a wonderfully clear outline, hold in thin hollows (and there are many hollows hereabouts) masses of white mist, and these are travelling towards the weald below. Some of them are coming by way of my near valley (unless evaporated by the sun or dispersed, as "new light dispels the dark"), and will contribute to the shrouding of the vast weald in a dense fog.

Shall I rise and go out and plunge into this grandeur and solemnity? As yet there is no sign of animated nature being about. I would not be the first to disturb a scene so solemn. I will just lay me down for a time and think upon it, and will look out again presently. I am awakened from my oblivion by the many signs of breaking day; the swallows twittering on the adjacent chimney; the martins' cozy talk as they build their mud nest under the eaves within reach of my window; the starlings' incessant visits to their young in the gable end. Sounds of rumbling cart wheels and rustic voices are heard. I must be up!

All would appear to promise a bright and gladsome day; not quite all, for there down in my valley is singing in his loudest and best strains the storm-cock.* I know his voice too well; he would not be singing so unless he thought that the slugs will be out with the coming rain, and the worms and the snails. He may be mistaken, but he is not generally.

The storm-cock is right. The sky becomes overcast, the wind sets the trees in motion, a steady rain falls, and there is but little prospect of progress with my photographic studies. I must abandon them for the present, and away to other and sterner engagements.

---

* The missel thrush.

METEOROLOGY FOR PHOTOGRAPHERS.

BY J. VINCENT ELSDEN, B.SC. (LOND.), F.C.S.

Chapter V.—Atmospheric Moisture—Hygrometers—Influence of Vapour in the Atmosphere—Moisture and Photography.

Whether in the invisible form of aqueous vapour, or in visible condition of clouds, mist, fog or rain, water is one of the most important of the constituents of the atmosphere from a meteorological as well as from a photographic point of view. Since the complete discussion of this part of the subject will occupy our attention for several chapters, it will be better in the present article to confine ourselves to the consideration of the invisible form of atmospheric moisture.

It is well known that all the aqueous vapour in the air has been derived originally from the surface of the earth. The atmosphere, indeed, has been compared to a large distilling apparatus, of which the sun is the furnace, and the sea the boiler. The amount of water which is thus drawn up in the form of vapour into the air may be roughly measured by the quantity which returns from it to the earth in the condition of rain and other forms of atmospheric precipitation; for it is probable that evaporation and condensation are nearly balanced in nature. The quantity of water which evaporates in a year can be still better estimated by the discharge of rivers, which depend entirely for their supply upon atmospheric moisture.

Unfortunately, it is not an easy matter to determine with any accuracy the quantity of water which passes into the air by evaporation, especially as the process is continually going on from every exposed surface of water upon the earth. The rate at which evaporation proceeds depends principally upon the temperature of the air, and the amount of vapour already present in it; for a given mass of air, at a certain pressure and temperature, can only contain a certain quantity of water in the form of vapour. When this limit is reached, the atmosphere is said to be *saturated*, and evaporation then ceases. For example, one cubic foot of air at 40° F. can contain only about half a grain of water vapour; but at 60° F., the same bulk of air can contain three and a half grains. As an example of the rapidity with which evaporation can proceed, it was calculated by Mr. Binnie that as much as four feet of water evaporated from a reservoir at Nagpoor during the dry season of India. Mr. C. Greaves found that taking an average of fourteen years, the rainfall of London was 25·721 inches, and the evaporation 20·613 inches, the evaporation exceeding the rainfall in only three years during that period.

We have said that when the point of saturation is reached, evaporation ceases. At this point any diminution of temperature or increase of pressure will cause some of the invisible vapour to condense into the visible form of cloud or rain. As both evaporation and condensation are continually going on, the amount of water vapour in the air is continually changing. It is probable, however, that the air never becomes so dry as to be entirely tree from vapour, and however little vapour there may be present in a given quantity of air, it will be sufficient to saturate it if the temperature is sufficiently reduced. Even in such an arid region as Arabia, as little as 10 per cent. of the total saturation is a rare occurrence. The true meaning of dampness or dryness of the atmosphere is not the absolute quantity of water vapour which is present in it, but the ratio of the vapour present to the quantity which would saturate the atmosphere at the same pressure and temperature. In other words, damp air is that which is near its point of saturation, while dry air is that which is far removed from its point of saturation; so that the air in winter is damper than in summer, although it does not contain so much water vapour. The relative humidity is greatest in winter, while vapour pressure is greatest in summer. As a given mass of air becomes cooler it becomes at the same time moister; and conversely, by raising the temperature, moist air becomes dry. It is of the utmost importance that this fact should be clearly understood, and we shall, therefore, return to it in explaining atmospheric precipitation.

The determination of the quantity of moisture present in the atmosphere is called *Hygrometry*. It is evident, however, that hygrometers can do no more than indicate the local humidity at the surface of the place of observation, and that they give no information respecting the moisture of the higher levels of the atmosphere. One of the oldest forms of hygrometer is that of Daniell, the action of which depends upon the principle that if a glass bulb be cooled down below the temperature at which the air becomes saturated with vapour, some of this vapour will be condensed upon the glass. Daniell's hygrometer consists of two bulbs connected by a tube bent twice at right angles. One bulb is blackened and contains ether, as well as a thermometer to register the temperature; the other bulb is surrounded by linen, which is kept moist with ether. By the evaporation of the ether the temperature is lowered, and the vapour of the ether in the unblackened glass condenses, causing evaporation of more ether from the blackened bulb. By this means the temperature of the blackened bulb becomes lowered, until moisture is deposited upon it. The instant this occurs, the temperature is noted, and this is called the *dew-point*. Technically speaking, the dew-point is the temperature at which the vapour present in the atmosphere exerts its maximum tension. In more familiar language, it is the temperature at which the atmosphere becomes saturated with vapour, and condensation begins to take place. Regnault's hygrometer (fig. 1.) is an improvement of the above form, the glass bulb being replaced by silver cups, and the evaporation being accelerated by an aspirator.

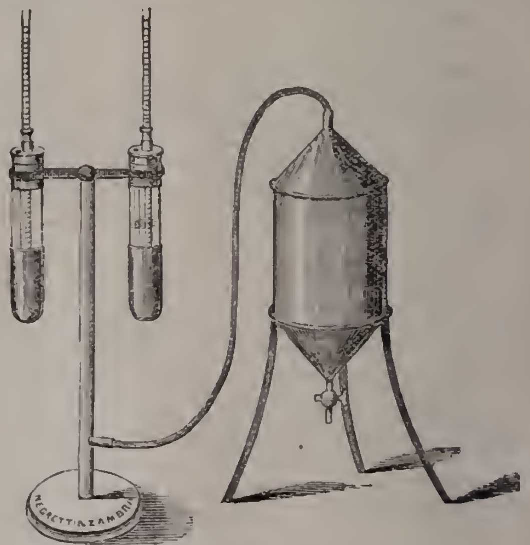

Fig. 1.

Dine's hygrometer is a modern form of great simplicity. Cold water from a small cistern is made to flow beneath a plate of black glass. A thermometer indicates the temperature at which moisture is deposited on the surface of the glass plate, and if the flow is stopped, and the temperature noted at the moment of the disappearance of the moisture, the mean of the two observations gives the dew-point with great accuracy. This form of instrument would be especially suitable for drying-rooms, as it is extremely easy to manage. Other hygrometers depend upon the expansion and contraction of substances when wet. Thus ropes contract, but hair becomes elongated, when wet. The cat-gut hygrometer is based upon this principle. A piece of cat-gut is kept fixed at one end, while the other passes over a wheel carrying an index. The cat-gut is kept stretched by a weight, and, as it lengthens or contracts, the index is carried round a dial. Such hygrometers are specially useful during frost. A somewhat similar form has been suggested by Mr. W. B. Woodbury. A piece of carbon tissue four inches long and one inch wide is supported horizontally in a notch, a card-board scale being placed behind it. With a moderate amount of moisture in the air, the tissue remains horizontal, but curves downwards in very damp weather, and upwards when very dry.

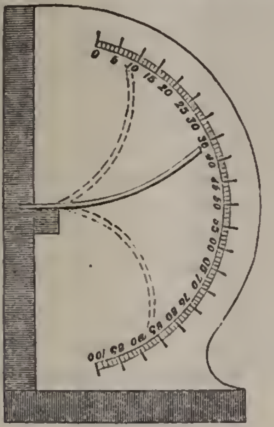

Fig. 2.

The apparatus which is almost universally employed in the present day for meteorological purposes is Mason's Wet and Dry Bulb Hygrometer (fig. 3). It consists of two ordinary thermometers, mounted a few inches apart, the bulb of one of them being kept moistened by a piece of muslin dipping in a small reservoir of water. It is evident that the rapidity of the evaporation from the wet muslin will be determined by the amount of moisture present in the air. If the air is saturated, no evaporation takes place, and consequently the wet bulb is not cooled, and the readings of the two thermometers are identical. The drier the air the faster evaporation proceeds, and the more the temperature of the wet bulb is lowered. From the readings of the wet and dry bulb hygrometer can be deduced the temperature of the dew-point,* the elastic force of aqueous vapour, and the relative humidity of the air. For this purpose, Glaisher's "Hygrometric Tables" should be used, as well as Marriott's "Table for facilitating the determination of the dew-point from observation of the dry and wet bulb thermometers." Knowing the temperature of the dew-point, the elastic force of aqueous vapour is readily obtained from the tables, and the relative humidity can be calculated by dividing the elastic force at the temperature of the dew-point by that at the temperature of the air. Thus, if the dry bulb read 56°, and the dew-point is 46°, the elastic force corresponding to these two temperatures will be found to be ·449 and ·311. Dividing the latter by the former we get ·69. Taking saturation as 100, we get 69 for relative humidity. The following table, given by Mr. Marriott, will be found useful for giving at a glance the relative humidity from observations of the wet and dry bulb readings.

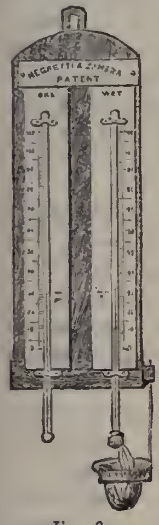

Fig. 3.

Difference between Dry and Wet Bulb Thermometers.	Temperature of the Air.									
	30·0°	35·0°	40·0°	45·0°	50 0°	55·0°	60·0°	65·0°	70·0°	75·0°
°	%	%	%	%	%	%	%	%	%	%
1	83·8	90·2	91·5	92·0	92·5	93·1	93·4	94·0	94·0	94·5
2	69·5	81·4	83·8	84·9	85·6	86·6	87·5	88·3	88·7	89·2
3	57·5	72·5	76·1	77·9	79·2	80·6	81·9	82·5	83·4	83·9
4	47·3	65·2	69·6	71·9	73·4	75·1	76·4	77·3	78·3	79·1
5	38·9	57·8	63·2	65·9	67·6	69·7	71·2	72·4	73·5	74·7
6	32·3	51·5	57·9	60·5	62·3	64·4	66·4	67·9	69·2	70·4
7	27·5	45·6	52·2	55·5	57·6	60·0	62·0	63·7	64·8	66·4
8	22·8	40·2	47·0	50·5	53·2	55·4	57·7	59·3	60·8	62·3
9	18·0	35·3	42·5	46·5	49·0	51·7	53·7	55·6	57·2	58·6
10	15·0	31·9	38·1	41·8	44·9	47·8	50·0	52·0	53·6	55·2
11		28·4	34·6	38·1	41·3	44·1	46·3	48·5	50·1	52·0
12		25·5	30·8	34·4	37·9	40·9	43·2	45·2	47·1	48·8
13		22·5	27·5	31·1	34·3	37·6	40·2	42·1	44·1	45·7
14		20·1	25·1	28·4	31·6	34·9	37·3	39·2	41·2	43·0
15		17·6	22·7	25·4	28·5	32·1	34·7	36·6	38·3	40·4

The observation of the dew-point in the evening has a great practical importance, for it has been observed that the temperature rarely falls below this point all through the night. If, therefore, the dew-point in the evening is above freezing point, it may be reasonably expected that there will be no frost.

If daily curves are drawn, showing the diurnal variation of the relative humidity of the air, it is found that the shape of these curves is almost exactly the reverse of the temperature curve. Thus the maximum humidity occurs from midnight to 4 a.m., when the minimum temperature exists; and the minimum humidity is at 2 p.m., the time of the maximum temperature. In places near the sea-coast, however, especially in calm weather, there is a slight exception to this law, the humidity sometimes increasing even after the diurnal increase of temperature has commenced; while in the very dry climate of Central Asia, the humidity is greatest in the day-time.

We have now to consider the influence of aqueous vapour in the air. There is no doubt that vapour at a high level plays an important part in the physics of the atmosphere; but, unfortunately, we know but little of the vertical distribution of atmospheric vapour. It is certain that it diminishes rapidly as we ascend, and it has been calculated that one half the quantity of vapour in the air lies below the height of 6,000 feet, and at 20,000 feet it has diminished to one-tenth the quantity present at the surface. Observations made in ascending mountains, as well as from balloons, show that there is a want of regularity in the vertical distribution of vapour, and that vapour-laden planes sometimes alternate with drier strata. The most striking influence of vapour in the atmosphere is its power of absorbing heat rays. Aqueous vapour, although invisible, acts as a screen, diminishing the heat in the day-time, and checking loss of heat from the earth by radiation at

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* Prof. Apjohn gives the following equation for determining the dew-point:—

$$f''=f'-\frac{t-t'}{87},$$

where f''=tension of aqueous vapour in the air, the temperature corresponding to which is the dew-point; f'= tension of vapour corresponding to wet-bulb reading; $t-t'$=difference in reading of wet and dry bulb. For temp. below freezing point the equation becomes—

$$f''=f-\frac{t-t'}{96}.$$

night. In the polar regions and on high mountains, where there is but little aqueous vapour, the heat of the sun is most intense; and in the dry climate of the Sahara, the excessive heat of day is succeeded by such a rapid loss of heat by radiation at night, that severe cold is felt. In short, aqueous vapour diminishes the sun-warmth by its absorptive power, but it increases air-warmth by checking terrestrial radiation.

We will now briefly sum up the influence of atmospheric moisture in photography. Several of the substances used in photographic processes are *hygroscopic*—that is to say, capable of absorbing water from the atmosphere. Calcium chloride possesses this property in a most marked degree; but even gelatine is influenced by it. One of the chief difficulties in carbon printing consists in drying the tissue at the proper rate, neither too quickly, as would be the case in very dry air, nor too slowly, as happens when there is an excess of moisture in the atmosphere. The hygrometer will supply the necessary information as to the prevailing atmospheric conditions, and the tissue may then either be immersed longer in the sensitizing solution, or more moisture may be blotted off, according as the atmosphere is dry or moist. A very dry atmosphere may be improved by sprinkling water on the floor; while a damp atmosphere may be, to a certain extent, remedied either by putting the air in motion, or raising its temperature, or by the use of a hygroscopic substance such as calcic chloride, sulphuric acid, or glacial phosphoric acid. This latter method is preferable when the air is not renewed, as in a closed room, or an unventilated drying closet. Not only is carbon tissue influenced by damp, but even gelatine plates and carbon opals are liable to mildew, and become rapidly spoilt if kept in too moist an atmosphere. Other effects of aqueous vapour will be described later under the headings "Climate and Photography," and the "Optical Conditions of the Atmosphere." In the meantime, we shall pass on, in our next chapter, to the visible forms of atmospheric moisture.

(*To be continued*).

Notes.

As one among the ever-recurring questions that we are asked we may instance, "What is the best way of fastening unmounted prints in an album?" Instead of referring to the score or so of "best ways" which one may find described in the back volumes of the Photographic News, let us quote from a correspondent's letter: "At one time I used to employ gum—just a touch at each corner—but now I invariably use the old-fashioned paste wafers. In this case there is no fear of the adhesive material spreading; and by applying a knife to the under edge of a wafer it can be lifted without any fear of tearing the photograph; so re-grouping becomes easy."

M. de Lesseps, as is well known, loses no chance of proclaiming his faith in the ultimate completion of the Panama Canal; and though, strangely, few details are made public concerning this great work, he has, it would seem, very sound reasons for his lively belief in the undertaking. The interest he takes in the work is known to be very great; and, by his direction, photographs are taken daily of the works at all the chief points, and in due course forwarded to him. He thus receives by every mail not only full written details of the state of affairs, but an infallible photographic diary, so to speak, of the progress of the excavators, of whom an army at least 20,000 strong are at work at one point or another along the line of the projected canal.

The latest batch of photographs received by the veteran de Lesseps, exhibiting the exact position of the works at Chagres, Culebra, Emperador, Corosita, and other points, show clearly that on the 18th of August last very nearly two-fifths of the enormous work had been completed. Especially interesting are the views which have been taken of the excavation at the Emperador Docks. If M. de Lesseps wants more capital for his scheme, he could not do better than issue an illustrated prospectus from which the public could see how vast and important a portion of the canal works has been already accomplished.

The *Graphic*—long looked upon as one of the strongholds of the wood engraver—issues this week a supplement containing no less than fifteen photographs in block form.

The story of the supplement consists of some pleasantly-written gossip about the doings of animals, the illustrative photographs being Meisenbach blocks from negatives taken at the London "Zoo" by C. J. Hinxman.

Among those of exceptional interest as examples of animal expression may be specially mentioned the Nubian lion—stretched out at full length, in his cage—and the Polar bear; but the head of a tiger, with his tongue hanging out, just as one may often notice in the case of a cat, should not be overlooked. The general view of the Gardens, with which the article opens, strikes us as comparing favourably with the best wood cuts that we have seen.

In a report of the annual fête of the London and South Western Railway Athletic Club, the *South London Press* deems it of sufficient importance to mention that "Mr. Goodden, booking clerk at Putney Station, and known as the South Western artist, photographed Mr. Scotter, the general manager, during the day." The natural inference from this little fact is, that photography has its uses as a social leveller. We have always believed that to the under officials of a railway, and especially to such an insignificant individual as a booking-clerk, the General Manager is a very awful personage indeed, only to be addressed with bated breath, and approached with the utmost humility. It really seems subversive of all that is proper and deferential to hear of a booking-clerk photographing the General Manager, and one scarcely dares to think of the latter meekly obeying the orders of the former to cross his legs, fold his arms, turn his head a little to the left, fix his eyes on some trivial object, and, above all, to put on as pleasant an expression as he can!

The papers describe, as the very latest scientific novelty, the *megaloscope*, an apparatus for illuminating and photographing the interior of the stomach. The invention of such an instrument was alluded to in these columns nearly two years ago.

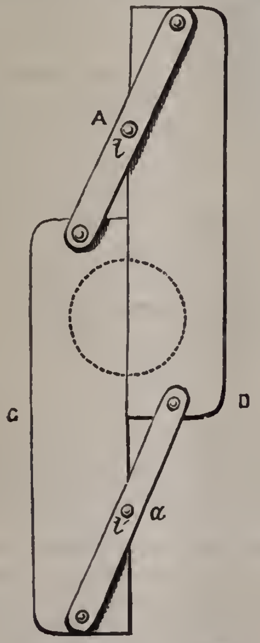
There was a rare hunt for photographs of Mr. Parnell last week. The cartoonists of *Punch* and *Judy* had both fixed upon the member for Cork as their subject, and as Mr. Parnell's *penchant* for perpetually altering his appearance was known, it was necessary to discover his latest "fad." It turned out that since he was last represented pictorially he had grown a beard, and so he was represented by Mr. Tenniel and Mr. Boucher. But it was almost a pity they did not stick to Mr. Parnell's portrait as it is best known to the public. As it was, everybody has been asking what Mr. Punch's cartoon meant last week, for nobody recognised the hirsute Home Ruler.

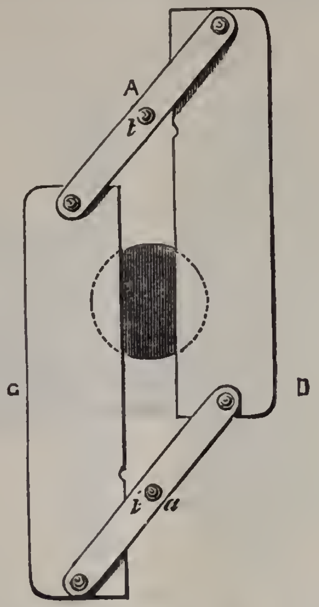
Something more than a new form of card mount is needed to galvanize such a new activity into the portrait studios as followed the introduction of the carte-de-visite; but without hoping to do more than stimulate business to a very moderate extent, it is not improbable that many of our readers may introduce portraits on rhombic cards as suggested by H. Eckert, of Prague.

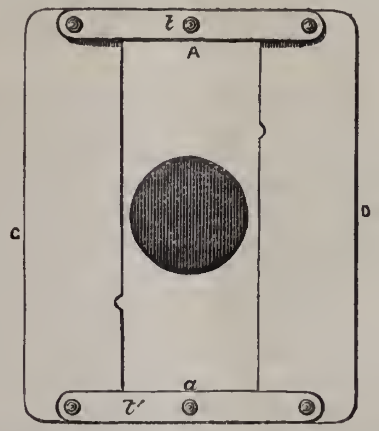
The suggestion of Herr Eckert to call the new introduction—which recalls the quarried windows of a church—the chonchoid portrait may, perhaps, be acceptable in this country, although, perhaps, the shield portrait might be a more acceptable name.

Writing from Geneva, M. Calame describes a shutter, the action of which closely resembles an ordinary parallel ruler, and appears well adapted for placing behind the lens.

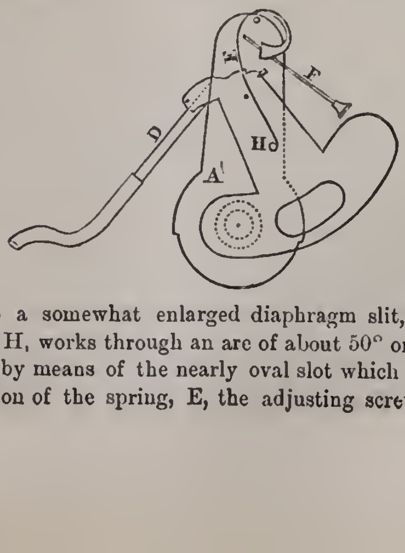
The essential mechanism is enclosed between two boards, and the subjoined wood-cuts show the apparatus when closed. Connected with one of the axes, A or *a*, is a motor apparatus consisting of a drum and spring, the spring being either of india-rubber or of steel, and when this is allowed to act by releasing a catch, the shutter opens as shown above, and again closes, but with that wing down which was originally up.





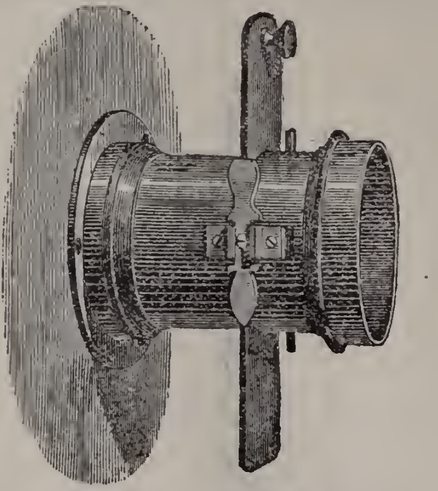


Another shutter has been devised by M. Dubary, of Angoulême, and the accompanying cut gives almost sufficient explanation of its action. On the plate, A, which fits into a somewhat enlarged diaphragm slit, a flying shutter, H, works through an arc of about 50° or 60°, and exposes by means of the nearly oval slot which is shown. The action of the spring, E, the adjusting screw, F, and



the pneumatic release, D, require no elucidation other than the diagram.

Yet another shutter and release, a simple drop through the diaphragm. It is sent out as an attachment to a double objective, which Liesegang supplies under the name "Leukoscope." The drawing may serve as a guide to those who may wish to fit their own lenses with such a shutter.



At the coming Anthropological Congress at Rome, what may be called "Criminal Anthropology" will form an important feature of the discussion; and amongst the exhibits collected to illustrate this section, photography will play a striking part. The authorities of all the chief European powers have been applied to, and the result is the most comprehensive collection of criminal portraiture ever brought together. In all cases, too, in which the actual articles cannot be borrowed, photographs of the burglars' tools in use in various countries, and of what may be called criminal chattels generally, will be on view. In short, what with criminals' skulls (there will be 700 of these at Rome), casts of criminals' brains, crime maps, criminal statistics of all kinds, and the comprehensive collection of criminal photography aforesaid, Criminal Anthropology will be studied at the approaching Congress under favourable conditions never yet equalled.

A photograph has been the cause of serious inconvenience to five unfortunate English tourists in Germany. It seems that the Frankfort detective police "wanted" a certain person, and suddenly discovered there was a great resemblance between the photograph of the criminal and a Mr. Wimple, one of the five Englishmen. Mr. Wimple pointed out that the photograph was that of a man at least sixty years old, while he was only thirty-seven, but this difference could not be perceived by the detectives, who had made up their minds they had got hold of the right man. Every one who has had anything to do with the detective police knows that when they get an idea into their heads, nothing short of a surgical operation can remove it, and so all Mr. Wimple's protestations only strengthened them in their opinion, and away he and his four companions were hurried off to prison. Having placed the unlucky tourists under lock and key, the police went to Homburg, where the luggage of their captives had been left, and there they discovered they had made a mistake. Of course the five gentlemen have been released; but how they must bless photography!

The enterprising landlord of a hostelry at a southern marine resort, which has only to be better known to be more generally appreciated, has improved on a method of advertisement which Swiss hotel keepers have long turnedto account. He has issued a little *brochure* in which are not only neatly executed photographs of his dining salon, his ladies' drawing room, smoking room, conservatory, &c., but also some capital views which, as he takes care to explain, are to be seen from certain of his bed-room windows, without extra charge. But perhaps the most artful of all the illustrations is that of the hotel bar, in which is seen the most charming presiding Hebe in the act of dispensing a "split."

The statue recently erected at Chalon-sur-Saône as a recognition of the circumstance that Nicéphore Niépce was the first to fix the image of the camera-obscura, is here represented.

It is of bronze, the model having been made by Guillaume, and the casting by Barbedienne.

The beauty and perfection of photographs by the methods of Daguerre and Talbot went far to eclipse the merits of Niépce as the discoverer of photography; that is to say, the first who made a fixed reproduction of the camera picture, and described his method of doing it.

The revised constitution and byelaws of the Society of Amateur Photographers of New York is to hand, and may well serve as a model for similar societies. There are now about a hundred active members. F. C. Beach is President, and the remaining officers are Dr. Janeway, C. W. Canfield, C. W. Dean, and J. S. Rich.

Among the good features of the organization may be mentioned the fact of the library, dark-room, and other belongings of the Association being available at all reasonable times for the use of members. All the more important chemicals used in development are also provided. Any body of persons intending to form an amateur society would do well to write to the Secretary (C. W. Canfield, 1321, Broadway) and ask for a copy of the pamphlet we have before us.

Patent Intelligence.

Applications for Letters Patent.

10,205. Ernest de Pas, 68, Fleet Street, London, for "An instrument for examining the internal organs of the human or animal body, and for photographing the same."—*Boisseau du Rocher*, France)—28th August, 1885.

Patent Sealed.

6359. Benjamin Constant le Moussu, 28, Southampton Buildings, Chancery Lane, W.C., for "An improved process for producing plates for surface printing."—23rd May, 1885.

6368. James Robertson and Douglass Robertson, 96, Buchanan Street, Glasgow, for "An improved mode of obtaining photographic negatives or positives and apparatus therefore."—23rd May, 1885.

PHOTOGRAPHIC EXPERIENCES OF A NATIVE OF THE FAR EAST.

BY S. K. LAWTON, JAFFNA, CEYLON.

Most of your readers in large European towns possess the facilities for obtaining the necessary photographic materials and appliances within the distance of a short walk, and when they meet with difficulties, they can obtain advice and assistance by merely stirring from home. Such will be interested in the following experiences of a brother student in a remote village in distant Ceylon, from whose thatched laboratory amidst palm groves, with paddy fields, and many Hindu temples on every side, rise daily the unsavory fumes sacred to the votaries of the "black art."

About twenty years ago, while a school boy, I was shown a glass positive produced at Kandy, about two hundred miles away, where the nearest photographic studio was, and even now is, located. The picture seemed so effective and marvellous, that a strong desire took possession of me to become able to produce something like it. I had then access to a collection of old books, and while rummaging it for books of adventure and other boyish literature, I lighted upon the first three volumes of the "London Saturday Journal," in several numbers of which for the year 1839, the Editor announced with a joyful flourish the birth of our beautiful art, and gave details of the processes both of Talbot and Daguerre. In the issue of the 30th March appeared a full description of Talbot's "Photogenic Drawing," the first published photographic process which, "with a liberality worthy of a philosopher and lover of his country," the inventor had communicated to the Secretary of the Royal Society. The Editor adds that "boxes fitted with every requisite for the exercise of the photogenic art are advertised by Messrs. Ackerman, of the Strand." As Daguerre's mode of working was, even at that date, kept a secret, we have reasons to conclude that the Messrs Ackerman were the first in the field of the large army of photographic material suppliers.

I got some idea of what a camera was like from a description in a school book, and from the cut in Webster's "Illustrated Dictionary." My first photographic apparatus cost me sixpence the sum I paid to the local carpenter, for making a hole in a small deal box to receive the larger tube belonging to a toy telescope. An arrangement by which a removable piece of oiled paper was held in position opposite the lens tube answered all the purposes of a focussing glass. There lived in the village an American missionary, a skilful medical man, who kept a small dispensary, and rendered gratuitous help to suffering Hindus and others about him. From this estimable man I obtained the supply of photographic chemicals, the enumeration of which, though now covering several pages in trade circulars, comprised then, for me, only one purchased article—crystallized nitrate of silver; the other article necessary in the production of Talbot's photogenic drawing (chloride of sodium) was obtained from nature's manufactory—the salt lagoons in the neighbourhood. The sensitive paper was prepared by several successive washes of chloride and nitrate solutions, and dried and preserved in a blotting-book.

There was a Cadjan* fence opposite my room which, when lighted by the morning sun, afforded a brilliant object for the camera. The focussing was done by sliding the tube in and out, and the prepared paper, with due precautions, was substituted for the oiled paper. After an exposure of an hour or two the impressed image was fixed in a strong solution of the chloride, and dried. By this means I occasionally succeeded in obtaining a negative image of the fence, which, though poor, delighted and encouraged me not a little.

A copy of Hunt's work on photography, republished in America in 1851, set me to work in working the old paper and glass processes. By the old albumen process I succeeded in getting brilliant pictures of the fence above mentioned, as well as palm groves, Hindu temples, &c. A catalogue of F. J. Cox, London, falling in my way, enabled me to obtain from the maker my first set of modern apparatus, and to practise the collodion process, to which I had been till ten years ago a complete stranger. When the new gelatine plates were announced I got a batch from London, but very few of them succeeded, as they were liable to melt away in the pyro-ammonia developer. I tried some of the same batch with the oxalate developer, and they remained firm, and gave fine results. A dozen half plates are sold by Ceylon dealers at about ten shillings, and other materials at proportionate rates. I have therefore found it most economical and quite successful to prepare my own nitrate of silver and chloride of gold, and am engaged in experiments to make my own albumenized paper.

During the last two years I have been making many trials in gelatine plate making. I have, during the cold rainy season, prepared plates that gave me perfect satisfaction. During hot weather I meet with a great many difficulties, and the plates are slow and the images thin, owing, probably, to the long time that is required for the emulsion to set.

Besides the difficulties of climate, the practice of photography has peculiar inconveniences in this distant Hindu village. Very often, when out with the camera, a large crowd collect about me and ask all sorts of questions, which unsettle me and cause me to commit errors. The peculiar operations and movements of a photographer are liable to create, amongst a people given up to superstition and a full belief in witchcraft, many unpleasant suspicions. I know at least two individuals who, having found the red lamp burning late at night in my room, now avoid me, having conceived a strong suspicion that I am in dangerous communion with the evil one.

Though far away, I take a warm interest in what takes place in the photographic world. One of the happiest days in the year with me is the one on which I receive from the Post Office your valuable annual, the Year-Book of Photography.

Reviews.

The Spectroscope and its Relation to Photography. By C. Ray Woods. Price 6d. (*Piper and Carter, 5, Castle Street, Holborn, London, E.C.*).

A tractate consisting of a series of articles written for photographers, and published in the columns of the Photographic News, at the request of the late H. Baden Pritchard, to whom the author makes grateful allusion for help and valuable suggestion. The object of the treatise, as stated by Mr. Woods, is to assist photographers to realize "the close connection that exists between their daily practice and its scientific principles, and the necessity for the complete understanding of both, on the part of those who would be complete masters of their work."

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* Made of plaited cocoa-nut leaves.

Burton's Note-Book for Photographers. Price 9d. and 1s. (*Piper and Carter, 5, Castle Street, Holborn, London, E.C.*)

This book is of a handy size for the pocket (3½″ × 5½″), and in addition to the ample space for notes, &c., contains tables and other matter for estimating exposures. Three of the tables are reproduced from the author's "Modern Photography," and are accompanied by examples explanatory of their use. To these is added a fourth table, compiled by Dr. J. A. Scott, showing approximately by how much it may be necessary to multiply the exposure given in Table II. for any hour of any month of the year. The book is supplied also with gummed perforated labels. In the ruled portion, set aside for notes as to exposure, there is not only a column for the "No. of slide," but also space for such permanent number as may be attached to the plate.

Light as a Means of Investigation. By George Gabriel Stokes. (*London*, 1885, *Macmillan*).

On the Nature of Light. By George Gabriel Stokes. (*London*, 1885, *Macmillan*).

Professor Stokes, by reproducing in book form the two courses of Burnett Lectures delivered by him at Aberdeen (1883 and 1884) has made a useful contribution to such scientific literature as is easily intelligible to the moderately well educated man or woman; but even the specialist is not unlikely to gain by perusing the books under notice, as the author has a pleasant knack of so generalising as to bring into apposition many facts which might not strike one as being intimately related or classifiable under the same heading. The teacher of science will also profit by studying the clear and explicit way in which Professor Stokes deals with his subject.

Fox Talbot, according to the author, originated the method of spectrum analysis; and we cannot do better than to quote from "Light as a Means of Investigation," the paragraph in which the experiments of the English father of photography are referred to.

As long ago as 1834, the late Mr. Fox Talbot showed that the red due to a salt of strontia and the red due to a salt of lithia can be at once distinguished by the prism, which in the case of lithia shows a narrow, well-marked line in the red, not far from the line C; while the spectrum of a strontium flame wants this line, and is of a more complicated character. It is remarkable for how long chemists neglected the precious means of discrimination lying at their very hands in the use of the prism—a striking example of how much may be lost by a too exclusive devotion to one branch of science to the neglect of others. Notwithstanding that W. A. Miller had published maps of the spectra of flames coloured by the alkalies and alkaline earths, it was not till Bunsen and Kirchhoff published their celebrated researches that spectral analysis came into regular use with chemists.

L'Amateur Photographe, Revue de la Photographie dans le monde entier. Rédacteur en chef: François Veynes. (*Paris: 13, Rue Chomel.*)

Amateur photographers in all parts of the world will be pleased to welcome a weekly publication in their special interests, and we are pleased to be able to speak in high terms of M. Veynes' venture. Nos. 1 and 2 contain much interesting and useful matter, including excellent and comprehensive correspondence from England.

L'Amateur Photographe deserves the support of the genuine amateur, as it bears no evidence either of being the property of a firm of apparatus dealers, and intended primarily as a means of selling their goods; nor does it practise the not unknown crime of taking original articles from the columns of its contemporaries without acknowledgment. In short, *L'Amateur Photographe* appears to be a true amateur publication. The subscription for one year is 20 francs, the price for a single number being 40 centimes.

Sidmouth, South Devon; the Resort of the Tourist. (*London, Griffith, Farran, and Co.*)

A well-written guide book, illustrated with Sprague ink-photographs from negatives by W. Harding Warner. The frontispiece (a photograph of Ladram Bay) is printed in colours, and is a good example of polychromic photography.

ANOTHER ATTEMPT TO PHOTOGRAPH THE SOLAR CORONA WITHOUT AN ECLIPSE.

BY WM. H. PICKERING.

Since writing my last communication on this subject, I have made a series of investigations with the object of improving my apparatus, if possible, and of obtaining some quantitative measurements of the light reflected by the atmosphere near the sun. To avoid the reflection of the light from the surfaces of the glass, I removed my achromatic lens, and substituted for it a simple spectacle-glass of one and three-eighths inches diameter, and forty-nine inches focus. As the diameter was relatively so small, the inclination of the surfaces to one another at any point was necessarily very slight; and this fact, combined with the extreme thinness of the glass, rendered the multiple internal reflections almost entirely harmless. Five diaphragms were used between the lens and plate, cutting off totally all internal reflection from the tube. The same drop-shutter was used as before, working just in front of the lens.

Several observers have attempted to compare the brilliancy of the corona as seen during a total solar eclipse with that of the full moon. Thus Belli in 1842, and Wilson in 1860, find the corona brighter than the moon; while Halley in 1715, Billerbeck in 1851, and Curtis in 1869, find the moon brighter than the corona.[*] Other observations by W. O. Ross in 1870, and by J. C. Smith in 1878,[†] would indicate that the corona was somewhat brighter than the full moon.

A photograph of the solar corona, in order to be of any use whatever, should show something more than a thin uniform ring of light around the sun. It should show some structure, some details of the rays and rifts visible at the time of an eclipse. The only observations which I have been able to find of the intrinsic brightness of different portions of the corona were those by Professor John W. Langley in 1878.[‡] He found that the corona at 1′ distance from the sun had a brilliancy equal to six full moons, while at 4′ distance it was only equal to ·1 of a full moon. Unfortunately for our present purpose, these observations were visual, and not photographic; but they will give us an idea of the size of the figures with which we are dealing. In order, then, for a photographic plate to show any of the irregularities of detail in the corona, such as the contrast between a ray and one of the neighbouring rifts, it must be capable of showing contrasts of light which do not vary from one another by more than about one-tenth the intrinsic brilliancy of the full moon.

A series of investigations was next instituted to determine what excess of brilliancy it was necessary for one surface to have over another, in order that the contrast between them might be rendered perceptible in a photograph. The difference of brilliancy required by an acute eye amounts to between one and two per cent. One sees it sometimes stated that the camera is capable of distinguishing contrasts which are quite invisible to the eye. This, I think, is a serious error. If both sources of light are of great brilliancy, though differing considerably, the eye may not perceive a very great difference between them; while a negative with a very short exposure may show a very considerable difference. If, however, the eye be protected by coloured glasses, the contrast will be as great as that presented by the negative.

But the question which occurs at present is not where great differences of light exist, but where the differences are very small, of only a few per cent. The inferiority of the best gelatine plates to the human eye in this respect is very readily shown by an attempt to photograph distant mountains. It will be found that it is perfectly impossible, even in the clearest weather, to photograph at a much greater distance than fifty or sixty miles. I recently, on a very clear morning, made a mountain ascent with a camera. Mountains over ninety miles distant were readily recognized and distinguished; but, on pointing the camera in their direction, nothing over forty miles distant could be photographed. There was no question but that mountains at a much greater distance than ninety miles could have been seen, had there been any high enough to be visible. Every photographer who has visited mountain regions is perfectly aware of the disabilities under which he labours in this respect.

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[*] *Memoirs of the Royal Astronomical Society*, volume xli., pages 243-253.

[†] Washington Observations, 1876; Appendix iii., page 387.

[‡] Washington Observations, 1876; Appendix iii., page 211.

Another illustration of the same thing is the impossibility of photographing the moon in the day-time, when the sun is high above the horizon. Although the moon may be perfectly distinct to the eye, the negative shows no trace of it. This fact of itself, I think, has a direct bearing on the question in point.

But in addition to these general facts, it was thought that some quantitative results would be desirable. Besides the chloride plates which I had been using, several well-known kinds of bromide plates were treated at the same time. These were selected with especial regard to the strong contrast qualities which they were supposed to possess. The plates tested were the Anthony chloride, the Carbutt B, the Allen and Rowell, and the Stanley. Different portions of the plate were exposed to a uniform illumination for various times, and it was found that all the plates gave about the same result, and that if the division lines between the areas were very sharp, and over an inch in length, as small a contrast as five per cent. could be detected; but if the division lines were not over one-eighth of an inch in length, even if one knew just where to look for them, it was impossible to recognize a difference of less than ten per cent. upon the negative. As the coronal rays on the photograph would be less than one-eighth of an inch in length in order to reach out beyond 3′, ten per cent. was selected as the limit of contrast necessary to obtain a satisfactory result.

Since the light reflected by the corona at 3 distance from the sun is only ·1 that of the full moon, in order to distinguish between a coronal ray and a neighbouring rift at that distance, it is necessary that the light reflected from the earth's atmosphere in that region should not exceed in intrinsic brilliancy that reflected by the moon itself.

A series of observations was next made to determine the relative light of the sun and of the sky in its immediate vicinity. The method employed was as follows:—Half of the photographic plate was covered with a thick yellow paper; a diaphragm of ·016 centimeter in diameter was placed in front of the lens, and four different exposures made to the sun on different parts of the plate, lasting respectively for two, four, eight, and sixteen seconds. The plate was then taken into the dark-room, and the exposed portion protected by the yellow paper, which was removed from the other half of the plate. The telescope was now so placed that the sun should be hidden behind a paper disk, fixed at about twenty feet distant. A diaphragm of one centimetre aperture was placed in front of the lens, and an exposure of four seconds given to the sky. On development, half of the plate, except where cut by the image of the disk, was found uniformly darkened. On the other half were four images of the sun, two of which were lighter, and one darker, than the sky. The third image of eight seconds' exposure was of exactly the same darkness as the sky; and it was accordingly shown, that since the diaphragm used with the sky was about four thousand times larger, the sun was about two thousand times as bright, photographically, as the sky in its immediate vicinity. A number of plates were taken on different days, when the sky seemed perfectly clear, and the results indicated that the number varied in general between a thousand and four thousand. Owing to the diffraction produced by the small diaphragm used in photographing the sun, which rendered the image 1·6 times larger than it really should be, all these figures must be multiplied by 1·6.

Comparisons were then made in a similar manner between the sky near the sun, and the full moon, the latter taken with the full aperture of the lens, 3·65 centimetres, and the former with an aperture of ·204 centimetre. Under these circumstances, with exposures of 15 seconds, the moon and sky darkened the plate to about an equal amount. The result of a number of experiments indicated that the sky in the immediate vicinity of the sun was of about four hundred times the intrinsic brilliancy of the full moon. The ratio of the sky to the sun on this same day was fifteen hundred, so that the light of the moon was to that of the sun as one to six hundred thousand. In some experiments which I made in 1879,[*] I found the visual ratio was one to three hundred and fifty thousand. On account of the extreme blueness of the sun, it was to be expected that the photographic ratio should be somewhat higher than the visual one.

I next tried comparing directly the light of the sun and the moon on the same plate, in order, if possible, to get a check on my results. The results, however, were unsatisfactory, the ratio coming out as 1 to 300,000, or only one-half the former amount. Owing to the difficulties of the experiment, this discrepancy may very well be referred to inaccuracies of the photographic plate, and changes in the sun's and moon's light during the course of the experiments. In all the results with regard to the sun, it must be remembered that the figures must be multiplied by 1·6, on account of diffraction. The two ratios, then, of the light of the moon to that of the sun, stand as 1 to 960,000, and 1 to 480,000; and of these, I think, in connection with my visual result, the former is the more correct figure. The moon at the time of these observations, June 26, 12 M., had an altitude of 29°, when the atmospheric absorption would amount to about twenty per cent.[†] Making this correction, we have the photographic ratio of the moon to the sun, as 1 to 760,000, or about twice as great as that to the eye. This is, of course, only an approximate result, as only very few observations were made, and as it was entirely outside the course of our enquiry.

Returning, then, to our original subject, we found the sky near the sun 400 times as bright as the full moon. Correcting for atmospheric absorption, this figure becomes 320 times. But we found before, that in order to detect the contrast between a coronal ray and a neighbouring rift, the light of the sky must not exceed that of the full moon. It therefore seems that even in the clearest weather the reflected light of the atmosphere is 300 times too strong to obtain the faintest visible image of the true coronal rays.

In connection with these experiments, I took a few photographs of the sun with my improved apparatus. In order to still further diminish the reflection of the light from the surfaces of the lens, I so placed the telescope that the sun was almost completely hidden behind the high steeple of a neighbouring church. A vast improvement in the results was at once obtained. The sun stood out sharply defined on a perfectly uniform background of blue sky. There was not the slightest trace of a fringe either where the steeple crossed the disk, or where the sky came in contact with the solar limb. The day was beautifully clear, and at six in the afternoon some more photographs were taken; but now, although the steeple was as clear as ever, all around the limb of the sun appeared the atmospheric halo, extending out in all directions, and gradually growing fainter as it receded from the sun. We may, therefore, in general, say, that with properly constructed apparatus, in perfectly clear weather, no halo whatever appears around the sun. It is only in slightly hazy weather, or as the sun approaches the horizon, that the appearances are produced which have been elsewhere described.

In brief, the result of my researches would seem to indicate, 1°; that, without a total eclipse, it ought to be impossible to photograph the solar corona, 2°; having tried, I have failed to photograph the corona, but have obtained the result which theory indicated.—*Science.*

FANCIED DANGERS OF AMMONIA DEVELOPMENT

It is curious to note to what extent the international principle applies to practice in photography, as well as to many other departments of the arts and sciences. In the development of dry plates, for example, at one time the system most in use in the United States was the ferrous oxalate, in contradistinction to pyrogallic acid employed in Great Britain. And now, when the oxalate method has here been in a great measure supplanted by the pyrogallic, we still find international differences in regard to imparting the requisite degree of alkalinity to the developer. Subject in both cases to exceptions, we find that while in England ammonia is the alkali employed, that which is preferred in America is either the carbonate of potash or of soda, or, in some instances, a mixture of both.

We have observed that public attention has been directed towards certain drawbacks, if not dangers, of a physiological nature, connected or imagined to be connected with the employment of ammonia in the dark room. But, as we hope to show, it is not fair to argue from the bad, even the toxic, effects of strong ammonia when inhaled in its purity, that like bad effects are produced by the inhalation of air containing only so much of it as suffices to impart a mere suspicion of its presence. Many worthy persons imagine that because a thing is deleterious—nay, poisonous—in a concentrated form, it must therefore be so when diluted. This is scarcely the case. Sodium chloride (common salt) may be both deleterious in an exceedingly great degree, or exceedingly beneficial, according to the circumstances under which, and the quantity in which, it is taken. So with alcohol, which present in the mild form of fermented ginger-beer, on the one hand, and at ninety-nine per cent. on the other, have a very different physiological action. Concentration and quantity are important factors in determining what is and is not a poison, either when inhaled by the lungs or imbibed by the stomach.

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[*] *Proceedings of the American Academy of Arts and Sciences*, 1880, p. 246.

[†] *Annals Harvard College Observatory*, vol. xiv. p. 62.

To seek to throw out a warning against the employment of an ammonia developer, because of the deleterious effect upon the system of pure, strong ammonia, is not wise or fair. We know very well that under some circumstances the vapour of strong ammonia, when inhaled undiluted with air, is reported to produce spasms of the glottis, convulsions, and even death; and that, even when somewhat diluted, it acts as a powerful acrid and local irritant, causing vesication when applied to the skin; but we also know that, when more largely diluted with air, it has been highly extolled in chronic hoarseness, asthma, &c. Who does not know the virtues attributed to the use of the common "smelling salts" bottle, the charge of which is merely carbonate of ammonia, scented with various fragrant essences? It is quite possible that some may have such delicate constitutions as to cause rupture or dilation of the air cells of the lungs as a result of the occasional sniffing of weak ammonia in the developing room; but we venture to say that such cases are rare indeed, and, although possible, we have not yet met with the first instance.

From the foregoing it will be seen that we do not attribute any great importance to the pessimist cry suggestive of death or disease in the ammonia developer. But *is* ammonia the best alkali for using with pyrogallic acid? We of late have been employing a developer in which the place of this volatile substance was supplied by a preparation of potash and soda, which in the estimation of ourselves and others gives a developer that yields a negative of somewhat more pleasing character than is possible to be obtained by the agency of ammonia. The tones are of a nearly pure black, very much like those given by a ferrous oxalate developer when worked at its best; and so far as we have yet been able to perceive, the same amount of detail is brought out that would be possible with ammonia, although experiments are still required to determine this point with definiteness. Such fogging and discolouration as arise from the employment of ammonia are quite unknown, while by its use use there will no scare arise from the bugbear of ammonia poisoning. When the formula is published, it will be found that there will be nothing new in it, its main features consisting in the proportions of certain additions to the alkalies.

It is our belief that ammonia development may yet be made to stand aside in favour of the one referred to, not, be it understood, that for a moment we share in the fancied physiological objections to ammonia in the homœopathic form in which its vapour is present in a properly constructed developing room, but because of the superior intrinsic merits of the other. Let it not be thought that we lightly esteem the dangers arising from the inhalation of strong liquor ammonia. If a bottle containing this pungent fluid be accidentally broken, let the doors and windows be thrown open and an immediate escape be made from the room, until by ventilation and dilution of the vapour the place is once more rendered safe.—*Photographic Times.*

THEORY AND PRACTICE OF PHOTOMICROGRAPHY.

BY MAURICE N. MILLER, M.D.[*]

If an illuminated translucent picture on a plane surface be placed at a considerable distance from a convex lens, a much diminished image will be formed at a point near the focus of lens.

If a minute and brightly-illuminated translucent object be placed near the focus of a convex lens, an enlarged image will be found at a considerable distance from the lens.

The conditions described in the first proposition, using an ordinary photographic negative, a microscopic objective, and a sensitive film to receive the image, are required in the production of microphotographs.

The second arrangement, introducing a mounted microscopic object, a microscopic objective, and a sensitive film, presents the conditions necessary in the production of photomicrographs. A microphotograph is simply a reduced copy of a photographic negative; while a photomicrograph is the fixed image of an object greatly enlarged by the microscope. It is with the production of the latter that we are engaged now.

In order that we may the better appreciate the conditions required in the production of enlarged pictures of minute objects, let us examine the simplest arrangement that may be employed for such purpose.

First, a microscope stand is required. This is placed on a table so that the optical body is in a horizontal position. The eyepiece is now removed, and a long bellows camera-box is connected with the microscope tube so as to make a light-tight joint. The whole being firmly fixed to the rigid table, the latter is placed so that the sun may shine on the mirror of this microscope, and on this alone. (Let me say just here that it is with translucent objects only that we have to deal. Little effort has thus far been directed toward the production of enlargements of opaque objects, and, inasmuch as we can operate with the lowest powers only in such work, it is not probable that the results thus obtainable will ever be much sought for.)

We now proceed with the description of the steps necessary to produce an enlargement with our simple apparatus. A microscopic object is placed upon the stage, and then held in position by the spring clips. (I shall have something to say about the preparation of these objects later on.) A piece of blue glass is now placed beneath the stage, and the mirror so adjusted that the sun's rays are brought to a focus a little beyond the object to be photographed, and, for illustration, we will take a mounted specimen of a small insect, which will afford us sufficient differentiation with moderate amplification.

A one-inch well-corrected objective is put on the microscope, and we adjust the camera so that the ground glass is about eighteen inches from the stage. Now, covering the head with an opaque cloth in the ordinary way, we reach the coarse adjustment, and obtain an image which we then sharpen with the fine focussing screw. You will observe that the camera is not too far distant, and we easily reach the milled heads of the focussing mechanism.

By the time we have gotten thus far it is probable that the sun has moved, or, more correctly, the earth has progressed so that the mirror needs another adjustment in order that the picture may have purely central illumination. Well, we give the mirror a final touch, substitute our sensitive plate for the ground glass, and expose. With the low power we are using there is plenty of room for a little cap over the nose of the objective, and this affords the best simple means of exposure. If higher powers be employed, and consequently less distance between the lens and the object, a swing shutter must be introduced within the camera.

Well, what is our result? We develop, and, if we have been moderate in our desires, using a low power—not endeavouring to amplify beyond thirty diameters—we shall get moderately successful pictures. Our principal difficulty is to get an even illumination. The centre of the field will, perhaps, be over-exposed, while a ring of darkness appears without this point. This is due to two principal causes, and one of them is easily eliminated. Reflections come from the inside of the tube, or from the mounting of the objective. Even the edge of the stage diaphragm may be bright enough to cause trouble, and the edge of the mirror-mounting introduces another source of unequal illumination. It is not enough that the afore-mentioned places be black—they must be *dead black*. I will allude to this again. But a much more serious cause of unequal illumination is found in the scattering rays of the mirror itself. The whole method is deficient. (*To be continued.*)

Correspondence.

A DINNER TO COMMEMORATE THE COMING OF AGE OF EMULSION PHOTOGRAPHY.

Dear Sir,—The Committee of the Photographic Club have thought it advisable to commemorate the 21st anniversary of the invention of emulsion photography, by a dinner to be held at Anderton's Hotel, on Wednesday, September 9th, at 6.30. Any gentleman wishing to attend will kindly notify the same to me on or before Monday next, the 7th inst. Dinner 5s. 6d.—Faithfully yours,

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[*] *Science Monthly.*

1, *Beacon Hill, N., September 2nd.* E. Dunmore.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 27th ult., Mr. T. H. **Norris** in the chair.

Mr. J. **Sutton** passed round several specimens of Japanese paper, also negatives produced thereon. The plan which was alluded to last week is now free from patent restrictions. He printed an impression in ink from a steel engraving, etching, or other suitable surface, upon the above-named paper, and rendered it transparent with a varnish composed of burnt linseed oil, dryers, and soap. The mixture, which should have the consistency of treacle, is applied cold to the paper, and is said to dry perfectly transparent in four hours. A short discussion ensued.

Mr. A. L. **Henderson** showed a wet plate transparency from a gelatine negative, in which the image was scarcely distinguishable on account of red and green fog. His transparency was made in the camera by means of reflected light, exposure being fifteen minutes. Two more positives from another negative were shown in support of a theory that films copied in the camera with the glass side facing the lens are much sharper than those copied in the ordinary way, viz., the film next the lens. Diffraction had been purposely produced in one of these plates, and became the subject of a discussion between Messrs. Cowan, Debenham, Haddon, and Henderson; the latter gentleman also showed a few views of Florida, and some transparencies of these subjects printed with the mixture published on page 398.

The **Chairman** mentioned that a special course of lectures on optics will be given this winter at the Finsbury Technological College (particulars will be found on page 547). He then read a short account of some experiments conducted with silver iodide, as follows:—

An excess of a dilute solution of potassium iodide was added to dilute solution of silver nitrate; the result was a slight opalescence. To this was added a solution of potassium bromide, which threw down a pale yellow precipitate. This experiment was repeated, but instead of using potassium bromide solution, dilute nitric acid (1 to 5) was added, which threw down a like-coloured precipitate. Silver solution was precipitated with sodium chloride solution, and the precipitate silver chloride washed and treated with potassium iodide solution; the silver chloride immediately changed colour, and on treating with ammonia solution (·880), did not dissolve, showing it was no longer silver chloride. This experiment was repeated, precipitating with HCl, and not washing the silver chloride; to this was added a few drops of hydriodic acid; the silver chloride immediately changed to a pale yellow colour. These precipitates were tested, and found to be silver iodide, the chloride being completely converted. Silver iodide was precipitated, washed with water, and dissolved in a boiling saturated solution of potassium bromide; cold water was added, and a yellow precipitate came down, which was washed till free from potassium bromide. Upon testing, it was found to be silver iodide. Silver chloride was precipitated, washed, and to it was added some strong potassium bromide solution; the colour changed to a pale yellow, and upon testing was found to be silver bromide. Silver bromide was precipitated, washed, and a strong solution of potassium iodide added; the colour of the precipitate turned deeper, and in filtering off, washing, and testing, was found to have changed to silver iodide. Silver iodide (which is yellow), on treating with strong ammonia, turns white, but does not dissolve; upon adding water, the yellow colour again appears. These experiments show that silver chloride can be changed to bromide or iodide, and silver bromide may be changed to silver iodide.

Mr. **Henderson** thought the Chairman's investigations agreed with the experiments he had made at the last meeting, and those mentioned by Mr. Ashman. He believed that silver iodide was formed in such a fine state in an excess of bromide, that it would readily wash out; zinc bromide, for instance, was so exceedingly fine that it would be difficult to wash gelatine containing it without the whole passing out.

Messrs. **Haddon**, **Debenham**, and **Cowan** maintained that the usually accepted theory regarding haloids had not been upset.

Mr. **Haddon** read an addenda to his paper given last week, in which he stated that methylated alcohol sp. gr. ·82 at a temperature of 19° C., dissolved ·06 per cent. of paraffin (*i.e.*, ·288 grains per ounce weight, or ·194 grains per ounce volume). The slight increase in solubility over his previous experiment he ascribed to the higher temperature and stronger spirit.

Messrs. Hume, Nisbet, and H. M. Hastings were elected members of the Association.

Birmingham Photographic Society.

A meeting of the above Society was held on Thursday, August 27th, in the Technical School, Bridge Street, W. J. **Harrison**, F.G.S., in the chair.

After the usual business of the meeting,

Mr. J. H. **Pickard**, the leader of the half-day excursion to Evesham held on Saturday, August 15th, read his humorous report.

The weather on the occasion was all that could be desired, which, combined with the excellent leadership of Mr. Pickard, rendered it one of the most enjoyable trips the members have had.

Mr. G. M. Jones was next called upon to re-deliver his paper on weights and measures, and the making of solutions (p. 484).

In the course of his remarks, Mr. **Jones** urged upon members to discontinue the rule-of-thumb way of making solutions, and to make them properly on the decimal system. Another point which Mr. Jones suggested was the keeping of the different ingredients of the developer in separate solutions, so that it becomes an easy matter to make a developer to any maker's formula from the solution at hand.

The question of a whole day excursion was next brought forward, when it was decided that there should be one; and the Council were asked to make arrangements for the same at as early a date as possible.

Some good work was laid upon the table by the members, including not a few taken at the last excursion. Comments upon these were freely indulged in, which concluded the business of the meeting.

Liverpool Photographic Association.

The usual monthly meeting of this Association was held at the Free Library, William Brown Street, on Thursday, August 27th, Mr. J. H. **Day**, the President, in the chair.

The minutes of the previous meeting were read and confirmed.

A discussion then arose as to the Society's excursions, and it was agreed that an excursion be made to Maghull and the neighbourhood on Saturday, September 5.

The **Secretary** announced that about 430 copies of the petition to the railway companies had been placed in the hands of the various photographic societies, and had been received, duly signed, from the secretaries of twenty associations out of thirty-six. Steps were being taken for their presentation in due course.

A long and interesting discussion followed on the subject of new formulæ for development.

Mr. R. **Crowe** exhibited a number of very good instantaneous views brought forward to prove the good result of ferrous-oxalate development. He also exhibited his new camera clip, and it was very much approved of. The construction of the clip gives the camera very efficient support, and enables the operator to place it on any available support, even of the most unlikely character, some of the photographs exhibited having been taken from a diagonal girder on the New Brighton landing stage by its aid.

Mr. W. H. **Kirkby** exhibited several very good negatives on negative paper, the detail being very delicate, and halation perfectly absent.

Talk in the Studio.

An American Newspaper on Photography.—The *Buffalo Express*, in speaking of the recent Convention, says:—"Photography is an exceedingly useful handicraft. It has developed wonderfully since, forty years ago, the faint portraits of Daguerre, on silvered plates of metal, first began to be common. But it is not art, and those who practise it are not artists. To use these words in relation to photography and photographers is a misuse of terms. This is the first thought that came to some who visited the remarkable exhibit of photographs and photographic appliances which was open in this city yesterday. The attempts one there saw to produce works of art by the photographic process were amusing and absurd. The 'scenic backgrounds,' and the like, of which there was great profusion, were of a kind to attract the vulgar, but to make the judicious grieve. By trying to force a handicraft out of its sphere, they made it offensive. The effects produced by the use of such appliances were pretentious and ugly, and their pretentiousness aggravated their ugliness. The 'compositions,' such as one purporting to represent a burning at the stake, and another called 'The Rescue,' were absurd to the last degree. Nothing could be more wooden and inartistic. Mrs. Jarley's wax-works are high art compared to such photographic efforts as these."

Estimation of Iodides in Presence of Bromides and Chlorides.—The fact that a soluble iodide will precipitate silver from a solution of silver chloride in an alkaline chloride is well known, but, as far as I am aware, has not as yet been utilised for the quantitive estimation of iodides. I took a measured quantity of standard silver nitrate solution, and added potassium chloride till the precipitate first formed was re-dissolved. I then ran into this, from a burette, the solution of the iodide (saturated, or nearly so, with potassium chloride so as to avoid the precipitation of silver chloride by dilution) till no further precipitate was produced. The silver iodide clots well, especially on warming and shaking. Results good. By using potassium bromide instead of chloride, both for the silver nitrate and the solution of the iodide, the end of the re-action was obscured, giving bad results; but a moderate amount of bromide in presence of the iodide does not appear to interfere.—T. L. Teed in the *Chemical News*.

Relation between the Composition and the Absortion Spectra of Organic Compounds.—G. Kruss.—Krüss and Œconomides examined solutions of indigo and its derivatives, with a view to decide whether the replacement of hydrogen in a compound by Me, Et, NO, NH, Br, &c., has a regular influence on the absorption spectrum of the compound. The author has now examined the absorption spectra of aqueous and alcoholic solutions of fluorescein, dibromofluorescein, tetrabromofluorescein, together with its metallic derivatives, tetranitrofluorescein, dibromodinitrofluorescein, methyltetrabromofluorescein, ethyltetrabromofluorescein, rosolic acid, and tetrabromorosolic acid, both with and without the addition of alkali. The results confirm the view previously brought forward, that the replacement of hydrogen in the benzene-ring, or in the side-chain by methyl, oxymethyl, ethyl, and bromine, causes a shifting of the absorption towards the less refractive end of the spectrum, whilst the introduction of an amido- or nitro-group has the opposite effect. This shifting increases proportionally to the number of hydrogen atoms, when the same elements or groups are substituted analogously.—*Chemical Societies' Reports.*

Destruction of Chlorophyll Solution by Light. By J. Reinke.—The prismatic spectrum was divided into seven bands, containing waves of definite range of wave-length, by means of seven cylindrical lenses interposed between the prism and the screen. The first band comprised rays of wave-length 750—710, and was separated from the second band by rays of wave-length 710—700; the second band included wave-lengths 700—660, and was separated from the third by wave-lengths 660—650, and so on. Solutions of chlorophyll (from sunflower leaves) in alcohol and benzene were exposed for the same time to the light of each band, and the decoloration of the chlorophyll produced was measured by a photometric method. The mean decolorations were as follows:—Red band (wave-length 700—660), 100; orange (wave-length 650—610), 78; violet (wave-length 450—410), 72; yellow (wave-length 600—560, 58; blue (wave-length 500—460), 50; dark red (wave-length 750—710), 41; green (wave-length 550—510), 34. The action of the different coloured rays is, therefore, intimately related to the absorption spectrum of chlorophyll, the maximum of decoloration falling between B and C, and coinciding with the maximum of absorption, and the curves being practically the same throughout their length.—*Chemical Societies' Abstracts.*

Photographic Club.—Dinner to Celebrate the Coming of Age of Emulsion Photography.—On September 9th, 1885, will be held a dinner to commemorate the invention of emulsion photography by Sayce and Bolton. Dinner at Anderton's Hotel at 6.30. Applications for tickets, price 5s. 6d., by Monday next, to be made to E. Dunmore, Hon. Sec., 1, Beacon Hill.

To Correspondents.

*** We cannot undertake to return rejected communications.

A Gleaner.—Directions have repeatedly appeared in the News. See vol. for 1882, pages 466-678, and 716.

A. G. Brophy.—If the article is a solid heavier than water, and insoluble in that fluid, all you want is an ordinary pair of scales, with an arrangement for hanging the object from one of them by a thread. First weigh the object in the air, and next in water—that is to say, with the article and as little as possible of the thread under water. The difference between the weight in air (a) and the weight in water (b) is equal to the weight of a volume of water equal in bulk to the object. A rule of three sum will now give you the specific gravity:

$$a-b : a :: 1 : x$$

Directions for determining specific gravity in other cases will be found in elementary hand-books of physics. 3. It is very likely that something of the kind may be adopted. 4. Not quite so much as 24, as far as our experience goes; perhaps 22.

J. V.—1. Thank you very much. 2. There is no remedy, except to touch them out. A good sable brush worked to a fine point, and then charged with a moderately stiff water colour, is best; but there is considerable danger of going beyond the margin and making matters worse.

H. C. Braun.—1. We could not insert it this week, as the wood cut is not ready, but, all being well, it will appear next week. 2. The enclosed has been handed to our publishers.

W. H. C.—1. At one time it was manufactured by Messrs. Mawson and Swan, of Newcastle-upon-Tyne; but we are not by any means sure that it is to be had there now. 2. We will try the process, and let you know the result.

G. B. R.—Next week.

J. W. G.—1. Your friend has been swindled; still, he is to blame, for what reasonable person could suppose that a firm could offer such advantageous terms broadcast? He should write to the local police office. 2. There is a process bearing the name you refer to, but it is a different matter altogether.

A. W. Davis.—It has been sent.

W. Turner.—It is called a pantagraph, and can be obtained from any maker of drawing and surveying instruments.

M. Wilcox.—The sensitive mixture recommended by Obernetter for the dusting on process is made as follows:—

Dextrine	4 drachms
Grape sugar	4 ,,
Bichromate of potassium	4 ,,
Glycerine	2 drops
Water	12 ounces

Bax.—Carbonate of potash is intended, not bi-carbonate.

Photographs Registered.

Mr. Mark Midgley (Fossgate, York)—Photo entitled, "Thanks, Brother, thanks."

Mr. W. G. Honey (Devizes)—Four Photos. of the "Claimant."

Mr. R. Tudor Williams (Monmouth)—Photo. of Hereford Agricultural Show at Monmouth.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1410.—September 11, 1885.

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A MINOR POINT IN PHOTOGRAPHIC OPTICS.

We notice that an American has recently re-discovered what we supposed to be a very well-known fact in connection with photographic optics—one which was certainly enumerated twenty, if not much more than twenty, years ago. Since the re-discoverer of this point had failed to notice its statement anywhere, we presume that it is not so well known as we supposed it to be, and that it will stand repetition here, with a few remarks upon it.

The particular fact referred to is that, in calculating the rapidity of a lens from the aperture, it is necessary to allow for the condensation of the rays in passing through the first combination, and before reaching the stop.

The amount of condensation is quite inconsiderable in the case of some forms of lenses, and may be entirely disregarded. These are the lenses in which the front combination is very near the diaphragm, as, for example, the portable symmetrical. In the case of some other lenses, however, and notably of the more rapid portrait lenses, the amount of condensation is very considerable, and, if not taken into consideration, introduces a material error in the calculation of exposures.

So far as we are aware, the late Mr. Dallmeyer was the first to point out a way of estimating what we may perhaps be allowed to call the "reputed" size of a stop—that is to say, the size which, were there no condensation by the front lens, would allow an amount of light to pass, equal to what does actually pass.

Mr. Dallmeyer's plan was one of extreme ingenuity. He directed that the camera, with the lens and stop to be tested, be focussed for a distant object, that the ground-glass be replaced with a piece of cardboard having a pinhole in the centre, that the camera be removed to a dark room, and that a candle be held behind the pinhole. If this be done, it will be observed that the light passing through the pinhole and the stop forms an illuminated disc on the front combination of the lens. The diameter of this is the "reputed" diameter of the stop. We have found the measurement to be somewhat facilitated by dusting a little prepared chalk or violet powder on to the front glass of the lens; but even then, in spite of its ingeniousness, we have not found the method a very practicable one. With a very bright source of light—a lime-light, or an arc electric light, for example—we imagine it might be, but we have not tried. In practice we prefer the performance of a trifling calculation to the mechanical method of estimation.

When

a=the focal length of the front combination;
b=the distance from the front combination to the stop;
d=the diameter of the stop, and
rd=the "reputed" diameter to be discovered—

$$rd=\frac{a\times d}{a-b}$$

Example.—The focal length of the front combination of a lens is 18 inches, the distance between the front combination and the stop is 2 inches, and the diameter of the stop is 1 inch;

$$rd=\frac{18\times 1}{18-2}=1{\cdot}125$$

that is to say, the "reputed" diameter is 1·125, or $1\frac{1}{8}$ inch.

This method, so far as it goes, is all that can be desired; but frequently, when it is wished to cut one stop, it is desirable to cut a whole set, especially at this time, when photographers are many of them adopting the Great Britain standard for their stops. Now, to calculate the diameter of each stop by the above formula would be most troublesome; indeed, the formula is not adapted to such calculation. It is adapted, not to the calculation of the actual diameter to which to cut a stop so that it may be equivalent to the "reputed" stop, but to the calculation of the "reputed" size that is to be credited to an actual stop.

In cutting a set of diaphragms to the Great Britain standard, it is usual to use a table, which states, for any given focal length, the diameters to which the stops should be cut, or to use Mr. W. Ackland's ingenious slide rule, which gives the same result by direct measurement. To make the necessary allowance for the condensation of the light before reaching the stop in such a case, the best plan is to estimate once for all a "reputed" focal length, if we may be allowed the expression, and to cut the stops as if this were the actual focal length.

As before:—

a=the focal length of the front combination;
b=the distance from the front combination to the stop;
f=the focal length of the lens complete, and
rf="reputed" focus. Then

$$rf=\frac{(a-b)\times f}{a}$$

Thus, for example, the focal length of a lens is 8 inches, whilst that of its front combination is 12 inches, the distance between the front combination and the stop is 2 inches. The "reputed" focal length will be

$$\frac{10\times 8}{12}$$

or 6·6 inches. We must, therefore, cut the stop as for a lens of 8 inches. This is not an exaggerated case at all, and it will be noticed that if the correction were disregarded, an error of about 30 per cent. would occur.

It follows, from what has already been said, that an allowance has to be made for the condensation of the light in the case of the fixed stop, as well as in the case of the movable ones; that, in fact, the fixed stop may be considerably less in diameter than the front combination, and may yet allow to pass all the light that the lens is capable of allowing to pass. It is of considerable advantage to have the aperture no larger than is sufficient to allow the whole of the light to pass, as by keeping it down, stray light is checked. The smallest diameter to which the stop can be cut without reducing the amount of light may readily be calculated by the formula just given.

The following is a practicable method of ascertaining whether or not the fixed stop is of such size as to allow all the light of the lens to pass, or is unnecessarily large.

The sun's light is allowed to strike on the front combination of the lens, so that the rays will focus in its axis. It is now noticed whether a ring of sunlight is formed on the fixed stop, or whether, on the other hand, the lens may be turned through a small angle without the direct sunshine falling on the fixed stop at all. In the first instance, the stop intercepts some of the light passing through the front combination; in the other, it is unnecessarily large to let it all through. If it is of the correct size, its edges will be only just touched by the sunshine, and this all round.

◆

THE PRICE OF NITRATE OF SILVER.

Large users of silver nitrate have not unfrequently complained that, notwithstanding the considerable reductions which are constantly taking place in the market value of silver, they reap no corresponding advantage in the purchase of the nitrate.

That there is some ground for this complaint cannot be doubted, but perhaps not quite so good ground as might be supposed, for when the price of silver was much higher than it is at present, the nitrate was sold as a "leading" or decoy article at such a price as to yield a minimum of profit to the producers or dealers; and it is only natural that now there is a material reduction in the price of silver, they should wish to take advantage of this to place their transactions on a sounder business basis.

In connection with the prospect of further reductions in the price of silver, we may quote some remarks which have recently appeared in the *Pall Mall Gazette* (Sept. 5), which may perhaps lead photographers to look forward to a time when silver may be only one-fourth of its present price.

> The price of silver has declined to 48d. per ounce for bars, and Indian Government rupee paper bearing 4 per cent. interest is quoted 73½ per 1,000 rupees. In the year 1876, when silver fell for a moment to 46½d per ounce, rupee paper never went below 75 in this market. Speculators, unable to sell "bears" freely of silver itself, are evidently forestalling a fall by getting out of rupee paper, which may be said to be down to the equivalent of 45d. per ounce. The fear that America is about to sell all or most of its annual production of silver, hitherto coined and retained under the Bland Act, has suddenly pervaded the East; Manchester is thoroughly alarmed, and trade between England and the Eastern markets, both for imports and exports, is unsettled by the certainty of fluctuations in the silver exchanges.
>
> At 4s. per ounce silver is worth little more than a twentieth part of an ounce of gold (77s. 9d.); and the great question, which only time can settle, is whether this price will so check the production of the mines as to counterbalance the expected reduction of demand by the American mints. Mr. J. H. Norman is publishing some calculations which go to show that in Colorado, the mining and treatment of 80 ounces of silver is no more costly than the mining and milling (*i.e.*, extraction or treatment) of one ounce of gold. In other words, the average cost price makes the proper proportion of silver not as 1 to 20, but as 1 to 80; not 4s., but only 1s. per ounce. Colorado is not the universe, but Mr. Norman nevertheless says roundly that "the world is living in a fool's paradise," and that "a universal panic" must take place when the facts are appreciated.

If it be a fact that silver can be mined and extracted at one-eightieth of the cost of gold, it is difficult to come to any other conclusion than that the price must fall to about one shilling per ounce; assuming, of course, that gold remains the standard of value, and that the means of production of both metals remain in a tolerably constant ratio until the equilibrium is established.

Let us now estimate the metallic value of silver nitrate, taking silver at its present price of four shillings per ounce. To begin with, it must be remembered that an ounce of silver as bought weighs 480 grains; but as the market price refers to standard silver, which is alloyed with seven and a half per cent. of copper, the ounce of silver consists in reality of only 444 grains of the precious metal. This 444 grains of fine silver, if converted into nitrate, will yield 699 grains of the salt. Consequently, 699 grains of silver nitrate contain silver having a money value of four shillings. A simple rule-of-three sum will show us that one ounce of silver nitrate (437½ grains) contains silver equal in value of 30·05 pence, or almost exactly two shillings and sixpence.

Considering everything, one can hardly regard the prices now charged for silver nitrate to be very excessive, as it must be remembered that ordinarily several profits have to be made, and the usual risks of trade have to be allowed for. Still, there may be cases in which large consumers can advantageously prepare their own nitrate. We shall treat of this in an early article.

◆

DEATH OF WALTER BENTLEY WOODBURY.

Another of those who have largely contributed to make photography what it is, has departed this life, W. B. Woodbury having been found dead in his bed on the morning of Saturday last. The sad event happened at Margate, where he had arrived on the previous day with some of his children.

The fact of Mr. Woodbury having died suddenly away from home necessitated the holding of an inquest, and the evidence showed that Mr. Woodbury was in the habit of occasionally taking laudanum as a means of procuring sleep; but there was no evidence whatever to show that he took an unusual quantity on Friday night. After having heard the evidence of Dr. White, of Margate, the jury returned an open verdict to the effect that "the deceased met his death from an overdose of laudanum, but whether taken by accident or otherwise, there was not sufficient evidence to prove."

Dr. White's evidence was as follows:—He found deceased lying on the bed in a perfectly natural position, and he also noticed a tumbler on the chair by the bed side, which smelt strongly of laudanum. Deceased had been dead about twelve hours. He (witness) could not tell what quantity of the drug had been taken, but, from the appearance of the residue in the glass, he should think that it had been taken in a pure state. To a man of Mr. Woodbury's habits and temperament, after the fatigue of the journey, the usual dose might possibly be too much.

Mr. Woodbury, who was fifty-one years of age at the time of his death, had practised photography as a profession since he was seventeen years of age, he having then commenced work in Australia. Soon after this he established a studio in Java, and produced excellent work under very trying circumstances. Some of his views taken in Java were published by Negretti and Zambra about twenty-five years ago.

About this time he came to London, but shortly returned to Java, and established himself on a somewhat larger scale in Batavia; but soon afterwards he came to London and introduced the process now so well known under the name of Woodburytype. Since then he has been actively engaged in devising and perfecting many processes bearing on photography, and in writing in such a way as to popularize science.

Among his inventions may be especially mentioned—etting aside his very notable invention, the Woodbury-ype—the photo-filigrane, the Goupil method of photo-gravure, and various block processes; but he made a host of minor inventions, and since 1861 he took out nearly thirty patents.

The above portrait is printed from an Ives' block, and is an excellent likeness. It has been arranged for the funeral to take place at Abney Park Cemetery on Saturday afternoon next.

◆

A PHOTOGRAPH TAKEN WITH A SPECTACLE LENS.

How many of those who have become eminent in photography have, as lads, commenced their experiments with a spectacle lens worth no more than twopence, and, may be, a cigar box as camera? But ordinarily this very cheap objective gets cast aside at a not very advanced stage.

Captain Abney has now and again called attention to the circumstance that the spectacle lens may be really serviceable, and has pointed out that in case of forgetting one's usual lens when out on a tour, it might even be worth while to make the exposure with a spectacle lens of suitable focus; and our supplement this week is an illustration of this.

Dr. A. P. Reed sends us the following particulars:—

There has been considerable argument from time to time in reference to the subject of cheap lenses, &c., and I thought the enclosed print taken with a glass out of a cheap pair of spectacles would be of a little interest.

It is a plano-convex of 9-inch focus, and worth, I suppose, from three to five cents. I put it into the camera as an experiment, gave forty seconds, $\frac{f}{90}$, with a very slow brand of plate I had. The negative is of fair density, and came up well with pyro and ammonia.

On examining the spectacle glass, I found two streaks across it (glass imperfections), and the surface not well polished, as it had been lying around I don't know how long. I put the plane surface front, and convex towards ground glass. The subject, "Hospital Grounds," is all grass or foliage, and if looked at with graphoscope or other means of bringing out perspective, it comes out well. There was considerable wind, and the tops of trees are hazy; sun was to left of instrument; time about noon.

WHAT IS TO BECOME OF OUR DOUBLE DARK SLIDES?

Glass *versus* Film Photography.

BY T. G. WHAITE.

The question of how are we going to store our negatives has become a serious and a heavy one in many houses, frequently necessitating the propping of floors. Film photography has come to our relief; a folio will now be the "proper" thing to use for a store-house.

Carriage of plates is a serious item; we are to be relieved by parcel post and films.

A holiday trip with a gross of glass plates, camera, double slides, &c., has hitherto been a very solid undertaking; in the future, it will be but a *filmy affair*.

For the great "interior trouble," halation, there is no cure equal to *castor oiled films*.

For every evil in negative photography, the roller-holder says, "film me with paper."

What have we been about in the old country, to let Bro. Jonathan come to our relief, and skim off the cream thusly?

We have stuck in a groove with our glass plates and double slides; the very near future will be a folio and a roller-holder.

I know I shall be told next week—"We have done this long years ago in England." So we have; I did it myself, but how? and why didn't we use it? "Because"—aye, there's the rub; there's sure to be a "because"; it's no use fooling ourselves with the soothing mixture that we knew all about it. I grant we did know *something*, and we had some patents, both for films and rollers, but they *never broke glass;* it will be "deal broke" this time.

I've seen many changes in photography in my time, from Daguerre to gelatine bromide; but this last, as its parent Jonathan would say, "licks all creation" (or soon will do).

As I asked at first, what *is* to become of our double slides? I have sixteen *hors de combat* now.

◆

PHOTOGRAPHIC APPARATUS AT THE ENGLISH PATENT OFFICE.

BY CHAPMAN JONES.

The convenience of photographers, and the profits of manufacturers who cater for them, have become so much more important during the last few years, that there is probably no one connected with the trade who cannot point to a large increase of business, and, if he so choose, comfort himself and praise his wares by drawing laudatory conclusions therefrom.

The practitioner is glad to see manufacturers competing for excellence, but this state of affairs brings with it minor troubles to both, for some inventions are neither useful nor remunerative. Every contrivance teaches its own lesson: it is either good or bad, and a knowledge of what has been done is the best start towards further progress.

Though there are plenty of persons whose laziness or ill-advised hurry leads them to ignore the experience of earlier workers, there is no need for forgotten ideas to wait for re-invention to bring them to the front again, while any record of them remains.

And apart altogether from such considerations, the student likes to trace the development of his study, and to become acquainted with at least the names of those who have made present achievements possible. It is hoped that these papers may prove a little help in the directions indicated.

It has been deemed advisable to exclude, at least for the present, apparatus that is used by manufacturers, rather than by photographers themselves, such as plate-coating machinery, as well as apparatus applicable only in certain cases, and not generally useful. Thus, inventions relating to Daguerreotypes, arrangements for giving automatic exposures (as for copying series of documents, &c.), and dark tents, are not referred to unless some detail claims attention for its own sake.

The mere adoption of a device will not, as a rule, be referred to where such device has been described before, and is not considered by the inventor to be any part of his invention.

The period covered extends from the date of the earliest application for protection (1839), up to the end of the year 1883. To have included 1884 would have been filling up valuable space with notes concerning inventions that have been too recently brought under public notice to need further advertisement; and the changes made at the Patent Office in 1884 make the end of the previous year a natural stopping place in any history of inventions.

It must not be supposed that the person associated with the earliest mention of a novelty is of necessity the original inventor of it; it can only be said that he is the first person who applied to the Patent Office for protection.

Many inventors employ agents, and the agent is often the actual patentee. In such a case, where the communicator's name is given in the specification, both names are quoted; thus, *A. B. for C. D.*, *A. B.* being the patentee acting according to instructions from *C. D.* The exact dates of all the specifications are given, so that any one desiring further particulars can readily find the required specification at the Patent Office Library, or elsewhere.

There are some well-known inventions that are always described as "patent," though they never were patented, having received "provisional protection" only; but no notice is taken of such facts.

Finally, while every effort has been made to get exactly at the meaning and true point of each invention, it should be borne in mind that some descriptions are profuse, while others are meagre; some inventors seem anxious to hide their meaning among a mass of general applications and modifications, while others make obvious omissions, and are occasionally unintelligible.

The camera will be considered under three main heads—Camera bodies, Camera fronts, and Camera backs; and changing boxes, focussing screens, &c., will be separately dealt with.

Camera Bodies.

The earliest specification referring to photographic matters was filed by M. Berry (August 14, 1839), and describes the production of Daguerreotypes according to Messrs. L. J. M. Daguerre, and J. I. Niepce, Junr. The camera has a wooden body in two pieces; the back part slides within the front part, and is secured by a screw through a slot in the base-board; the ordinary form of sliding body camera. V. A. Prout (April 8, 1865) makes the front part to slide within the back, and this idea is carried further by W. F. Stanley (August 18, 1880) in his telescopic camera, which has two or more sliding pieces, the smallest, and therefore the innermost piece, being in the front. There is no baseboard; each draw supports the next smaller one, and has a spring at its lower part to hold it fast when drawn out, besides a cord run in a groove to make the joints dust-tight. The chief object of the telescopic form is portability, and this end can be attained in wooden body cameras by folding, as well as by a sliding arrangement. F. Fowke (May 31, 1856) dispenses with the base board, and makes the front part of the body tapered, so that the four pieces may fold together against the back frame; and W. Morgan-Brown, for J. H. Hermagis (March 13, 1875), describes a camera that is packed by drawing out the front and back, and then folding flat the sides, top and bottom, which are suitably hinged.

Portability of the camera itself is altogether sacrificed by A. Pumphrey (April 9, 1881) for the sake of convenience in carrying and exposing a stock of films. He uses a non-collapsible, rectangular box, of which only about one half of the upper two-fifths is used as the camera proper, the rest of the space constituting a changing box, which will be referred to subsequently.

It has been sought to advantageously replace wood by metal in the construction of cameras, though not, apparently, with much success, if we except certain instruments made for special purposes. A. J. Melhuish (November 10, 1859, and December 28, 1859) uses preferably thin brass suitably strengthened, and makes a rigid body in which the other parts are packed; or the body may slide or fold, care being taken to cover the joints with a strip of metal, velvet, or cloth. The body may be reduced in length by using a tube in front to carry the lens. H. Neville (July 24, 1861) makes a camera for microscopic work "of wood, or metal, or both"; but the advantages of metal would, probably, show most conspicuously in such designs as that of T. Bolas (November 3, 1881.) This camera is practically a vertical cylinder with a lens on one side, and the plate-holder opposite. It has a revolving lining with suitable holes for the lens and plate respectively, so that a quarter turn will either cover or expose them both. The cylindrical chamber is represented as enclosed in a rectangular case, and a second lens opening into this case acts as a finder, and for focussing.

Camera bodies of framework covered by an opaque material, as paper, cloth, &c., have been proposed by W. Jeffery (May 7, 1859), and A. J. Melhuish (December 28, 1859), the latter using metal for the framework.

For portability and general convenience there is nothing that can compete successfully with the bellows body. It is an obvious adaptation that must have been made almost as soon as the necessity arose. J. C. Bourne (March 27, 1855) makes a collapsible body of cloth, but not in regular gussets, the cloth being limp; and J. Mawson (November 13, 1855) uses a conical tube of flexible cloth. There does not appear to be any means of keeping these bodies extended when they are not at full stretch, though in the latter case focussing is done by moving the front part of the camera. J. E. Grisdale (March 12, 1862) connects the camera back and front by "lazy-tongs" levers, and covers the whole with a bellows or bag.

Accepting the ordinary type of bellows body, the base-board has been modified by W. J. Stillman (November 14, 1871), who, in addition to the back and front of the camera, has a central frame with the base-board folding up against each side of it. It is obvious that this arrangement forms what is now called a "long-focus" camera. W. B. Woodbury (April 27, 1877) utilizes the box in which the camera packs for the base-board; the shallow hinged lid, when opened until in a plane parallel with the bottom of the box, carries the front of the camera in different positions to suit the focal length of the lens used. The back works in the box itself by means of a screw. G. Hare (June 27, 1882) hinges the base-board to the bottom front edge of the back frame, and has a folding bracket at one side to support it. The front works in grooves along the base-board for focussing.

T. H. Blair (February 4, 1880) makes the back part of his camera large enough that his changing box may be put in it for carrying.

Other and more radical changes have been made in camera bodies for special purposes. An orange-coloured glass bottle, squat and wide-bottomed, open at both ends, is described by J. H. Johnson for G. J. Bourdin (December 21, 1864). The sensitive plate, when in position, forms the bottom to the bottle, and the lens projects from its neck. The apparatus lies horizontally, as usual, for exposure, and the sensitizing, developing, &c., solutions (wet collodion process) are introduced through a hole in the side by a pipette. The solutions flow over the plate when the apparatus is turned so that the plate is lowermost, and the operations can be watched in daylight, the orange glass affording the necessary protection for the sensitive surface. The glass camera may be enclosed in a suitable frame.

Miniature cameras made like opera or field-glasses have been described by Mr. W. E. Newton for H. Cook (May 22, 1867), and by C. D. Abel for A. Loiseau and J. B. Germeuil-Bonnaud (February 23, 1881). Both inventors use twin lenses, and give up one barrel wholly to the purposes of a finder, &c. H. Cooks uses plates an inch and a-half square, and a changing-box to hold fifty or so of them. According to the later invention, both barrels may be fitted as cameras for getting stereoscopic pictures, and the apparatus may be used also as an opera or field-glass by changing the lenses, &c. The opera-glass objective may be employed in photographing by adding a small bellows camera behind it.

Of the adjuncts to cameras that will not call for treatment under separate heads, we have, by J. B. Dancer (September 5, 1856), a spirit-level fixed on the top; by C. Langlois (September 16, 1856), screw feet for levelling or inclining; by J. Purnell (April 9, 1857), a removable division so that a pair of stereoscopic pictures may be taken on one plate; by T. H. Blair (February 4, 1880), a view-metre, consisting of a rectangular frame in front of a sight hole, which, when fixed on the top of the camera, becomes a finder; and by W. F. Stanley (July 10, 1882), a scale, which may be a revolving dial, to indicate the adjustment of focus for reducing to any known proportion, and also the distance away that the object should be placed. A microscope combined with a camera is described by H. E. Newton for L. Jaubert (February 14, 1866), and the combined apparatus may be used horizontally, vertically with the sensitive plate at the bottom, or vertically with the plate at the top, for convenience in arranging and lighting the object to be photographed.

(To be continued.)

THE LUMINIFEROUS ETHER.

BY LAWRENCE SMALL.

When Newton had shown that bodies tended to approach each other owing to the action of force, the strength of which between any two bodies increased directly as the product of their masses, and inversely as the square of the distance between them, some explanation of the force was made necessary, and Le Sage propounded his theory of gravity. Le Sage proposed to explain gravitation much in the same way as we now account for the pressure of a gas. We know gaseous pressure to be the effect of molecular motion. The molecules of a gas are not fixed, but move in all directions in straight lines until they are interfered with by other molecules with which they come in collision, or until they are stopped by the objects against which they strike, or by the sides of the containing vessel. When a molecule strikes against another, or against an object, it rebounds and moves off in another direction. The molecules of air dashing in incalculable myriads against a body produced by their bombardment an effect equivalent to a continuous pressure, for although the molecules as they strike the object rebound, other molecules immediately succeed and maintain the effect. If this battering took place on only one side of a body it will readily be understood that there would be a tendency for the body to be driven along. Le Sage supposed that besides the ordinary matter of which we were cognisant, there existed in space a more refined kind of matter which consisted of corpuscles, much smaller than the molecules of grosser matter, moving about rapidly in all directions. A solitary body in space would thus be battered equally on all sides, and there would be no tendency to motion. But when a second body is introduced there is instantly a sheltering of each by the other on the inner sides, while the sides turned away from one another are exposed to the full hail of these corpuscles. Thus there is a greater tendency for the bodies to be driven together than for them to separate, and the difference of the two tendencies is the intensity of the force of gravity.

This corpuscular theory of gravity makes it necessary to suppose that bodies are perfectly permeable by the corpuscles, because the strength of the force is known to depend on the mass, and not on the extent of the surface of the body; and thus the theory requires that every molecule of a body should be subjected to the full force of the bombardment. Very probably this is not the true theory of the cause of gravity, but it shows us that to account for gravity, we must suppose that interstellar and even intermolecular space is not void, but is filled with matter the motions of which produce pressure. Another consideration compels us to believe that space is occupied by matter, and that is the fact of the transmisison of light from the sun and stars.

Matter is only affected by other matter in motion, so that whatever can affect the retina must be material; and light must either be a moving substance, or the motion of matter extended in space. Sir Isaac Newton believed light to consist of extremely small bodies (corpuscles) which streamed with great velocity in all directions from a shining body, and which, entering the eye, and impinging on the nerve ends of the retina, produced an effect which became in the brain the sensation of light.

Huyghens conceived light to be due to waves in the medium which Descartes had supposed to fill all space. Newton, however, opposed the undulatory theory of light with great vigour, basing his chief argument on the fact that when a wave meets with any obstruction, it divides, passes the object on both sides, and forms again, but with diminished height, behind it. But light apparently does not bend round objects, but seems to proceed in perfectly straight lines. Therefore, said Newton, light is not due to wave motion, and the corpuscular theory is true. This argument was shown to be false by the experimental demonstration of the fact that light can and does bend round objects, though the waves (as in the case of those on water) have a much diminished amplitude of vibration, and (with the exception of those confined to a small angle of bending) are consequently unable to excite vision. Therefore, although the ether waves are deflected (or diffracted) we are unable to see, as well as hear, round a corner. The English physicists, unfortunately, accepted the corpuscular theory of light on the authority of Newton, even in the face of facts that would have convinced Newton himself. It was not until the end of the last century that the truth of the undulatory theory was established by the labours of Dr. Thomas Young, and every newly discovered fact since then has served as additional proof of the existence of interstellar ether.

What, then, is ether? It is a substance extended in space as far at least as the furthest star visible by telescopic aid. From the character of the vibrations we know that the ether is not a gas, for no set of disconnected molecules can transmit vibrations such as are transmitted by the ether. Neither can they be transmitted by a liquid, for the medium must possess rigidity, or elasticity of figure—that is, it should tend to regain its shape after distortion. The extreme mobility of the ether forbids us to regard it as an ordinary solid, for it closes up completely after a body of the grosser matter has passed through it. But even this property may be possessed by a solid. If a leaden bullet be placed on a thick cake of Burgundy pitch, the bullet will gradually sink into the solid pitch, and in the course of a few months will have disappeared entirely beneath the surface. The only apparent difference between this phenomenon and that of the closing up of the ether after a body has passed through it, is the time that is required; in the one case months, and in the other the minute fraction of a second, being necessary. The ether may best be regarded as in a state intermediate between solid and the liquid. We are not entirely unacquainted with such a body. A jelly, by the constant addition of water, may be made to pass by a long series of gradations from the solid to the liquid state, at no one of which can we say, "Here the solid state ends and the liquid begins." We may picture the ether as a highly attenuated jelly filling all space, in which material (as distinguished from ethereal) molecules are imbedded. It is believed to be a perfectly continuous or homogeneous body—that is, it is incapable of being resolved into molecules or atoms. The ether has of course a definite rigidity and a definite density on both of which the velocity of wave propagation depends., The greater the density the less the velocity, but the greater the elasticity the *greater* the velocity.

The velocity of light and the density and elasticity of ether are so connected, that if two are known, the other can be determined. Sir W. Thompson has, from certain data, made an estimation of the density of the ether which makes it almost infinitesimal. Yet, small as the density of the ether is, it is enormous when compared with that of air at (say) a distance of 4,000 miles from the earth's surface. Knowing the density, the elasticity of the ether is easily calculated, and a value is obtained which shows that the elasticity of the ether is insignificant when compared with that of steel. Hence we may say that the great velocity of light is owing rather to the sma density than to the great elasticity of the ether.

Light and heat both consist of transverse vibrations in the ether; that is, the wave motion takes place in a direction perpendicular to the line of propagation. Similarly, in waves of water, the undulation travels horizontally, while the motion of the particles of any wave is up and down.

These ethereal undulations are produced by the vibrations of the molecules of hot bodies. Heat is a vibratory motion of the molecules of a body; if a body were entirely devoid of heat, the molecules would be perfectly quiescent. The hotter the body, the more violent is the vibration; or, rather, the greater the intensity of the vibration, the more powerfully it produces the sensation of heat. These vibrations disturb the ether much as a moving particle imbedded in jelly would disturb the jelly, producing waves which are transmitted with the enormous velocity above mentioned. If the vibrations of the molecules take place with a comparatively small degree of intensity, the undulations of the ether are incapable of exciting vision; but when the body is hot enough—that is, when the molecular vibrations take place with sufficient rapidity—the body becomes self-luminous, because the ether waves are now capable of affecting the retina of the eye. An iron ball heated to the temperature of, say, boiling water, can emit no light, but radiates heat only. When the temperature is raised to a certain degree it begins to shine with a dull red light; made hotter still, the light is of a bright red; and, when the heat is sufficient to melt the iron, the light is a dazzling white. When a body is heated by radiation from another, the ether waves throw the molecules of the colder body into a more intense state of vibration; when a body cools, the vibrating molecules give up their motion to the ether, becoming more and more quiescent. This transference of motion from the ether to the molecule, or from the molecule to the ether, shows that the ether is not frictionless. The same fact is indicated by certain stellar phenomena.

I come now to a recent theory as to the nature of material atoms. Sir W. Thomson's idea of the constitution of an atom is that it is a vortex ring in, and of, the ether. We have all seen smoke rings made in the air by a smoker, and we have seen the ring moving through the air with the same kind of motion as an india-rubber umbrella-ring has when it is moved along a round stick. Material atoms are supposed to consist of such vortex rings in the ether. If the ether be frictionless, these rings could never have been produced, and must have existed from eternity; but if the ether be not frictionless, the vortex rings will gradually lose their vortical motion, and will ultimately become as the surrounding ethereal medium. Supposing this idea of the structure of the atom to be true, one of two things will happen according as the ether is frictionless or not. In the first case the atoms would be indestructible; and the principle of the dissipation of energy indicates that all the matter of the universe will aggregate into fewer and fewer but larger and larger masses, and, if finite in quantity, will eventually form one huge mass devoid of heat, of light, and of motion—cold, and dark, and motionless. In the second case, the atoms, though they might endure for countless billions of years, would at the last cease to exist as atoms, their vortical motion having been destroyed, and would become a part of the ether. In such a case the motion would still exist, and in the ether, though it would not exist as a vortical motion; yet it is conceivable that this motion might be so compounded with other motions in the ether as to produce afresh vortices, that is, atoms of gross matter. Thus, on the supposition that the vortex-atom theory is true, and that the ether is not frictionless, while atoms are, at one part of the universe, being resolved into ether, at another part, and by purely natural agencies, atoms are being produced. So that as fast as matter falls together, and aggregates into larger masses (owing to its loss of energy), and so fast as the atoms of matter cease to exist, so fast are they reproduced and distributed throughout the universe to form that nebulous condition of things from which, as we know, the present stellar systems have been developed. Indeed, it seems but reasonable to suppose that those nebulæ discernible only by high telescopic power, and shining with but very faint light, are nebulæ of more recent origin than those known as planetary nebulæ; and that these in turn are younger than the nebulæ from which the solar system originated, the greater nebulosity indicating the earlier youth.

The conception of the ether as a universal medium affords a material explanation of the force of gravity. We have seen that Le Sage proposed to explain the tendency which all bodies have to approach one another by a bombardment of matter by extremely fine corpuscles, which showered through space in all directions, a difference in pressure on the sides of bodies being produced by a mutual sheltering of two or more bodies. The known existence of the ether dispenses with these flying corpuscles, and gravity may be accounted for by supposing that bodies near each other produce, by their molecular motions, differences of pressure in the ether by which the bodies are forced towards one another. Vortex atoms in the ether would suffice to produce the requisite differences in pressure. Besides being probably the cause of gravitation, the ether will very likely be found to be the cause of the other (so-called) attractive forces, electricity and magnetism. Indeed, Dr. O. Lodge has advanced the supposition that the ether itself may be electricity; or rather, that by an arrangement of matter by which an electromotive is set up, the ether may be sheared into positive and negative electricities. In short, this conception of the ether seems to unify all phenomena, all kinds of matter being made up of atoms which are vortices in the ether, each kind of atom having its own peculiar vortical motion; and all kinds of force being resolvable into pressures produced by disturbances within the ether.

Whether this view of the ether as the finality of all phenomena be justifiable or not, it is certain that the ether is "capable of vastly more than anyone has yet ventured to guess,*" and there seems to be great probability that a deeper knowledge of this wonderful substance will serve to establish the unity of matter and the unity of force—*Our Corner.*

ON FOCUSSING.

An expression in a recent article by our esteemed *confrere*, Mr. Stillman, relative to focussing, is apt to, and in all probability will be, misunderstood by those of our readers who are imperfectly acquainted with optics as applied to photographic lenses.

The expression is as follows:—"If a lens is properly constructed, the focus given with its aperture is identical with that obtained with a smaller diaphragm, and the proper way to focus is to use the full aperture, and then stop down to the requisite degree."

Now as this is found in practice to be not invariably in harmony with the experience of many, while it is quite true in itself, we purpose entering into such an explanation of the matter as will reconcile the inharmonious results of theory and practice.

We may say, first of all, that a photographic lens cannot be said to be a perfect optical instrument in the sense in which the same may be claimed on behalf of an object glass for the telescope or the microscope. Hence it cannot be "properly" constructed; that is to say, its errors arising from spherical and chromatic aberration, and the incapacity of transmitting an oblique ray properly, cannot, with our present optical resources and knowledge, be entirely eliminated, but only be minimized.

If a lens were rendered perfectly aplanatic—that is, if spherical aberration were entirely absent—then would the recommendation given as to focussing with full aperture and diaphragming down be absolutely correct. But this condition—*i.e.*, freedom from spherial aberration with a large aperture—does not prevail in perfection in any photographic lens, except in the rays transmitted axially, and, in innumerable cases, not even then.

In some, but not in all portrait lenses, the correction is such as to permit of the system of focussing recommended being practised in all its strictness. Other portrait lenses, and some, too, which possess excellent characters as efficient working instruments, are deficient in that refinement of correction by which the best result is secured by dropping in a small stop after focussing with a large one. A lens intended for covering a field large in proportion to its focus is not aplanatic, and cannot define with full aperture at all; hence all lenses of this class—that is, "wide angle"—are made with a fixed diaphragm having an aperture much smaller than the diameter of the lenses, and this because of the spherical aberration, or that property by which the margin of a lens does not transmit a ray to a focus on the same plane as rays nearer the centre.

No class of lens is better calculated to produce a landscape replete with every good optical quality, rectilinearity excepted, than the well-known, time-honoured, single achromatic landscape lens. Such opticians as Ross and Dallmeyer used to say that of all lenses extant, it was the best for landscapes on account of the pluck and vigour it yielded. Now it is a fact as sound in theory as accurate in practice, that each and every one of the family of single achromatic lenses—and in which is included some by which as fine pictures as any in the world have been taken—has its focus or plane of the greatest sharpness altered by changing the size of the stop, the focus becoming longer in proportion as the aperture becomes smaller.

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* "The Unseen Universe." 6th edition, p. 154.

To show the difference between strict mathematical theory and every-day practice, we may state that with a single achromatic objective, which strict theory cannot accept as optically perfect, we have taken photographs so intensely sharp as to permit of the image on the negative being examined by an exceedingly powerful magnifying glass.

The diameter of the lens is $2\frac{1}{4}$ inches, its focus $15\frac{1}{4}$ inches. The aperture in the largest or fixed diaphragm is seven-eighths of an inch, and with that aperture the definition is excellent; for portraits, groups, or instantaneous landscapes it leaves nothing to be desired. The next stop is one of half an inch, representing an intensity power of $\frac{f}{30}$, which, with the sensitive plates of the period, is still well within the powers of action of the drop-shutter. The third stop is slightly in excess of a quarter of an inch.

We were speaking on this subject to the head of a firm of photographers who make a speciality of doing fine line work for engraving purposes, and he said that while he employs the largest stop for the arranging of his subject, he invariably effects his final focussing after the working stop is inserted. This he found specially necessary with one particular lens by which most of his best work is made. The practical outcome of the whole matter is this: if, after becoming intimately acquainted with the peculiarities of a lens, it is found to be aplanatic in such a measure as not to require re-focussing when making the jump from full aperture to the small stop (and there are innumerable lenses of this character), then let it be used in this way accordingly; but if the focus is found to require re-adjustment when employed under like circumstances (and this also applies to innumerable lenses), then let the focussing be done with the working stop, or one only a little larger if the light is deficient.

A lens may belong to the former class without possessing some other features which are useful or recognized as necessary, such as flatness of field with good definition; while one of the latter class is not to be lightly esteemed on account of the presence of a modicum of spherical aberration, the elimination of which might introduce an evil much greater than that sought to be cured. A lens may be "properly constructed" for one purpose, and not, for another. A certain horse may be "perfect" as regards his application to the traction of a heavy load, while as a racer he would be nowhere.—*Photographic Times.*

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E. MUYBRIDGE PHOTOGRAPHING THE MOTION OF BIRDS AND QUADRUPEDS.

The following is extracted from the *Philadelphia Public Ledger*:—

To-day Edward Muybridge, of this city, proposes to begin the use of his system of instantaneous photography in the Zoological Garden, and he expects to spend ten days or more there in photographing the motions of the representative birds and beasts. Yesterday Mr. Muybridge and about half-a-dozen assistants—most of them students from the University of Pennsylvania—were at work on a grassy slope in the southern part of the Garden, preparing the electric batteries, cameras, and "backgrounds," and it was said that everything would be ready this morning to begin photographing pigeons, eagles, and other birds in motion. Mr. Muybridge says that very little is known about the motions of birds, and he believes that their photographs will be found no less interesting than the pictures which have been shown from time to time of horses and other quadrupeds in motion.

Mr. Muybridge anticipates considerable difficulty in photographing wild beast, as they cannot be taken further from their indoor cages than the inclosed yards. Owing to the limited area of these inclosures the photographer will not have as good facilities as he would desire for conducting the work. The bars of the cages may, in some cases, interfere considerably with the work, but Mr. Muybridge expresses confidence in being able to accomplish his designs.

His invention is the application of electricity to making photographic exposures in quick succession, and at regular intervals of time or distance; also making that succession of exposures from different points of view at the same corresponding intervals of time or distance. "We propose," said Mr. Muybridge, "to make a thorough analysis of the movements of birds and quadrupeds, and as I am neither a physiologist nor an anatomist, two professors from the University of Pennsylvania are assisting in the work to give it additional weight and value. They are Dr. Francis X. Dercum, Instructor on Nervous Diseases, and Dr. A. J. Parker, Professor of Comparative Anatomy and Zoology.

The apparatus includes three batteries of twelve cameras each for photographing from three points—the side, the front, and the rear. The three batteries do their work simultaneously. First the three number one cameras act, then the three number twos, and so on, until the three number twelves have operated. All this gives thirty-six different views at twelve intervals of time. One round movement of an animal, as a flap up and down of a bird's wing, is shown in twelve different phases, each phase being photographed from three different points. Le Clanche batteries of thirty-six cells each are used. The cable connecting the battery with the camera contains thirteen wires, one being a return wire, and the others connected with the twelve electro-magnets that are immediately above the twelve cameras.

Mr. Muybridge says that the apparatus can photograph a movement occuping the one five-thousandth part of a second of time. The calculations of the time of the movement of an animal as a whole, or the motion of any one part of the body in comparison with the motion of any other part, are made by means of the "background," a large square of canvas stretched on a wooden frame, and divided by cords into forty-eight squares. Each of the forty-eight squares are sub-divided by thinner cords into one hundred spaces, each two inches square. If the animal to be photographed is white or light in colour, the canvas is black and the cords white. If the colour of the animal is dark, the canvas is whitewashed and the cords black. The background is photographed with the animal, and the mathematical calculations are made upon the positions of the photographed phases of motion along the little squares.

Mr. Muybridge says that this work has been carried on for several years under the patronage of the University of Pennsylvania, and the cost at the time of its completion will probably reach $20,000. In order to be re-imbursed for this expenditure it is proposed to embody the results of the investigations and experiments in a very elaborate publication. "Without going outside of Philadelphia, New York, and Boston," said Mr. Muybridge, "we found no less than one hundred and fifty institutions and individuals willing to subscribe for a work costing $100. This willingness was expressed after a mere verbal description of what we proposed doing.

"The results of our investigations so far this year have been such that we have no hesitation in pursuing them to the projected goal. We have devoted ourselves to the motions of men, women, and children, particularly in their performance of the ordinary duties of life. For instance, the motions of persons with and without loads on their heads, or in their arms or hands; on level places and on inclines; going up, coming down, and turning corners.

"To show how little was known until recently about the locomotion of animals, it may be mentioned that after a prolonged and careful search I found only one artist who could describe the sequence of the steps of a horse; in other words, tell how a horse walked. In pictures of battles you see the bodies of horses represented with one motion, and the legs with another; an impossible combination in reality. Artists of the highest celebrity continue at this day to make absurd representations of animals in motion. So much has been published of late about the real motions of horses and other animals, as shown by the investigations that we have been pursuing, that it is unnecessary to speak further by way of illustrating the value of the work we are now continuing at the 'Zoo.'"

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Notes.

By order of the Italian Government, an official photographer has now been added to the small army engaged in the exhumation of the buried city. Hitherto, many of the frescoes and mosaics laid bare by the excavators have, in spite of the greatest care, cracked and crumbled into ruin when an attempt has been made to remove them to the Naples Museum, or even to complete the operations necessary to their complete restoration to light and air. In future, therefore, as soon as a fresco or mosaic is uncovered, the excavatory works are to cease until the official photographer has secured as perfect a negative of it as possible; so that if the worst subsequently happens, there may be a permanent record of the vanished relic of the past.

In the representation of the statue of Niépce we gave last week it will have been noticed that that worthy was leaning on a photographic camera, and it seems to us that his pose is one which our own sculptors may take a note of with advantage. Why not, in our statues of the future, associate the effigy of the celebrity which is set up with some sign or symbol of the profession in which he has won his fame? Our statues now are terribly monotonous in their frock-coated or "Roman-togged" sameness, but in future the famous artist might be sculptured standing at his easel; the great surgeon, wielding the scalpel; the architect poring, compasses in hand, over a plan; whilst the statesman might be leaning on a pile of Blue Books or Statutes at large. Really, our sculptors had better take this suggestion to heart.

At Aberdeen, on Wednesday, met the body which still retains the somewhat imposing name of "British Association for the Advancement of Science." Sir Lyon Playfair delivered an address in which he contrasted the smallness of the expenditure made in Britain on behalf of science, with the liberality which it obtains in the United States and in certain Continental countries.

Photography does so much to familiarize the general public with the faces of well-nigh everyone who achieves either popularity or notoriety, that it is not surprising that individuals who wish to have their names in the mouths of the masses freely patronise the camera. But there is an unpleasant, not to say highly inconvenient, side to that facility for personal identification which the circulation of one's carte affords the populace, as some of the defendants in the sensational case now being heard at Bow Street have lately found out. The papers have already detailed, indeed, the violent tendencies of the mob which waited outside the Police Court till the hearing for the day was over, and which audibly expressed its intention of "going for" the better known of the said defendants. But we have not yet seen reported the incident which we personally observed, that amongst a certain section of the demonstrative and threatening crowd a photographic portrait of the so-called "General" Booth was being passed, each temporary possessor of it studying it most intently before handing it on.

The purpose of the examination appeared to be clear. There was a general belief in the crowd that the "General" was attending the examination, and the photograph was evidently being passed round to enable its scrutinizers to freshen their knowledge of the pronounced features of the Salvation Army's leader. That this expedient was not altogether successful was subsequently proved by the rough way in which a worthy journalist—the Editor of *Lloyds*, and therefore a man the crowd would have delighted to honour, had they known who he was—was hustled, in the mistaken belief that he was the "S. A. General." It was a case of mistaken identity, like that for which the English tourists suffered at Frankfort the other day.

An article on "Balloon Photography," which appears in *Nature* this week, is illustrated with the arrangement adopted by Gaston Tissandier—almost identical with that of Shadbolt, already figured in the News on p. 659 of our last volume, and there is also a reproduction from a balloon photograph, which strikingly recalls Shadbolt's view of Blackheath reproduced in the News on the page above mentioned.

An article by Mr. P. G. Hamerton, in this month's *Longman's* on the collection of works of art, contains some suggestive hints which bear upon the recent discussion on the photographs of the National Gallery pictures and retouching. Mr. Hamerton, in speaking of heliogravures, and photogravures, utters a warning against announcements to the effect that "reproductions are done entirely by process, and have not been retouched by any engraver." When this statement is true the reproductions are likely to be unsatisfactory, as was the case with a particularly bad set of reproductions of Rembrandt's etchings, loudly heralded with this announcement. "The quality of Amand Durand's wonderful reproductions is due in great part to the large amount of highly intelligent hand-labour which he bestows upon the plate after photography has rendered an intermediate service by giving the correct forms and directions of the lines, but not their depth." If this be the opinion of so skilled a critic as Mr. Hamerton, it is scarcely worth while for any copyist who has been more than usually successful to deny that he has retouched a negative. To be told that a copy of a picture owes its success to retouching may come to be a compliment.

Mr. Hamerton, it may be mentioned, praises the Autotype process very highly, remarking that "for the poor collection of drawings it is as precious as Amand Durand's heliogravure for the collection of etchings. By its means he may *almost* possess the finest drawings in the great collections of the world."

The authorities at the Tower of London have set a good example. For the new guide about to be issued, a number of photographs of the building have been taken, and have been forwarded—simply, we presume, as a matter of form —to the Queen for approval, before being inserted in the book. It is not stated whether the guide-books are to be illustrated with photographs or drawings, made from photographs. If the first, the cost of the book will be somewhat heavy.

The sun-pump of Ch. Tellier, which is now working at

Auteuil, may be regarded rather as a scientific curiosity than as an apparatus of practical utility; still, it will pump up something like a hundred gallons of water per hour to a height of about sixty feet. Its action depends on the driving off of ammonia from its solution by the solar heat, and the re-solution of the gas under the cooling action of the water pumped.

Writes a jocose correspondent:—"The order of the Esel (first-class) has been bestowed on the sapient chief of the police who seized the English travellers at Frankfort. Seeing—as you stated last week—that it was through the blunder of this official over a photograph that the unlucky travellers were incarcerated, he could scarcely claim the order of the camera. This is why they gave him the order of the E(a)sel!"

A correspondent writes:—"Some years ago I had a photograph taken of myself. The photograph was put away in a box for a considerable time, and when taken out, was found to have faded very perceptibly. I consulted a photographic friend as to what should be done to restore it if possible, and he suggested putting it in the sun. I adopted this suggestion, and, to my surprise, I found the colour come back, and the photograph now looks almost as well as when originally taken. It would be interesting to know whether any of your readers have had similar experience."

A very old photographic swindle has been lately in full swing in the south of London. A man has been busy photographing the outsides of houses, and, according to a report in a local paper, has taken several pounds out of one or two streets in a day. But reports a correspondent of the same paper, "The poor man has had so much business that he has mixed up houses, terraces, villas, and squares in such a confused mass he cannot find the negatives of any one of his patrons' houses;" in other words, the fellow has taken the money and not the pictures. A man was lately charged at West Ham Police Court with obtaining money under false pretences, the circumstances being exactly similar to those just mentioned. It is clear the game is a paying one, or so many would not engage in it. It seems hard, when legitimate and honest photographers cannot find enough to do, that rogues should be able to step in and gull the public in this manner.

Patent Intelligence.

Application for Letters Patent.

10,403. William Davey, 53. Chancery Lane, for "An improved process of making and finishing photographic portraits or pictures."—2nd September, 1885.

Patents Sealed.

13,116. Edward Probert Evans, Royal Porcelain Works, and Thomas Sanday, Cole Hill, both in Worcester, for "A new process for producing incised patterns or designs on copper or other metallic plates for printing from."—Dated 3rd October, 1884.

12,389. Josiah Thomas Chapman and Thomas Scott, 41, John Dalton Street, Manchester, for "Improvements in folding cameras."—Dated 15th September, 1884.

5523. Eugen Himley, 22, Gt. St. Helen's, London, for "Improved method of, and apparatus for, taking photographs by artificial light."—5th May, 1885.

Specifications Published during the Week.

13,103. Ludwig Hermann Philippi, of Hamburg, Germany, Architect, for "Improvements in Reproducing Photographs by Printing, and in Producing Printing Blocks or Rollers Therefor."—Dated July 1st, 1885.

The object of this invention is to produce pictures by means of a number of printing blocks, which are all obtained by means of the same photographical positive or negative, but all differ from each other in consequence of a relatively more or less long exposure to the influence of light, and the impressions of which are placed one above the other on the material whereon the reproduction of the original has to appear.

To carry my invention into practice, I make use of a photographical negative or positive produced on suitable transparent or translucent material, such as glass, gelatine, &c. I place such negative or positive on a plate of metal, glass, stone, or other suitable material, which is covered with a layer of such substances which are changeable in their solubility through the influence of light, as, for example, asphaltum, chromatized gelatine, and the like, and insert between both, or place upon both, a transparent or translucent plate or foil provided with parallel lines.

Then I expose the sensitized coating until all shades of the photographical positive or negative, but the darkest and consequently the most impermeable, partly interrupted by the lines of the hatched plate or foil, are transferred thereon. Preferably I place the photographical positive or negative in such a manner as to dispose light and shade in the same manner as the original shows them, but such position also may be varied according to convenience. By washing out afterwards the sensitized coating respectively by etching the plate beneath it, or by treating it with a sand-blast, a printing block is produced, in which all spots not exposed to the influence of the light are washed out respectively, etched, or ground away; while the rest of the plate is covered with a system of parallel lines, corresponding with the design of the inserted plate or foil. By making an impression with such block, only the parallel lines will appear on the material to be printed.

In the like manner, I make some more printing blocks by giving the inserted plate at each exposure a turn of a part of a circle, and by reducing the time of exposing at each exposure (when supposing an equal force of the acting light, an equal transparency or translucency of the transparent or translucent materials, and an equal sensibility of the sensitized layer to exist at each exposure); thus printing blocks are produced with less and less hatched surfaces. In the most cases, four printing blocks will suffice, thus requiring a turn of 45 degrees of the hatched plate or foil at each exposure.

I then make impressions with such printing blocks on paper, cloth, or other suitable material, by placing properly the guide-marks of the blocks. Thus pictures are produced, in which the shades are composed of crossed lines, and such crossing will be as more frequent as the shade is darker, while the clearest part of the picture does not show any lines at all.

In lieu of parallel lines on the transparent or translucent plate or foil, I also make use of any other design with repeated figures; I also vary with the designs for the different blocks, or I insert two or more plates or foils with equal designs, but in different positions, or with designs differing from each other. Any suitable tissue of wire, thread, &c., or perforated sheets of metal, wood, paper, or similar material may equally be employed instead of the hatched transparent or translucent plate or foil.

By the same process I also produce curved blocks or printing rollers; but in such case I make use of photographical positives or negatives, and of foil (either hatched or otherwise, provided with designs) both produced on flexible transparent or translucent material, as gelatine-paper, tracing-cloth, or other suitable material; or instead of the hatched foil, I employ also the above-mentioned tissue or perforated material.

When impressions are made with blocks or rollers made according to my invention on transparent or translucent material, and when the printed plates or foils are placed above each other, transparent or translucent pictures are produced with the described crossing of lines; when made on sufficiently transparent and thin material, such pictures may be used for making a printing-block or roller, which shows all fineness of the crossing.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—

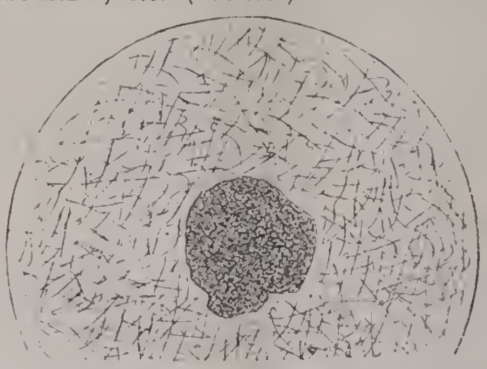
The method of producing pictures by means of a number of printing-blocks, which are all obtained by means of the same photographic positive or negative, but all differ from each other in consequence of a relatively more or less long exposure to the influence of light, and the impressions of which are placed one above the other on the material whereon the reproduction of the original has to appear.

13,116. Edward Probert Evans, Manager of the Royal Porcelain Works in the City of Worcester, and Thomas Sanday, of Cole Hill, in the said City, Designer, for "A New Process for Producing Incised Patterns or Designs on Copper or other Metallic Plates for Printing from."—Dated October, 3rd, 1884.

The copper or other metallic plate to be operated upon must first be very carefully cleaned. The design or pattern which it is desired to reproduce must then be traced upon the plate, or be printed upon the same from an engraved plate in a preparation of wax called "stopping." The plate so treated is then to be placed in an electro (copper, silver, or other metal) bath, and allowed to remain in the bath until the electro-metallic deposit upon the plate is of the required thickness. The "stopping' is then removed, leaving an incised pattern or design upon the plate similar to a pattern or design produced by engraving, from which prints may be taken and transferred to pottery or other surfaces.

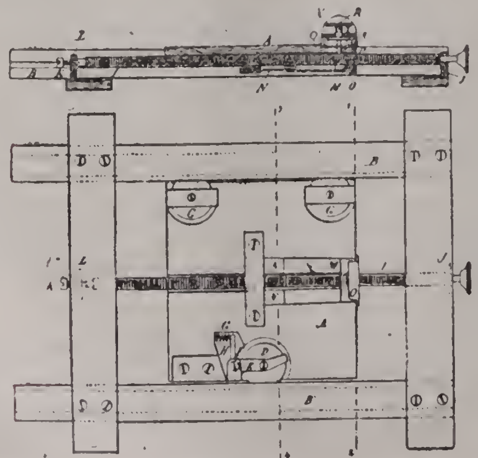
Patents Granted in America.

324,750. E. W. Carter, Cohoes, N.Y. "Filtering-Paper." Filed March 12, 1885.—(No Model.)



Claim.—A paper for filtering purposes made from sponge and fibrous pulp, and having loose cut thread or similar fibre mixed therewith for strengthening the same, substantially as described.

324,489. Francois Roussel, Villefranche, Rhone, France. "Photographic Camera."—Filed June 5, 1885. (No model). Patented in France, February, 21, 1885, No. 164,927.

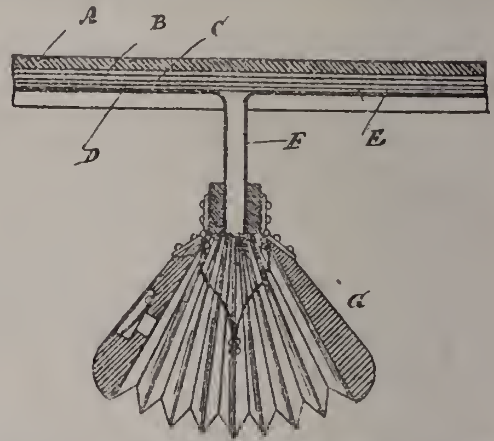


Claim.—1. The combination, with the sliding carriage A and frame, of the screw I in bearings in the frame and passing beneath the carriage, the spring-arms N, and half-nut M, a latch to hold the half-nut against the screw, and a push-button and its stem, whereby the operation of the push-button releases the latch and forces the half-nut away from the screw I, so that the carriage A can be moved freely in focussing, substantially as specified.

2. The combination, with the sliding carriage A and frame and the adjusting-screw I, of the rollers C C′ upon one side of the sliding carriage, the roller D upon the other side of the carriage, its frame E, arm H, and spring G, whereby the roller D is held against the frame by the spring, for the purposes and substantially as specified.

3. The combination, with the sliding carriage A and screw I, of the spring-arms N, half-nut M, button R, and stem U, bridge Q, plate T, pivoted latch P, and its flange O, substantially as specified.

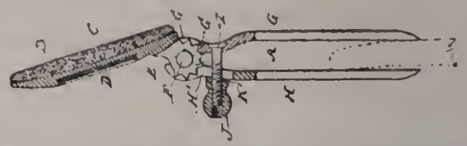
324,960. Hugo Sack, Plagwitz, Leipsic, Germany, "Light Copying Apparatus."—Filed December 20, 1884. (No model.)



Claim.—1. In combination, with the glass plate A, paper B, containing the drawing to be copied, and the sensitive or copying paper C, the perforated material D, and the air-tight material E, provided with a pipe, F, and suitable suction apparatus, substantially as and for the purpose set forth.

2. The combination with the air-tight material E, and the glass plate A, of a light copying apparatus, and the air-cushion around the surface of the air-tight material, in the manner and for the purpose described.

325,006. Charles E. Neeley, Gurdon, Ark. "Head-Rest." Filed June 2, 1885. (No model).



Claim.—1. The combination, with an adjustable head-piece provided on one face with a cushioned surface, and on the other with a mirror, of a clamping device adapted to secure the same to the back of a car-seat or chair, substantially as shown and described.

2. The combination, with an adjustable head-piece having a cushioned head-rest on one side, and a mirror on the other, and provided with a circular toothed support at right angles to its rear face, and pivots centrally formed on or attached to the said support, of a clamping device adapted to secure the same to the back of a car-seat or chair, substantially as shown and described.

3. The combination, with an adjustable head-piece having a circular-toothed support at right angles to its rear face, of two clamping-pieces attachable to the same, each piece being formed with a longitudinal slot at its upper end, a semicircular groove on its inner side, and the front clamping-piece having a shoulder at the lower end of its longitudinal slot, a screw-threaded rod projecting at right angles from the rear-face of the front piece, a washer, and of a knob or nut on said rod, substantially as shown and described.

4. The combination, with the adjustable head-piece B, having the cushioned rest C, and the toothed circular support E, pro-

vided with the pivots F, of the clamping device A, consisting of the front piece, G, having a semicircular groove on its inner side, the longitudinal slot G', the shoulder G^2, engaging with the teeth of the support E, and the backwardly-projecting screw-threaded rod I, operating in conjunction with the back piece H, having a semicircular groove on its inner side, and the longitudinal slot H', of the knob J, formed with central screw-threaded bore, and of the washer K, substantially as shown and described.

5. The combination, with the head-piece B, having the rest C, the mirror D, the circular-toothed support E, and the pivots F, of the clamping-device A, consisting of the pieces G and H, having the longitudinal slots G' and H', the semicircular grooves surrounding the pivots F, and the piece G, having the shoulder G^2, the screw-threaded rod I, the eternally-screw-threaded knob J, and the washer K, substantially as shown and described, whereby the head-rest or mirror can be adjusted at any desired angle, and the head-piece B can be secured to the back of a car-seat or other chair, as specified.

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A CASE OF BICHROMATE POISONING.

BY MAX BOLTE.

Three years ago, when I still resided at Havana, a friend of mine, who was a rather enthusiastic carbon printer, one evening met me in my dark room, where I was making the preparations for silver printing. "Ah! get rid of that," and saying so he threw the gold solution into the sink. He then entered into a long discussion on the subject, and the consequence was that when I next met my friend I received from him the first practical lesson.

Having studied Liesegang's, Monckhoven's, and Leon Vidal's treatises on carbon printing, I decided to follow Liesegang and Monckhoven, and here I may state that those two authors, as far as I can judge, have really given very good directions in every way.

My first trials, however, came out much better than I ever should have expected, and even if some prints did not show all the brilliancy and strength, as well as the fine half-tones desired, this was not a matter to complain of, for very often I had to work with carbon paper which was more than a year old; and, besides, it must be borne in mind that some kinds of paper—chocolate, for example—decompose rather quickly in a hot climate like Havana.

In about three months I became quite an enthusiastic amateur carbon printer, and twice a month I printed generally about twenty 8 × 10 sheets, besides some of larger dimensions. The good results I obtained rendered me still more enthusiastic, and I even did all I could to make proselytes and engage other amateurs in undertaking carbon printing.

About seven months after having taken up carbon printing, I was visited by some rather disagreeable sores and ulcers which appeared on my legs and arms, and which I attributed to impurity of my blood; however, the physician who attended me told me that he had never before seen ulcers of such a character. Having been compelled to suspend carbon printing for about eight weeks, these ulcers also disappeared.

The next year, as soon as the hot weather set in, I was again overtaken by these dreadful ulcers, and, unfortunately, they appeared in much greater numbers, and showed a far more venomous character than before. They resisted for some time all treatment, until, after about ten weeks, they also disappeared. All this time I noticed that, whenever I got small cuts or wounds, they all showed much inflammation, closing on the surface and forming pus, and taking weeks before they got healed. My doctor, after many examinations, and having even consulted two of his confrères, advised me to leave Havana and go to Europe, where he expected I would find competent authorities who would most likely cure me.

In Germany I consulted three physicians, known to be the most eminent in their profession, and two of them, after a thorough examination, gave their opinion that the case was analogous to that of syphilic disorganization. The treatment consisted in subcutaneous injections of bichloride of mercury, with small additions of common salt. After having received some twenty-eight of these injections, it happened that the last provoked an ulcer on the hip, which kept me for eleven weeks in bed. This sore, however, was of the worst character, and required three operations, cutting always the borders larger, and even employing chloride of zinc for seventy-two hours to cauterize the bad flesh, &c. Some dry scabs made their appearance also, and these, I was informed, were nothing but the proof that the injections had done their work. Finally, after thirteen weeks, I became a convalescent, and returned to Havana. Some weeks after my return I again resumed carbon printing, protecting my fingers by means of rubber finger-coverings; but, nevertheless, it became apparent that I could not continue, for again ulcers (of a smaller type, however) made their appearance.

Being compelled by my business to visit New York, I met here some gentlemen (amateur and professional photographers) who, when I complained of my sufferings, informed me that I had been poisoned by the bichromate of potash. I consulted two physicians here, and both, on first examination, declared that I was suffering from poisoning from this drug, and both made me understand that I never again should touch it. I am told that the curative agent I am now employing (sulphide of calcium, two pills of an eighth of a grain, daily) will have to be continued for at least ten months.

I liked carbon printing very much, but what I have suffered as a consequence is too much, and, of course, I will abstain from it in future.

These lines, perhaps, may be read by some one who, like myself, has been poisoned, and I hope the remedy I mention may be of benefit to him.—*Photographic Times.*

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SOME SENTIMENT ABOUT A DETECTIVE CAMERA.

BY EDWARD L. WILSON, PH.D.

It was on a bright May day, at the New Orleans Exposition. I was awfully worn with my work, and, as was my frequent habit, just for a rest, I took up the cunning little Anthony's Detective Camera which always sat upon my desk when not in use, and went out into the park for some sport.

I had a favourite hiding place, underneath one of the grand old live oaks, where, at the junction of the carriage road and the walk which ran from the Art Hall to the Horticultural Hall, I could detect all sorts of subjects, from a mule team to the infinitely more obdurate combination—a twain of Creole lovers.

After seating myself for the work, I would un-hide my little companion, place it in order, fix the shutter, pull out the slide, and then, to keep it in good temper while some one or something was coming, would hum a verse of a Creole song to it, which begins perhaps thusly:—

"Si to te 'tit zozo,
Et moi-meme mo te fusil;
Mo sre tchonc toi—*Boum!*"

If thou wert a little bird,
And I were a little gun,
I would shoot thee—*bang!*"

Oh! dear little
Mahogany jewel,
I love thee as a little pig loves the mud.

And by that time, as I watched the finder, I would begin to see the pigmies coming. Is it not just marvellous to see such *mites* of humanity moving about so spry, and *all so sharp?*

Ah! there come my victims! I have caught you at last, my Creole friends! The old folks are at the springs, and you are having a slight *seance* under an umbrella, none too large for you both. I "detect" you ere you are a quarter of an inch in size. You would not feel even *that* high if you knew *I* saw you. But I am going to let you go by me while I—click! There, after all, in my nervousness I pushed the spring, and I have shot them—in the back.

"They were so one, that none can truly say,
Which of them ruled, or whether did obey."

Apparently—

"He ruled, because she would obey; and she,
In so obeying, ruled as well as he!"

The plate happened to develop a most interesting and affectionate scene, and—I sent a copy to the gentleman.

It brought him to my office in a few hours.

"Way you gid dad?" he said angrily, holding the carte up before me.

"From memory," I said.

"Wad you wond for tage id?"

"It was an accident," I answered.

"You ave my ca-ad?"

"No, I do not want you kyard. I am not much on a duel.

This was the joker who caught you, not I," I asserted, and then showed him how to "detect."

"'Tis a good idy," he said, and seemed to grow cooler.

Neither of us spoke for a moment, and then he said: "I kin mague you de troub' to kib dad cliche? Fo' me—fo' mad—ame?"

I answered that I quickly would.

"Oh! I tek you' word fo' hall dad. It mague me ver 'appy."

It was all I could do to keep the warm-hearted fellow from insisting on having divine service and a thankgiving dinner at his Esplanade street home in honor of his having been caught so cleverly with "zot amusing detektif *mash*-een."

You would tire if I told you how through the summer whole military companies were flanked, thieves caught, crowds arrested, living animals taken in, and what not of interesting subjects made mine by this effective detective objective.

If you had a hundred other cameras, you should have one of these too. There is more fun to the square inch to be had with it than anything I know, and *that* part of my story, at least, is the real, properly exposed, and thoroughly developed truth, and *not* sentiment, though it is *all true.—Anthony's Bulletin.*

THE CAMERA IN THE CORAL ISLANDS.

A Photographer's Diary of the "Wairarapa's" Second Trip to the South Seas.

BY A. H. BURTON (BURTON BROS.).

To return to Dunedin from the great South Seas Excursion without having landed on either the Samoan or Tongan groups was evidently out of the question. Photographs of these Islands, as well as of the Fijis, were looked for, and photographs must be supplied. "Measles" might be a sufficient explanation to all who went on the first trip, and to some others who were in a position to realise the situation, but it was felt that it would be deemed but a poor excuse "down south." Accordingly, advantage was taken of the Company's liberal concession to all who had gone on the trial trip, a ticket was secured for the second, and on

Monday afternoon, July 7th, six days after her return to Auckland, the *Wairarapa* left the wharf for the Coral Islands once more. Whereas on the former trip she carried 103 passengers, this time there were just eighty, including seven of us "old hands." The journey began under the best of auspices, and everyone seemed at once to throw away all forebodings, and to feel assured that *this* trip was going to be a great success. The sea was smooth, there was a minimum of sea sickness, and all seemed at once to become "weel acquent." A most business-like committee, with an energetic and capable chairman, was formed, and the result quickly appeared in a very successful entertainment of music and recitations on the second evening out. Next day a chess tournament, which brought out eleven competitors, was inaugurated. Athletic sports beguiled the daylight hours, and a ball followed in the evening. Ladies being very powerfully in the minority, an additional levy of winsome damsels was improvised. On Thursday morning appeared on a notice-board an announcement of the early issue of a newspaper, the prospectus concluding thus:—"Nothing will be inserted in the paper which is calculated to cause any disturbance in this most Pacific Ocean." Another entertainment—quite as good as the former one—brought another day to a close, and on

Friday, July 11th, at 2 p.m., we found ourselves at Suva, in the Fijis. The Suvans had prepared for our amusement a performance of "The Pirates of Penzance," which exhibited, when the smallness of the white population is taken into account, a wonderful amount of musical and dramatic talent.

Saturday, July 12.—Yesterday afternoon the weather had been anti-photographic, so the first start with the camera was made to-day in a native village about two miles from Suva. Studies of tropical foliage, with peeps of the harbour; groups of men, women, and "pickaninnies"; and other groups of passengers, with the prettiest and shapeliest native girls they could find and persuade to be "posed"—made a good morning s work. When our boats reached the village, the tide was "in," and all stepped ashore easily enough; but on the return journey it was "out," and very much "out," too; so those who did not care to wade two or three hundred yards had to be carried on the backs of stalwart Fijians. Verily it was a sight to see a most genial and almost more portly member of our party carried, supported, and propped up by five of the biggest men the village could produce. After luncheon another little trip was made by way of the Immigration Depôt (by boat thus far) through the Cemetery and Botanical Gardens to some caves, which rank among the "shows" of the place. The beauty of the foliage seen in the morning filled all with delight, but the effect was almost effaced by the wondrous wealth of nature spread around us in the afternoon's walk. Fresh pictures revealed themselves on every hand, and the day was but too short for the camera to secure all it could see. Thoughtful residents had provided refreshments, which were discussed in the first and larger cave, and then, one by one, the party crept through a very, very narrow gallery to a second cavern, whence the outer air was reached by another route. While the photographer was laboriously dragging himself and instrument through this "needle's eye," he was complimented by the wits of the party striking up the appropriate air, "The Camera's A-coming." The afternoon's programme included a visit to a large banyan tree, and suddenly emerging from the bush the photographer beheld before him the huge tree laden with most extraordinary fruit. The whole of the party had climbed into the branches, and the sad spectacle was witnessed of affluent "globe-trotters" and substantial Fijian merchants all "up a tree." Two or three "shots," permanently to record this event, concluded the first day as far as photography was concerned—twenty-eight exposures being the satisfactory result. Meanwhile a large party had gone up the Rewa River to the great mill of the Colonial Sugar Company, and returned at night full of delight. Having secured a number of negatives on the former trip, a second visit thither had not been needed.

Sunday, July 13th.—Sailing early from Suva, reached Levuka at 2 p.m. Felt greatly tempted to take the camera ashore, but resisted, and quietly "prospected" for the morrow. Turning to the left on landing, and passing by Nasova, the old Government House, between the native villages of Ndremba and Nai-Koro-Koro, is most romantically situated the Cemetery, and in the most beautiful part, on the very point of a tongue-like cliff, almost overhanging the sea, is a sweetly poetic tomb. A large mass of rock stands—seemingly only just balanced—on two or three small stones; and in the rock is inserted a tablet with the inscription—"Beneath the evening shadow of this rock lie the hallowed remains"; and here follows the name of a young lady, wife of a very prominent official. The grave itself is further marked by a beautiful cross of polished marble. Altogether it strikes the spectator as one of the most graceful and affecting tributes which devoted love could possibly rear to the memory of one who had "gone before."

Monday, July 14th.—After taking a panorama of Levuka, pushed on to the villages of Ndremba and Nai-Koro-Koro, to work the ground prospected yesterday. Pictures of native houses and their inhabitants—studies of tropical trees—then more groups—characteristic verdure again. Such was the order of the day, as fast as one could go, until the sun dropped behind the Levuka hills, when back self and bearers trudged to the ship, thirty "exposures" being the day's "bag." This evening had a conversation with Mr. Hemmings, the German Consul here, who, it will be remembered, entertained the first excursionists at a "Fijian at Home," that gave such unalloyed pleasure to all. It is this gentleman's opinion—founded upon twenty-six years' knowledge of the South Seas—that the Union S.S. Company would do well (say, next year) to vary considerably their programme; namely, to leave out altogether the Fijis, as being already well-known or easily reached by the steamers *Penguin* and *Suva*; make directly for Vavau, in the Friendly Islands; then to Samoa, going to Savaii—not to Apia, or such settled places at all. From thence to Tahiti; afterwards to the Marquesas Islands, taking Rarotonga, in the Cook Islands, on the way back to Auckland. This trip could be done in six weeks or thereabouts, and would give, says Mr. Hemmings, something like a thorough idea of the South Seas.

Tuesday, July 15th.—Reached Vuna Point, Taviuni, at 3 p.m. After a shot at the Sugar Mill, went with a large party in a "special train" along the tramway which runs some four miles through the sugar canes into the bush. The sky, already lowering at the start, became blacker as we proceeded, though we escaped anything worse than a sprinkle. This would not be worth mentioning were it not that this was almost the only day on which the weather was not everything that could be wished. Of course photography was "out of it"; but this was of less consequence, as very good results had been obtained here on the first trip.

Wednesday, July 16th.—Early in the forenoon we were off the Island of Mango. From the glowing account of this lovely isle given by the "First-trippers," a grand field day was anticipated, and, truly, a grand field day was enjoyed. The force was divided; one body, consisting chiefly of ladies, pulled round to attack the island by a flank movement through the well-known and most lovely lagoon, while the larger division pushed on boldly to the front, gallantly cleared the cocoanut groves, and then, deploying in the open ground, regardless of the heavy fire poured down from the tropical sun overhead, carried the Bungalow and the heights of Talasinga. The original holders of these coigns of vantage cheerfully accepted the new condition of things, and shared their luncheon with the victors. Meanwhile, the Engineer Corps—represented by the photographer-in-chief and a small but effective following of dingy mercenaries, had hovered on the skirts of the column, making a diversion ever and anon as some tempting scene would invite capture. After cocoanut palms, banana groves, and bread fruit and pandanus odoratissimus trees had thus fallen, the camera was planted in the very front of the Bungalow; and the grand valley beneath, with the Butoni Mill as a centre, was covered by its fire, and irresistibly swept through one hundred and twenty degrees of angle in a panorama of three plates. From this point the Engineer Corps was ordered to advance upon the coffee estate. Like good fortune awaited them here; for just before reaching the summit (crowned by the manager's house), they were confronted by a large body of coolies (female), who drew up in front of a village. Their disposition was excellent, but after a very brief engagement they were all "taken." The chieftess of the party (a Brahmin, it afterwards appeared) was decorated with silver anklets and wristlets, a ring of about three inches in diameter through one nostril, and change for three English sovereigns in small silver coins disposed over her person. Despite the temptation, no attempt was made to "loot." This lady, on the approach of the victors, appeared to consider it the correct thing to veil herself, which she did, partially, with a corner of her robe; but on the photographer-in-chief imitating her with a corner of his robe (coat-lap), she laughed at the joke, dropped the garment, and let all who would gaze their fill. After this the whole coffee estate, with the "nursery" and the newly-planted ceara rubber trees, were duly captured; and this portion of the force returned to the landing place, covered with honour and self-satisfaction. The report of the force that moved by way of the lagoon was also eminently satisfactory, the way having been cleared by the engineers on the previous trip, and all the best (that is, most picturesque) positions duly secured on that occasion. The whole force—now massed in the saloon of the *Wairarapa*—duly dined, felicitated themselves on their achievements, and then generously abandoned the whole of their conquests to the original occupiers, reserving only the glory. The engineers, though, retained their spoils—namely, twenty-two exposed plates. The *Wairarapa* gaily steamed away for the Navigators' Group, or Samoa, on

Thursday, July 17th.—The Fiji portion of the programme had now been duly done, and next came the momentous question: "Is it possible that anything can turn up this time to prevent our landing in the Samoan and Tongan Islands?"

Friday, July 18th.—This day was published the first number of the "Wairapara Wilderness," surely a strange title for a newspaper. Admitting the paramount necessity of invoking "apt alliteration's artful aid," one would think that a better word than "Wilderness" might have been hit upon. How would the "Wairarapa Whistle" have sounded? However, the first issue certainly fulfilled the promise of the prospectus, for there was truly nothing in it at all calculated to "cause disturbance in this most Pacific Ocean." It was as innocent of offence as Archibald Grosvenor's decalet, "Gentle Jane was as good as gold." Indeed, it reminded one of the old story of the Scottish wooer, who, on the eve of their marriage, reminded his lassie that he had been very civil, not having snatched a single kiss during the whole of their five years' courtship. "Ou, ay," said the maiden, "senselessly ceevil!" To-night our third entertainment was given, and another success scored.

(*To be continued.*)

THEORY AND PRACTICE OF PHOTOMICROGRAPHY.

BY MAURICE N. MILLER, M.D.*

LET me now describe, in contrast with the above, what I regard as the very best arrangement that can be made, with ample means and convenient surroundings. We will then compare the two, and see how far we may be able to dispense with the more expensive and complicated apparatus.

The first question to settle is the source from which we must obtain our light; and I unhesitatingly answer, directly from that great source of all light—the sun.

Electricity comes nearest to sunlight in value for photomicrographic purposes; but unless the operator has a very large stock of patience, I advise him to have nothing to do with it. The only form that is of the slightest use, except for low amplification, is that evolved from the arc lamp, and thus far we have no regulators that are certain to remain in the optical axis of our instruments for a single second. The incandescent lamp is of no use, except, as previously indicated, for very unambitious attempts with low powers. I have travelled most thoroughly and conscientiously this electric road, and let me sum up my advice to you in this little word—*don't!*

The calcium jet is far better for our purposes than the electric light. It is easily regulated, can be kept steadily in adjustment, but it is a very expensive luxury. Besides this, there is a certain hardness, a cold black and white that is inseparable from this mode of illumination. I used to think I could pick out calcium-light negatives from pictures made with other modes of illumination. I don't know that I would be willing to say as much now; but that there is a cold chalk-and-charcoal feature to prints from such negatives, I presume many besides myself have noticed.

The minor methods of lighting—by oil, gas, &c.—do not deserve any consideration at our hands at this time. We are engaged in the attempt to produce the very best results obtainable, and I know very well that no amateur is going to be satisfied with silhouettes made with a dark lantern attached to a camera box. I never knew of a lens with power enough for an amateur. Far be it from me to discourage small beginnings; but I want you all to aim high, and never to rest till you can say your work is good enough to offer as patterns for others to equal.

In presenting what I regard as the best arrangements for our work, it will, in reality, be a description of the apartments belonging to my new laboratory, now in course of construction.

First, a room which has one window, at least, facing the south, is a great desideratum; but, as an illustration of what may be done under disadvantages, many of you may, perhaps, be surprised to learn that the laboratory of the late Col. Woodward was so located that all of his work had to be done before eleven o'clock a.m., on account of the shadow of an adjoining building.

Premising that we have a southern exposure, we must next be able to secure absolute darkness in our room. This is best accomplished by inside shutters of painted wood, although all the windows, save one, may be darkened in any way thought desirable. Let me again say that nothing short of absolute darkness will answer. With our present highly sensitive plates the twilight of our old-fashioned dark rooms will not answer. Our one room may possibly answer, not only for the purposes of an operating apartment, but also serve for the development and preparation of the plates. Indeed, we may work quite conveniently, using the room in this double capacity, if we have at our command one or two dark boxes in which to allow slow developments to proceed while we are otherwise engaged, and while the room is lighted. Of course a separate dark room is preferable. Attached to the window-ledge, and outside the window, level with the bottom of the latter, we have a strong rigid shelf for the heliostat. This shelf should be so strongly affixed that it is, in reality, a part of the building. Mine is of slate (although painted oak answers very well), and the length is equal to the breadth of the window, while the width should be at least twenty inches. To the window-frame—which is, of course, the one with the southern exposure—we must affix two inside shutters; by this I mean a double shutter, opening vertically in the centre of the window. The left half of this shutter, as you face the window, need not be hinged, but fastened permanently and rigidly to the window-casing. The right-hand shutter is hinged to the casing, and must be well fitted, so that when closed the room is instantly in perfect darkness. This requires the services of a good mechanic.

Another shelf is required, inside our room, for our microscope and accessories, and for this purpose a pine plank, two inches thick, and ten by twenty-four inches, answers perfectly. This is fastened to the bottom of the window-casing by one end, and the other end is supported by a brace or leg to the floor. This should be a permanent fixture, or, at least, so fastened by screws as to be perfectly rigid. I should have said in the beginning that the building, if in a large town, ought to be on a good foundation, and free from tremor. Our large buildings that tremble with every passing truck will not answer the purpose.

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* Continued from page 574.

One more fixture, and we are ready for the placing of our apparatus. We require no camera box other than our apartment—we simply need a frame to hold the ground glass and the plate-holder. A frame of this sort can be easily made, or a camera box may be utilized by removing the front. This should be affixed solidly to a staud that may be raised or lowered, an iron camera stand answering the purpose perfectly—especially if, after the proper position has been obtained, it may be readily and securely fixed to the floor.

(*To be continued*).

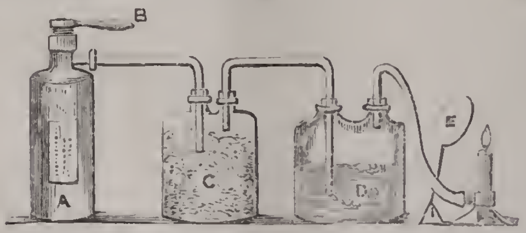
Correspondence.

THE NITROUS OXIDE AND CARBON DISULPHIDE LIGHT.

Sir,—Permit me to make a few observations on this new light.

The manufacture of nitrous oxide gas (protoxide of nitrogen) is by no means a simple matter, as the nitrate of ammonia crystals have to be melted at a given heat (such temperature being kept constant by a thermostatic arrangement); the gas is then passed through three wash bottles, and finally collected. In my profession (that of a dental surgeon) we are supplied with N. O. gas compressed in iron or copper bottles, holding 15, 50, or 100 gallons. The 15-gallon bottles are easiest to manipulate, as the gas is only compressed; whereas, in the 50 gallons and others, it is condensed to liquidity. The cost of filling these bottles is about 2d. a gallon; and if this new light is as actinic as stated, half a gallon should be ample for an exposure.

As there is a certain amount of danger with the carbon disulphide vapour, I should recommend casing the bottle in iron gauze, although I imagine if it were made to pass through a Woulfe bottle, back-flow would be obviated. I give a rough sketch of my idea.



A, 50-gallon gas bottle; B, key; C, bottle containing carbon disulph.; D, wash bottle; E, reflector; F, burner.

Further, as every gas bottle bears a label giving its weight full and empty, and as 15 gallons weigh four ounces, the photographer who is near an obliging dentist would have little trouble in borrowing his gas bottle for experiments, and paying for the quantity used. I shall shortly be trying this new light, and shall be happy to give my experiences.—Yours, &c., H. C. Braun.

1, *Kilburn Square, London, N.W.*

HOW TO TAKE GOOD PICTURES ON GELATINE PLATES.

Dear Sir,—I have taken much interest in the very able letters of Mr. Bottone on development with iron, and have tried to use it, but only with partial success, as I have never got a negative quite free from a precipitate when dry. Would you be good enough to inform me, through your paper, if Mr. Bottone pours the mixture on to the dry plate without first washing it with water?—Yours truly, G. B. Thorneycroft.

THE INVENTOR OF DISSOLVING VIEWS.

Sir,—Can any of the readers of the Photographic News give me any information respecting Henry Langdon Childe, the inventor of dissolving views, who died in 1874? Was any obituary of him published, and where? Date of his birth, period when he first exhibited his method, and, in fact, any information respecting him, I should be very thankful for.—Yours, &c., W. Jerome Harrison.

365, *Lodge Road, Hockley, Birmingham.*

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 3rd inst., J. J. Smith in the chair.

C. Heinrich Trinks, who had lately returned from the Continent, spoke of a novel drop-shutter suggested by Dr. Fol, which could be quickly constructed in the field. It was made by cutting an elongated slot in a wide strip of black paste-board, and the slot was passed in front of the lens when an exposure had to be made. He recommended small cameras for tourists, accommodated with three lenses, ranging in focus from half to one and a half times the length of plate. Mr. Trinks then showed negatives exhibiting fog, except in those parts where emulsion had been dried on the back of the plate; here the image was semi-transparent, and was a great source of annoyance to those who employed English plates in Germany.

W. E. Debenham attributed the marks in question to the circumstance that an unsafe light had been acting at the back of the plate.

L. Warnerke understood that plates sold in America with emulsion on the backs were returned to the makers as imperfect.

A. Mackie remarked that if this plan were adopted here, five out of six would be returned. He then showed a series of prints made from English commercial plates, all of which had emulsion at the back when developed; but there was an absence of marks.

W. Ackland: It has been said that English plates do not give the marks referred to when developed here, and on the Continent they are said to do so; therefore, the fault is in the use of them. If an extremely sensitive plate is held up for examination against an unsafe light, spots of emulsion on the back will check the fog.

Trinks replied that eight plates were developed at the same time in almost total darkness, ferrous oxalate being used; those plates of German manufacture were perfect, while those of English were not.

A. L. Henderson remembered developing his plates at one time in a porcelain dish having large spots of black varnish thereon, and he obtained marks like those Mr. Trinks had shown; he thought the yellow colour of emulsion at the back was more likely to absorb light penetrating through the film, than to reflect it back, as had been suggested.

W. Cobb believed five out of six photographers examined their plates by transmitted light before or during development.

J. D. Ball enquired whether colour would appear the same in moonlight as by daylight? Sir Walter Scott, in his "Lay of the Last Minstrel," says:—

> "The moon-beam kissed the holy pane,
> And threw on the pavement a bloody stain."

He (Mr. Ball) had tried certain colours in moonlight, and when that light was transmitted he obtained a shadow.

W. H. Harrison said that moonlight was very poor in chemical rays, and not rich in the rays of the other end of the spectrum. Even if a red glass were of light colour, and of such a red as to transmit the whole range of red rays coming from the moon—two favourable conditions unlikely to be found together—he thought it hardly possible the strong effect described by Sir Walter Scott could be produced.

Mackie asked if anyone could give him a satisfactory answer regarding the line of light surrounding dark objects, instanced by him in the Eastman Company's prints.

J. B. B. Wellington attributed the phenomenon to a liberation of bromine.

Messrs. Debenham and Harrison also spoke on this subject;

and after a short discussion it was arranged to deal with the question at the next meeting, when Mr. Briginshaw will have completed a few experiments in this direction.

Montague L. Troupe was elected a member of the Association.

Derby Photographic Society.

The usual monthly meeting of the Derby Photographic Society was held at the Mechanics' Institute on Wednesday, September 2, under the presidency of Mr. Richard Keene, and a most interesting paper on "Artistic Photography" was read by A. J. Cox.

The Society regretted to learn that, owing to Mr. F. W. Simpson's intended removal from Derby, they had to elect another hon. secretary in his place. A cordial vote of thanks was given to him for his valuable services, and it was determined to hold a special meeting at the County Hotel, on Tuesday, September 22, at 8 p.m., to present him with an album containing the photographs and signatures of all the members.

James E. Kaye was unanimously elected Hon. Secretary in place of Mr. Simpson.

Votes of thanks to Mr. Cox and Mr. Keene brought the meeting to a close.

Talk in the Studio.

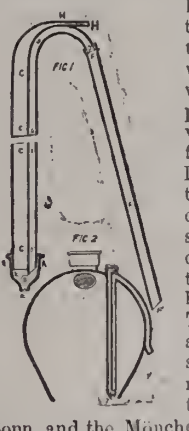
A Lecture by Leon Warnerke.—This (Friday) evening Mr. Warnerke will deliver, at eight o'clock, a lecture at the Rooms of the Balloon Society, Aquarium, Westminster, on "A New Departure in Photography." He will, it is understood, give a comprehensive summary of what has been done in the direction of film photography, and will exhibit a collection of illustrative examples. Tickets can be had in the Aquarium Building, or at the offices of the Society, 26, Budge Row, Cannon Street, London, E C.

Dinner in Honour of Sayce and Bolton.—On Wednesday last the festival dinner, organised by the Photographic Club to commemorate the coming of age of the bromide emulsion process, took place at Anderton's Hotel, Fleet Street, W. Ackland in the chair. J. B. Sayce, in responding to the toast of the evening, spoke of the early efforts to make a sensitive collodion, and pointed out the main sources of failure which had prevented success until Mr. Bolton had himself devised the method of working which was published just twenty-one years ago. From the time when he first sensitized a collodion plate in the bath, he had felt that the bath must be abolished, as involving a very round-about method of making the sensitive film. W. B. Bolton responded briefly, and referred to the rapid extension of emulsion photography in the present day. The gathering was enlivened with songs and recitations by W. Cobb, A. Cowan, W. E. Debenham, Dr. C. White, and others; and at a late hour the company dispersed; but before those present left the room it was announced that Messrs. Sayce and Bolton had been elected honorary members of the Club.

Marion's Tablets of Compressed Pyrogallic Acid.—Each tablet, which is two inches square and not quite an eighth of an inch thick, weighs just one hundred grains; but the upper surface is not level, it being deeply grooved so as to divide the tablet into twenty-five small squares of four grains each. The tablet can thus be readily broken into doses of four grains; the four-grain dose then taking the form of a miniature biscuit about $\frac{3}{8}''$ square, and nearly $\frac{1}{8}''$ thick. Should, however, the worker require two grains or one grain, he can cut this biscuit into four or two with sufficient accuracy for all practical purposes. (There is probably no reason why each small square should not bear dotted lines to indicate single grains.) Five of these tablets, wrapped in vegetable parchment, and enclosed in such a box as one might take in the waistcoat pocket, are to the tourist rather more than an equivalent to the bulky ounce bottle of pyro and a pair of scales.

A Course of Illustrated Lectures on Photography and Chemistry at the Birkbeck Institution.—A course of about thirty lectures (fully illustrated by experiments and demonstrations) on "Photography, Practical and Theoretical," will be given by H. Chapman Jones (whose name is well known to our readers as a diligent experimenter and able lecturer) on Wednesday evenings, at seven o'clock, commencing October 7th. This course will be specially suitable for amateurs who wish to become acquainted with the art, as well as for professional photographers who are anxious to understand those branches of chemistry, optics, &c., that will prove most useful to them. An examination at the end of the course is conducted by the City and Guilds Institute, who grant certificates and prizes to those who prove themselves qualified. Fees for the course—Members of the Institution, 12s.; non-members, 15s. Half-price tickets—Those engaged in professional studios, manufacturers' laboratories, or dealers' warehouses, can obtain half-price tickets by stating the name of the firm they are employed by, and the nature of their employment. These half-price tickets cannot be obtained before October 7th, and will be issued in the Lecture room only, either before or after a lecture. *Syllabus of Course of Lectures.*—Applications of photography—history of its development—chemical action of light—the chemistry of simple substances in frequent use, but only so far as practically concerns photographers in ordinary work—gelatine, albumen, asphalte, pyroxyline, &c. Optics.—Reflection, refraction—the measurement of light—actinometers, sensitometers, photometers—decomposition of light—the spectrum—absorbing media—illumination of the dark-room. Cameras and accessories.—Testing cameras, &c.—exposure shutters—changing boxes—stands, &c., &c. Lenses.—Landscape, rectilinear, symmetrical—portrait combinations, old and new—calculations concerning lenses—diaphragm, its uses and effects—rapidity—depth of definition—angle of view—distribution of light—flare spot—distortion—chromatic aberration—achromatism—spherical aberration, &c.—the choice of lenses and their use. Negatives.—Production of negatives with gelatine dry plates—various developers, their use and abuse—methods of intensification, &c., &c.—faults in general: how to correct and how to avoid them—portraiture, landscape work, copying, &c. Collodion Plates.—Their preparation and use—collodion positives—Daguerreotypes—paper negatives (calotype). Emulsions.—Gelatine and collodion—preparation—coating plates, &c. Printing.—Silver printing—printing by development—printing by salts of iron—chrysotype—cyanotype—Platinotype. Printing in chromated gelatine—pigmented tissue—single and double transfer printing in carbon—gelatine reliefs, &c.—printing in uranium salts, &c. Woodburytype—stannotype—filigrain or water-mark pictures—heliotype—collotype—photo-lithography and zincography—photo-etched plates, &c. Enamels.—Dusting-on process. Transparencies.—Enlarged negatives—reversed negatives. Art as Applicable in Photography.—Balance—form—chiaroscuro—choice and arrangement of subjects, &c. Classes in chemistry are also held; inorganic chemistry, by G. Chaloner, and organic chemistry by H. Chapman Jones.

A New Syphon.—Bode and Wimpf have designed a new kind of syphon, which is of great use in syphoning off acid, caustic, or poisonous liquids. Its special feature is due to the fact that it is not set by suction, but by blowing, so that the liquid to be syphoned off can never get into the mouth. Fig. 1 represents the construction. The tube D is surrounded by a wider one C, closed at the top, and provided with a ball valve, B, at the end E. On putting the apparatus into a liquid the ball valve is raised, and the tubes C and D are filled to the height of the surrounding liquor. If now air be blown into the tube H, the valve is closed, and the liquid being driven from C into D and F, sets the syphon to work. The blowing is then discontinued, and H closed. If it be desired to interrupt the flow, it is only necessary to blow again a little stronger through H. The valve B is now pressed into its seat, and no liquor being able to enter the syphon, it empties itself. The syphon need never be removed from the liquid, either at the start or at the end. C. Gerhard, of Bonn, and the Möncheberg Pottery, are prepared to supply the syphon to the trade. It can be made of glass, earthenware, ebonite, india-rubber, and metal. It is also intended to fit Woulff's bottles with this syphoning arrangement, as shown in Fig. 2, for drawing off acids in the course of manufacture.—*Journal Chem. Ind.*



The Prospectus of the North, Central, and South American Exposition, which opens on November 10th next, has been issued. This new company has been organised with a capital of $500,000. It has purchased the buildings and plant of the World's Exposition at New Orleans, and is now in possession of the same. It proposes to inaugurate even a greater and more interesting Eposition than the magnificent World's Exposition. The new company starts out under the most favourable circumstances; with the buildings and accessories in hand and in order for occupancy, and paid for, the great bulk of their work is already accomplished. Many of the prominent exhibitors at the World's Exposition have left their exhibits intact. Large numbers will return with greatly increased and far more attractive exhibits; and applications for space from new exhibitors are pouring in in large numbers.—*The Lithographer*.

IMPROVEMENTS IN THE MANUFACTURE OF FIRE AND WATERPROOF BOARDS OR PAPER FROM ASBESTOS.—This invention relates to the manufacture of non-hygroscopic asbestos boards or papers. American or other soft fibrous asbestos, to the amount of 20-25 per cent. of the weight of the dry finished board, is taken and mixed with 25-35 per cent. of powdered aluminium sulphate. When well mixed the mass is impregnated with a 50 per cent. solution of zinc chloride in water. After washing with water, the mass is treated with ammonia, and after another washing with water, an addition is made of a 10 per cent. solution of resin soap, mixed with an equal amount of sulphate of alumina. To the pulp thus prepared in the rag-engine, inventor adds above 35 per cent. flour of ordinary or "green" asbestos stone. Finally, 5 to 8 per cent. of barium sulphate is added, and, when diluted with water as required, the pulp may be employed for either machine- or hand-made paper. It is proposed to prepare a material suitable for roofing purposes, by covering on both sides ordinary tarred roofing paper or felt, with asbestos paper prepared as above.—*Jour. Chem. Ind.*

INSTRUMENT FOR MEASURING THE THERMIC INTENSITY OF THE SOLAR RADIATION.—The author proposes to register the indications of an actinometer giving the thermic intensity of the solar radiation, this apparatus receiving the solar radiations directly—*i. e.*, without the interposition of any transparent plate, and being secured against the disturbing action of the wind. The registering actinometer consists of a thermo-electric element inclosed in a slender brass tube. One of the soldered points is in the dark, and the other receives a bundle of solar rays falling normally to its blackened surface in the axis of the tube. This tube is fitted with five aluminium diaphragms, with apertures progressively decreasing until the last, which is 4 m.m. in diameter, and placed at suitable distances. This tube is mounted on an equatorial movement, which keeps its axis in the direction of the solar rays. Though freely exposed to the sun, the actinometric disc does not receive the action of air-currents; there is produced here a phenomenon analogous to that of Deleuil's free piston-machine. The disc only receives the sun upon a small part of its surface; but, in consequence of Peltier's phenomenon, the effect is the same as if the quantity of energy contained in the right section of the solar bundle were uniformly diffused over its surface. The two extremities of the element, and the points of junction of the wires, are soldered galvano-plastically by a deposit of copper to a circuit connected with a galvanometer placed in a dark chamber. The actinometer, mounted upon its movement, is placed on the roof. The indications of the mirror galvanometer are registered photographically by an arrangement which, with some modifications, is identical to that used by Mascari for registering terrestrial magnetism and atmospheric electricity.—A. CROVA in the *Chemical News*.

PHOTOGRAPHIC CLUB.—The subject for discussion on Wednesday, September 16th, will be on "Halation." Saturday afternoon outing at Westerham; train leaves Charing Cross at 1.40.

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To Correspondents.

*** We cannot undertake to return rejected communications.

R. L. Mc D.—1. The idea is a good one, and you should have no difficulty in carrying it out; but you will have to make a few preliminary experiments as to exposure. Probably about two yards will serve. 2. Such specimens of old processes can be obtained occasionally; but if you are in a hurry, the best way will be to advertise for what you require.

J. CALVERT.—Add more acetic acid, and use the solution fresh.

VICTIM.—The process is worked by several, but more especially by the inventor, J. Albert, Hof-photograph, Vienna.

H. C. BRAUN.—The information cannot be usefully given in the compact way you wish. See articles which appeared in our volume for 1882, pp. 673, 690, 706, 738, 770.

WILLIAM MATHEWS.—Your communication to hand. A proof shall be sent to you.

H. SPINK.—1. The article was written by W. Barry, photographer, of Hull; and if you write to him he will no doubt give you further particulars. 2. We have asked one who has been very successful in this line to write such an article, and hope to publish it shortly.

C. H. W.—One of the best potash and soda developers is that of F. C. Beach; it is made as follows:—

Pyro Solution.

Warm distilled water	2 ounces
Sulphite soda (chem. pure)	2 ,,

Dissolve; and when cold, add—

Sulphurous acid	2 ounces
Pyrogallic acid	½ ounce

Potash Solution.

A	Water	4 ounces
	Carb. potash (chem. pure)	3 ,,
B	Water	3 ,,
	Sulphite soda (chem. pure)	2 ,,

A and B are now combined into one solution, which will measure between eight or nine fluid ounces. To develop an 8½ by 6½ plate which has had a drop-shutter exposure, take water three ounces, and add thereto half an ounce of No. 1 and three drams of No. 2 of the potash solution, increasing the latter to five drams in case the image hangs back. For a plate which has had the proper exposure, or which has been somewhat over-exposed, add to the three ounces of water three drams of No. 1 and one dram of No 2. After a minute's time, if the image fails to appear, add a second dram of the potash, repeating the additions at intervals of a minute until developing commences.

E. H. HOLDER.—It is an instrument likely to be useful if employed intelligently.

HALO.—It seems to us that it arises from a reflection from the edges of one of the glasses, or from the brass-work. Black the edges of the glasses, and line the tube with black velvet. Look also to the edges of the mount.

B. W. J.—Our publishers effect the registration at a cost of one and sixpence for each picture.

ED. J. HUGHES.—1. Use a black background in taking the original. 2. The latter is coated twice. 3. One of the rapid symmetrical or rectilinear type.

J. W.—It seems to us that the mischief is due to insufficient washing. You must remember that when a film is hardened by alum, there is great difficulty in thoroughly removing all traces of a soluble substance.

H. PICKERING.—We cannot lay hands on it just now, but will look for it. Please let us know how the matter progresses.

Photographs Registered.

FRANK M. SUTCLIFF (Whitby)—2 Photos. of River Esk Viaduct.

SHRUBSOLE (Davey Place, Norwich)—Photo. of Prince of Wales, Prince Albert Victor, and Officers of P.W.O. Artillery Militia.

A. C. WORTH (Stockbridge, Hants.)—Photo. of Weymouth Pier, with Swans.

A. W. PAGE & Co. (Elm Street, Kingston-on-Thames)—Photo. of Prince of Wales, Prince Albert Victor, Hon. H. L. Bourke, and others.

F. R. LYNDE (498, Edgware Road)—2 Photos. of Mdle. Antoinette Trebelli.

A. G. GIBSON (Penzance)—3 Photos. of "Bishop" Light House, Scilly Isles.

J. J. THOMPSON (Omagh)—Photo. group of Prince and Princess of Wales and others at Baron's Court.

W. PIPER (Camborne)—4 Photos. of C. A. V. Conybeare, B.A.

WINTER & SON (Hull)—Photo. of Painting of R.M. steamers, *Orlando* and *Angelo*.

C. TAYLOR (Chislehurst)—Photo. of Mr. J. Laing, Mrs. Laing, and others.

W. GARTHWAITE—Photo. of Hydraulic Tower at Grimsby Docks.

T. HIRST (Horsforth, Leeds)—Photos. of Universities Cricket Team and Yorkshire County Cricket Club.

H. L. MOREL (Hyson Green, Notts)—2 Photos. of Child in a Hamper.

W. G. HONEY (Divizes)—Photo. of three Children; ditto of two Children.

R. W. ROBINSON (Winwood, Tunbridge Wells)—Photos. entitled "'Twixt Cup and Lip"; "Why Don't you Speak for yourself, John?"

A. A. INGLIS (Carlton Hill, Edinburgh)—15 Photos. of Pictures in National Gallery.

R. K. N. FLAMANK (Aston, Birmingham)—2 Photos. of War Picture in Lower Grounds, Aston.

The Photographic News.

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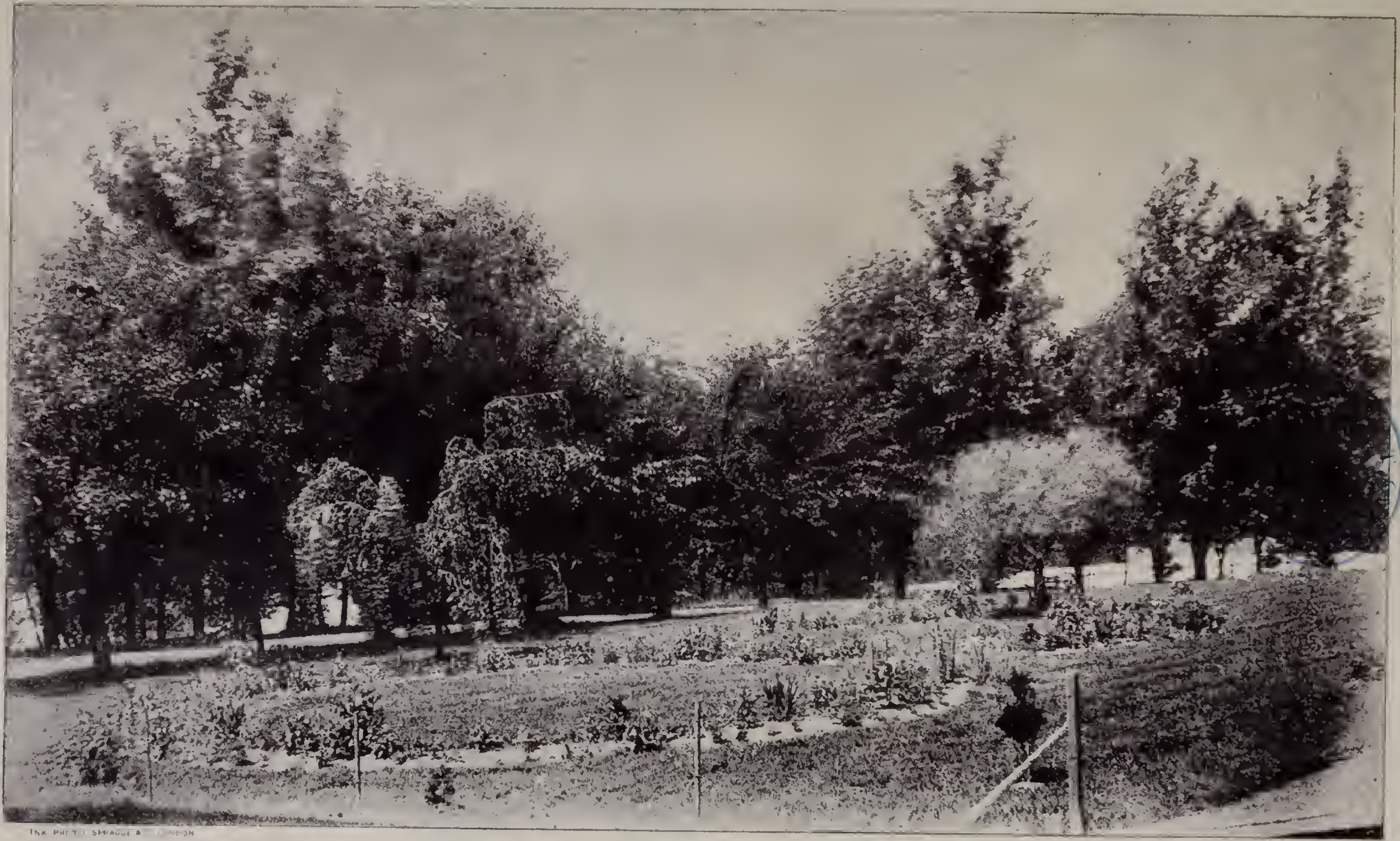
SUPPLEMENT TO "THE PHOTOGRAPHIC NEWS" 11TH SEPTEMBER, 1885.



INK PHOTO SPRAGUE & CO LONDON

PHOTOGRAPH TAKEN WITH A SPECTACLE LENS, BY A. B. REED, M.D.
FOCUS OF LENS 9 IN, STOP ABOUT $\frac{f}{30}$. SLOW PLATE, EXPOSURE 40 SECONDS.
(Subject The Grounds of the Nova Scotia Hospital for the Insane.)

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1411.—*September* 18, 1885.

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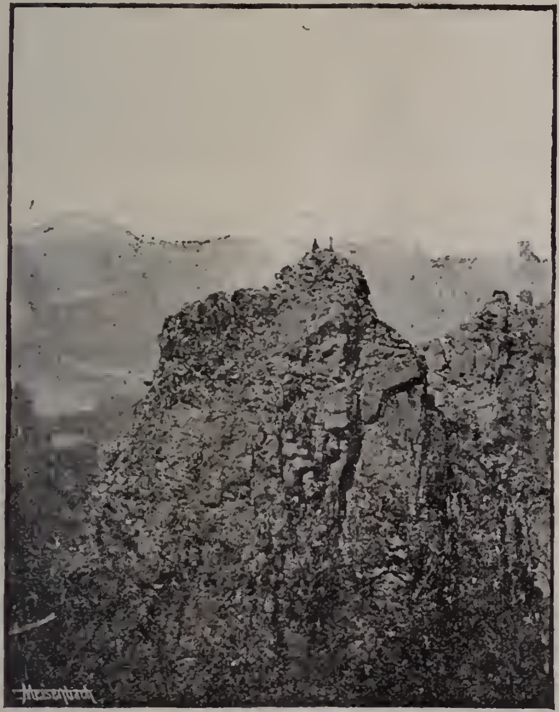
A LADY PHOTOGRAPHER IN SWITZERLAND.

The first of three photographs sent to us by a lady correspondent who prefers to be known to our readers under the *nom de plume* of "Jean Ville," is a very striking picture of one of the peaks known as the Zwei Schwestern the view being taken from the other peak. Considering that one does not often meet with good Alpine photographs, and very seldom indeed meets with notably excellent ones, it is especially pleasing to meet with the latter when they are the result of a woman's energy and skill.



"Jean Ville" writes thus with respect to the picture of one of the "Sisters":—"The Zwei Schwestern (or Two Sisters) is a double-peaked rock well seen to the north from Pontresina. Its ascent necessitates a violent display of gymnastics on the part of both guide and tourist. On reaching the summit of the first (or westerly) peak, the aspect of the second is most startling, the face of the rock being so perpendicular that one is, at first, quite unable to trace any possible route up it. The ascent, however, is made up the very centre of the rock seen in the accompanying photograph; and as my two companions (the guide Christian de Christian Grass and an English lady) slowly climbed from ledge to ledge, I had an opportunity of noticing from my position on the first peak the exact line of ascent. The *bête noir* of the climbing photographer—the tripod—was much in our way while going up the first peak, which, though less sensational in appearance at a distance, is far more difficult to climb than the other. Our sturdy little guide, however, was so anxious to have a picture of himself perched on so lofty a height, that he made light of his work. In fact, a week before, when I made my first ascent of the Sisters, the suggestion that I should return there with my camera came from him."

With respect to the remaining photographs, we have the following from the pen of "Jean Ville":—"A view of Piz Roseg and Piz Tscheierva from near the summit of the

Corvatsch, is included with those from the Sisters, as, perhaps, it may be found of interest; also the channel of the Grand Moulin, or Glacier Mill, on the Morteratsch Glacier; this was difficult to photograph, as the camera had to be placed nearly over it, and steps cut in the wall of ice for the points of the tripod to rest."

◆

YELLOW FEVER.

Under the above somewhat startling title, Dr. H. W. Vogel issues, in the *Photographische Notizen*, a word of warning with regard to the fading of silver prints, which is well worth the consideration of English photographers.

"In the last few weeks," says the Doctor, "I have in various places noticed photographers' show-cases, and have been shocked at the number of yellow pictures I discovered in them. I found these not only in the establishments of "small" photographers, but also in those of large firms. It is true that the evil was not always so noticeable that it would come under the observation of the laity; still, to the skilled eye, the symptoms, although they might only indicate the first stage, were quite visible. Many of the pictures which were actually in the 'yellow fever' stage belonged to firms of which I know that the printing process is conducted with the greatest care. Surely when, in spite of all care, the evil is so frequent, there is something wrong in our modern system of printing?"

Dr. Vogel proceeds, after giving vent to the lamentations just quoted, to answer the question which forms the last clause of our quotation. He points out, in the first place, that the very position of a photograph in a show-case is liable to give rise to fading, as compared with that of a print in an album or hung on the wall of a room. At the same time, he gives a curious example of the possibility of rapid fading, even in the last-mentioned position.

Dr. Vogel had, in an old house of his, a number of valuable photographs (silver prints, presumably, though he does not say so) hanging on the walls. These had remained unchanged for ten years. When, however, he removed them to the walls of a new house, which had not thoroughly dried, eight weeks' time yellowed them completely! It is pointed out that show-cases may sometimes present conditions similar to the last mentioned. The prints which Dr. Vogel has kept dry in his albums have in no way changed. Indeed, they "differ from wine, in the matter of keeping, only inasmuch as they do not *improve* like this latter."

The Doctor, having so far pointed out the damage which arises from dampness, points out that, as absolute dryness is unattainable for photographs in any ordinary circumstances, it comes to be a question of time only when some effect will be produced on them by dampness, even if other conditions are favourable. He points out that the sea air is particularly detrimental, as is also the damp heat of the tropics, and this especially in the case of mounted prints. He then goes on to describe in a more precise manner what he considers to be the chief causes of the "yellow fever" in silver prints. These are:—

First. Insufficient fixing. Not less than five grammes (say eighty grains) of hypo should be used to each sheet of paper fixed. The size of the sheet referred to is not given, but it is presumably about 17 by 22 inches, the usual size. The result of the use of a less quantity of hypo is the danger of the formation of an insoluble double hyposulphite of silver and soda in the paper. This is not immediately decomposed, but is through time, when "the yellow fever" infallibly appears. This fault is more liable to occur than might be supposed, because a principal, however careful he may be in seeing that the prints are carefully washed, is liable to overlook the weighing out of the hypo, in which case, to his surprise, he finds his prints turning yellow in spite of all his care in the matter of washing.

Second. Insufficient washing. This fault, Dr. Vogel says, is of less common occurrence than it used to be.

We may say that, from recent observations made in this country, and also from experiments made by ourselves, we are led to doubt if hyposulphite of soda left in prints will produce *yellowness*. It will undoubtedly, at any rate when assisted by damp, result in fading in the sense of weakening of the image; but this is something very different from yellow discolouration.

Third. Dampness, against the inroads of which Dr. Vogel sees no certain remedy, as, apart from imperfect fixing or washing, the albumen itself contains the germs of the disorder, if dampness only be granted. "Sulphur is contained in albumen, and, if decomposition steps in, sulphuretted hydrogen is produced, which is followed by yellowing as a certainty."

Dr. Vogel, as we have seen, mentions the influence of the material used for mounting, as conducive to yellowing; but he scarcely, we think, lays enough emphasis on it. We should ourselves have set the mountant used for fixing silver prints to their boards as probably, in practice, the *principal* cause of fading, and of fading which very frequently takes the form of "yellow fever."

We have in our possession a number of large albums of photographs done from twenty to thirty years ago. One of these belongs to the old Scotch "Exchange Club," so far as we know now extinct, so that the photographs are not a collection all finished by one hand, but by many. They are fixed in albums, the edge of the prints only being glued down. There is scarcely a case in which the prints are not faded and yellowed when they are gummed down. We have been able to ascertain that at least some were fixed with starch; indeed, it is probable that all were. The centre of the prints are for the most part in very good preservation, as also are throughout several prints which have been slipped between the pages of the album without any mounting at all.

Dr. Vogel, after bewailing the lack of permanence of silver prints, naturally turns his attention to other processes, so-called permanent ones. Carbon printing is the first which he mentions, but he seems by no means greatly inclined towards it. He considers its permanence to be by no means very great. "The same [carbon prints] certainly do not turn yellow so long as the pigment is genuine, but they are very easily destroyed by mechanical means, and particularly by damp weather, when they show an inclination to leave their supports." He regrets the disappearance of "the beautiful pigment transparencies which used to decorate so many reception rooms."

On the whole, platinum printing, which Dr. Vogel says was first practically worked by Dr. Albert, of Munich, seems to offer to him the greatest likelihood of success in the future; and this in spite of the fact that the expense is quite double that of silver printing. He considers the permanence of a platinum print to be far greater than that of a silver print on albumenized paper, and even hints an opinion that it is more permanent than a carbon print.

PHOTOTYPE BLOCKS BY E. FREWING.

At the present time many persons are occupied in making phototype blocks in which the grain is regular and mechanical—in fact, blocks which in appearance more or less closely resemble those of Ives. As regards the use of relief photographs adapted for use in the printing press, we may point out that ever since Ives introduced his method, there has been a steady advance, both as to the frequency with which such blocks are used, and as regards their quality.

One of the most recent workers in this direction—E. Frewing, of Lavender Road, Clapham—has made us two blocks from silver prints supplied to him by us, and we place the results before our readers.

The first is a photograph of a ruined powder mill near Philadelphia, from an original taken on a washed collodion emulsion plate by C. R. Pancoast, of that place. The Powder Mill is a favourite subject for the camera among the photographic amateurs of the Quaker city, and there are few among them who have not taken one or more negatives of it.

The second is from a very pretty little study of child life, sent to us the other day by T. G. Whaite; he sent it, among others, to show the kind of result he could get on the Eastman paper.

Reviews.

Reports of Observations of the Total Eclipse of the Sun, August 7, 1869. By Prof. J. H. C. Coffin. (*Nautical Almanac Office, Washington, U.S., May*, 1885.)

Here is presented a work which is nominally a report as to how a sum of £1,000, voted by Congress, was spent in connection with eclipse observations during 1869. The 158 pages of printed matter in large quarto, now before us, together with ten illustrated plates, are not, however, by any means, a mere statement of accounts, but a comprehensive treatise on practical solar eclipse observations, so far embodying the results of previous and subsequent work as to make the volume one which deserves a place in the reference library of every physicist.

The Rights and Liabilities of Cyclists. By J. A. Williamson. Price sixpence. (*London: Iliffe, Fleet Street.*)

Now that so large a proportion of out-door photographers patronise the wheel—whether as a "bike or as a "trike" —for taking their cameras afield, this little work will be of service to many of our readers.

It seems hard that everyone is assumed to have a complete knowledge of the law, but if this assumption were not made, it is pretty certain that such difficulties in legal administration would arise as to far outbalance any advantage from the contrary assumption. He who mounts a cycle for the first time not unfrequently launches himself on the road without having made himself familiar with those rules which are universal throughout the country; and now and then not only brings his machine to complete grief as a consequence, but has maybe, a bill to pay in addition, as a certain class of drivers are by no means indisposed to wreck a tricycle when a safe opportunity presents itself; hence we should advise those photographers who adopt the cycle as a vehicle for the camera to carefully read J. A. Williamson's little book before taking to the road. It should also be noted that a master is responsible for the acts of a servant while acting on his behalf, so that a careless assistant who takes to the road with tricycle and camera may run up a long bill of costs for his employer. As regards this matter, the book under notice says :—

> "A master is responsible for the wrongful act of his servants, even if it be wilful, reckless, or malicious, provided the act is done by the servant within the scope of his employment and in furtherance of his master's business or for the master's benefit. Where the master entrusts a tricycle or other machine to his servant to be used by him in furtherance of his (the master's) business, or for the execution of his orders, the master will be responsible for the negligent management of the machine so entrusted, so long as the servant is using it or dealing with it in the ordinary course of his employment.
>
> "In all cases of improvident and negligent driving the master will be responsible if the servant was driving about the master's business, or using the master's machine for the master's benefit, and the master cannot exonerate himself from liability by showing that the servant has acted in wilful disobedience to his orders, or made a detour to call on a friend, or to gratify some purpose of his own. If the servant, however, was going on a frolic of his own, without being at all on his master's business, then the master would not be liable in case of an accident occurring."

◆

A GRIEVOUS DIFFICULTY, AND ITS SOLUTION.

BY J. N. MC'N.

Write it for the News? Well, yes, I don't mind, although the laugh is undoubtedly against myself. You see it happened "thusly." I had lately become the happy possessor of a whole-plate camera, with carriers for half- and quarter-plates included in the outfit, so that anything I wished "to take," from $4\frac{3}{4}$ by $3\frac{1}{4}$ to $8\frac{1}{2}$ by $6\frac{1}{2}$, was mine. It will be readily understood that, having this apparatus, and a neat, compact, and handy dark-room at my disposal, it was not long before I was amongst the "operations," and almost everything, from the cat upwards, was performed upon with varying success, and many were the plates, and much the expense thereof, wasted in gaining experience. At last I was able to take a fair negative; and one afternoon, having visitors (my intended and her mother) I was induced (?) to try my hand on my sweetheart, and "take" her right off at once and for ever, without even the help of the parson. Marching her into the yard I forthwith rigged up and set about the task with my usual energy (?) I soon had matters arranged, and "snapped" her off—don't be alarmed, Mr. Editor, I didn't eat her—and, developing the plate, found the exposure hardly correct, so went at it again.

This time I used the double slide, and took my love in two positions. Development brought out one plate to perfection, but although both plates were in the same tray, with the same developer, no amount of coaxing would bring out the other, not even a shadow. Here was a puzzle, besides which, my Amanda averred that the picture which would not come, "was the best; it was her favourite position"—a profile. Nothing remained but to try again, so two more shots were fired, with precisely the same result. That settled the question. Of course the plates were wrong; something was certainly the matter with some of them, that was self-evident; so, determined to sift the matter to the bottom, another box was opened, and two more exposed. Just the same; one "turned up," or rather "came out," the other wouldn't budge a mark. This would not do anyhow; I would write to the maker, and see how it was he came to turn out such bad plates, and by that night's post I accordingly wrote, receiving, in course, a courteous reply, asking that two exposed but undeveloped, and two unexposed plates might be sent to him. Meanwhile, thinking that the developer might be at fault, although I did not see how it could, I tried three more double exposures, using a different developer to each, which resulted as before, in three pictures and three blanks.

Two exposed and two unexposed plates were packed up for transit to the maker as requested, but before sending them, it occurred to me that as I had had a batch of full plates in at the same time as the quarters, they might possibly be the same, and it would be just as well to try them, so that if they proved wrong, the whole lot could be returned together. Proceeding to put a couple in the slide, it was necessary I should remove the quarter-plate carrier I had been using for my previous operations, and my feelings may be better imagined than described, when I discovered, cosily lying under the carrier, the piece of black cardboard, full-plate size, which I use for placing between the plates when making an exposure.

Here was a solution of the difficulty from an unexpected quarter, and whether mortification at being guilty of so silly a trick, or gratification in having at last solved what seemed an insurmountable problem, reigned predominant, it is difficult to say. This, however, I will venture to say: never again shall I be found guilty of a similar folly; and if what I have written only serves to guard some enthusiastic brother amateur from an error of like nature, my object in placing this "grievous difficulty" before your readers will be accomplished.

◆

POSITIVES ON GELATINO-CHLORIDE OF SILVER.

BY W. M. ASHMAN AND R. OFFORD.

Eighth Article.

We will suppose that a suitable paper, such as Rive, Saxe, Renát Rive, or a well-sized material of other make possessing strength, whiteness, close texture, and freedom from impurities, has been chosen, and that a coating of starch and gelatine mixture, in which one or other of the salting formulæ mentioned by us on page 533, has been incorporated; then the next step is to dry the same in a manner favourable to easy manipulation when the work of sensitizing begins, the whole process being analogous to that of preparing and finishing albumenized paper. Here we may remark that we strongly recommend experimentalists to make use of the commercial paper expressly manufactured for photographic purposes, and supplied by all stock dealers under the cognomen of "plain" at something like one-third the price of albumenized; by so doing they will obviate the tedious processes of calendering, extra sizing, forming substrata, &c.

Gelatine-amido mixtures, such as we have mentioned, set quickly when spread upon paper, and in the moist state are particularly susceptible to injury; for this reason, then, in order to avoid as much as possible abrasion of the surface, it will be advisible to pass the sheets or lengths of freshly coated paper along rods conveniently fixed in the coating room, and to allow them to remain (surface outward) in that position until the margins are no longer tacky. Coated paper dries from the edges towards the centre, and, if permitted to do so spontaneously, would be difficult to flatten afterwards; therefore, when it has reached the stage referred to, it is more convenient to finish the process on racks made for that purpose. Light wooden frames of suitable dimensions, traversed by cords in opposite directions, answer well for the work. Flattening out the corners and placing the paper in piles, surface uppermost, follows, and in due course the work may be repeated, this time reversing the surface, our object being now to get the paper to lie quite flat. Removal from the drying room to a cooler apartment, and subjecting the carefully straightened heaps to pressure between two deal boards, will, in time, effect our purpose. By exerting considerable pressure for twenty-four hours, it will cause the paper to lie flat enough for trimming and packing, in a similar condition to that in which we are accustomed to receive ordinary albumenized paper for sensitizing.

Two forms of sensitizer have been found to suit this kind of paper; one, a solution of silver nitrate in a neutral condition, and the other a similar solution rendered acid by an admixture of citric acid. The former admits of the use of any of the ordinary toning mixtures, provided the proportion of organic salts, acids, &c., in the coating are not greatly in excess of the haloid, but paper so sensitized will not keep white beyond a few days. The latter tones better in a special bath such as we intend to mention, and retains its purity for a much longer time; this characteristic may be developed still further in either case by thoroughly washing the paper after its removal from the sensitizing bath, some details regarding which we shall describe further on. To prepare the neutral sensitizing solution, we take of

Silver nitrate	80 grammes
Water	1 litre

When dissolved, pass through Swedish filtering paper, or a piece of clean sponge packed tightly in the neck of a glass funnel. The liquid is then tested with litmus paper, when, if it be found slightly acid, the correction can readily be made by adding a small trace of sodium carbonate. Sensitizing—or floating, as it is sometimes called—does not need particular description, since everybody is familiar with that process; it will be sufficient to say that the filtered solution is poured into a clean flat dish, supported on a level table, the apartment being illuminated by artificial light, or daylight passed through golden fabric. A sheet of paper is laid down in contact with the surface of the silver, remaining there long enough to ensure a chemical change in the coating—that is, for the soluble haloid, citrate, tartrate, or other salts to be converted into silver salts which are sensitive to light. Three minutes' floating will do this, when the now sensitized paper should be lifted from the solution and suspended from a corner, or thrown over a clean rod in the drying room. When direct artificial heat, such as an ordinary coal fire, is employed for quickly drying the paper, more care will have to be observed than is usually found necessary with albumen, owing to the tendency the surface has to become discoloured by excessive heat—scorched, in fact. For fuller details on sensitizing, see pages 106 and 138, vol. xxvii.

Some rapidity is gained by exposing the dried paper to the fumes of ammonia hydrate, and the effect of the gas is to slightly accelerate toning, but the influence exerted on the latter process is not sufficient to demand more than passing notice. Paper fuming can be best performed by supporting the sensitive surface something like sixteen to eighteen inches above a dish containing about twenty cubic centimeters of strong liquid ammonia, the whole being enclosed in a light and air-tight box; twenty minutes' exposure to fresh ammonia is the limit usually required for paper prepared according to our formula. Papers containing less acid do not require so long; this, however, is merely indicative; the correct time requisite must be settled by the experimentalist himself, since no hard and fast rule can be applied to any process in which the conditions may be varied to such an extent without altogether departing from the main features.

All that need be said concerning the actual work of printing is, that the paper darkens faster in the light than albumen, and the proofs do not require to be printed much, if any, deeper than it is intended they should appear when quite finished; all other conditions remain about the same.

Reverting to the acid sensitizer alluded to above, we take:—

Silver nitrate	80 grammes
Water	1 litre

dissolve, and add:—

Citric acid	8 grammes

Should there be an opalescent appearance in the solution, a few drops of strong nitric acid will quickly dissolve it.

Floating is conducted in the usual way, and the advantages of fuming with ammonia are more pronounced than in the case of the alkaline bath, because, most probably, additional citrate of silver is formed.

An increase in the speed of printing, as well as considerable assistance towards keeping sensitized paper fairly white for a somewhat long period, may be gained by removing the nitrate salts formed by the decomposition of silver nitrate, and that of the haloid and other added salts, and replacing them with silver nitrate and certain other compounds of a more or less organic nature. Our experiments in this direction are not yet complete, but they have been sufficiently satisfactory to induce us to continue them; and in the meantime, our readers will have the opportunity of repeating experiments on the lines of those we have already made, out of which they may discover some facts of practical utility.

In an exhaustive series of articles on "Silver Printing by Means of Albumen," written many years ago for the pages of the Photographic News by MM. Davanne and A. Giraud, it was pointed out that the removal of unacted upon silver nitrate conferred keeping properties upon a paper so sensitized; but the resulting prints were exceedingly poor in quality, and, moreover, printed very slowly. Not long since a very able leader in these columns was devoted to the subject of preserving paper in the sensitive condition, and, among other things, the writer pointed out how vigour could be obtained after a considerable amount of washing.

Our experiments have been carried out upon similar lines, and we propose to detail some of them. Sheets of paper coated with salted gelatine and starch, in accordance with our formula, were floated one minute each upon one of the above silver nitrate solutions, and all but one were afterwards washed in three successive water baths. These we will designate A, B, C, D, E. A was not washed; B was washed, and re-floated for one minute upon a similar silver solution, diluted with twice its volume of water; C was also floated upon the same solution after ·5 gramme of citric acid, and 1·5 gramme of candied sugar had been added. D received similar treatment, and was again floated upon a dilute solution of potassium and sodium citrate. E was washed half-an-hour, then the same treatment as C, followed by a short immersion in a dilute solution of sodium acetate. B, C, and D printed rapidly, viz., in less than half the time required for ordinary freshly prepared and fumed albumenized paper; A, not washed, was slower, but not so slow as albumen; E gave only a faint image after an hour's exposure to a good light, as also did another sheet washed for half-an-hour, and not re-sensitized.

So far as regards toning, there was not much to choose between A, B, C, or D; the latter, however, was the most vigorous. From these and other tests, which space will not permit us to record just now, there seems to be little doubt that this class of paper could be prepared commercially to work very satisfactorily. In our own trials we merely blotted off the superfluous liquids in each case before proceeding to the next stage.

We have said so much on the subject of toning that it may be considered by some quite unnecessary to add anything more; but as we have found that a method of toning (which is very little used in this country) has proved more energetic than many of the ordinary solutions, we deemed it advisable to include it. The mixture we refer to is the gold and uranium toning bath, and we make it as follows:—

1.—Auric chloride, 1 per cent. solution ... 20 c.c.
Water ... ... 100 „

Sodium bicarbonate, sufficient to neutralize any acid that may be present.

2.—Uranium nitrate, 1 per cent. solution ... 20 c.c.
Water ... ... 100 „

Sodium bicarbonate, a little more than enough to neutralize the acid.

This may, to an extent, be known by the disappearance of much of the colour; but, in most cases, we presume, litmus paper will be employed for the purpose.

A slightly alkaline stage having been reached, Nos. 1 and 2 are mixed, and 500 c c.s of water added, when the bath becomes ready for immediate use. This bath works better directly after mixing, and it is doubtful whether there is any economy in using a bath over and over again, provided steps are taken to recover the most expensive metal.

Toning is carried a little further than it is desired the prints should appear when finished; we prefer that the proofs should receive at least three washing waters before entering the toning bath, and upon leaving that solution we pass them into water containing sodium chloride (one of salt to one thousand of water) in order to check further toning action. It is well to give the prints one or two changes in clean water before transferring them to the fixing bath, which may be of the ordinary one to five strength, and ten minutes of constant agitation therein will effect thorough fixation; but we do not think this can be done in less time than we have named.

Copious washing afterwards may be regarded as a necessity, and the use of a one per cent. alum solution as an eliminator is also to be recommended, since it plays the double part of hypo destroyer and agent for hardening the surface, which appears to be needed in order to withstand damage during washing. It is also desirable to render the surface of any prints which have to be burnished tolerably hard, and the ordinary commercial alum helps to do that.

Alum can be made use of at a much earlier stage of the process with some advantages, especially when a substratum of gelatine, either with or without barium sulphate, has been put upon the paper. Chrome alum can be used, but in that case there does not appear to be any distinct advantage beyond hardening the gelatine; while as a set-off, we have increased difficulty of toning, plus a certain amount of colour proportionate to the quantity of alum employed. Common alum is free from the second objection, and a stronger toning bath than it is usual to employ overcomes the first named; in fact, by doubling the proportions of uranium and gold above mentioned, without altering the quantity of water there given, any would-be recalcitrant will tone favourably. Substratums hardened with alum are not easily soluble in any subsequent process of coating; the presence of alum also helps to keep silver salts from penetrating through the back of the paper, and so favours the image remaining upon the surface. Moreover, common alum does most assuredly increase printing vigour.

Since penning the previous article, we have still further varied the proportions of gelatine and starch there given with results which are likely to prove most useful. For instance, by increasing the gelatine we get paper that will stand a good deal of rough usage. By reducing the gelatine we obtain matt surface prints of remarkable beauty, possessing a tooth for working upon which other processes do not yield. The whites are of great purity, without any tendency to harshness, and the shadows have all the intensity that may be requisite in a photographic print.

Printing speed is also a matter of some importance, and in this case is less than one half that required for obtaining an ordinary silver print; added to which, toning as above is under complete control, and is a comparatively easy undertaking for a novice. When we consider the supreme advantages accruing from methods of direct printing against any plan of development, which must necessarily possess in some degree the elements of uncertainty, we recognise in this process a possible future which cannot be over-estimated, and we think that a matt surfaced amido-gelatine print, either home prepared throughout, as we have indicated, or perhaps upon a machine coated paper, more conveniently obtained from a commercial source, will be greatly admired and much used by non-professional photographers, who are not bound to study the public taste. Professional photographers who test the value of the process will find it admirably suited to the requirements of a base for high-class artistic work in monochrome, or miniature finishing in water-colour.

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COMPOSITE PORTRAITURE.

BY JOSEPH JASTROW.

The process of composite photography has been applied to the solution of two problems: 1. Given a series of objects having in common an interesting characteristic, to find a single type which shall represent the whole group. 2. Given a series of representations of the same object, to find a single representation which shall give a superior effect by combining the strong points, and neglecting the defects, of each of the series. The latter problem is by far the simpler. The composite of six medallion heads of Alexander the Great may be taken to represent the real Alexander better than any one of the originals, because the probability of the six artists having introduced the same inaccuracy is very small. In the first problem, however, we are introducing an essentially new face—a type representing *par excellence* the peculiar characteristic for which the originals were grouped together. In combining the portraits of criminals, the object is to get a type of criminality; in combining the portraits of national academicians, one of recognized scientific ability.

Other methods of producing a type are when the artist puts on paper the general effect of more or less unconscious observation of physical peculiarities in the class of persons represented; or when the anthropologist selects among a number of savages, for instance, one who was judged to have all the distinctive marks of his tribe in neither an exaggerated nor a deficient degree, and yet combined with them no individual eccentricities—in short, that much-talked-of average man, whom one does not meet every day. Composite photography aims to take this process out of the hands of erring judgment and vague imagination, and reduce the art of type-getting to a mechanical one of combining photographs.

In several cases, when various images have been combined to elicit a type, it has happened that the resultant has been remarkably similar to one individual of the group represented. This was strikingly illustrated in the portraits published in *Science*, No. 118. Mr. Galton mentions, that in one such case he took a second composite, omitting the face which resembled the first composite, and the two pictures thus obtained were practically alike. In the case of the national academicians, the gentleman referred to as representing the type was not one of the sitters at all. The explanation of this peculiarity (excluding all possibility of mehanical error in photographing) seems to be possible in two ways. It may be regarded as an example of what has been spoken of as "prepotency,' which means that one set of features was so powerful and characteristic as to outweigh the effect of all others not in harmony with it. On the other hand, it may be said that the peculiar face is really very nearly the arithmetical mean in point of appearance of its class. For example, if we desired the average height of twenty-one men, five of whom were five feet ten inches in height; five, five feet nine inches high; one, five feet eight inches; five, five feet seven inches; and five, five feet six inches, each, we might take the man of five feet eight inches as the average of the lot. This individual would then be the mean of his class, just as the one face was the mean of its class. If, now, we omit the man of just five feet eight inches in height, the average of the group is not altered in the least. So, also, in omitting the one photograph, as Mr. Galton observes, the type is not altered. This leads probably to the latter explanation.

The problem is reduced to its simplest terms in the combination of but two faces. The resultant here ought to be the exact mean between the two originals. If the composite resembles one more than the other, we must regard that one as the more powerful characteristic face; if it resembles each of the originals, they probably resemble each other; if it differs from both, they differ from each other. That is, the mean of the three inches and five inches does not differ much from either, nor do they differ much from each other: the mean of one inch and seven inches is also four inches, but the differences between them and the mean are large.

I have attempted to experiment with ordinary photographs, and without the elaborate apparatus of composite photography, and give my results, in the hope of thus placing the process within the reach of every one.

The most natural method of combining two pictures is by means of the well-known Brewster stereoscope. I tried this, and was surprised at the splendid result. I went to work with all the fervour of an original discoverer, but afterwards found, on looking at Mr. Galton's article, that he had done the same. I mention this, because Mr. Galton himself, in the same place,[*] admits an independent suggestion, both of this and of composite photography, in the shape of a letter from Mr. Austin, of New Zealand, to Charles Darwin.

It was easy to arrange a device by which one of the two photographs could be raised or lowered, moved laterally, and also swung around its centre so as to bring its image exactly in correspondence with that of the other photograph. The only requisites are that the two pictures be approximately of the same size and position. When these requisites were not satisfied, I found other methods of combining them, as will appear below. With an ordinary stereoscope and a family album, anyone has the means of an amusing and instructive study. A few of the results gotten in this way may be worth recording.

As was said before, in uniting two pictures, say of two sisters that are commonly considered to resemble each other, the composite is very much like either. Some will call it more like the one, some more like the other. By alternately closing each eye, and then opening both, the observation becomes more striking. If the pictures represent persons who are total strangers to each other, the result is often an entirely different face from either. The effect is peculiar of combining the photographs of two persons of opposite sex. The male face seems to predominate; but this is probably due to the influence of the beard, moustache, &c.; for in combining children of opposite sex, or using photographs of adults with smooth faces, the predominance disappears. Like the beard, so, too, the hair, costume, &c., are apt to lend an undesirable peculiarity to the composite. This can be partly avoided by cutting out the shape of the face proper in white paper, and attaching it with a rubber band to the photograph, thus combining the features alone. On the same principle, one can combine the upper part of one face with the lower part of another by covering with paper the suitable parts of each.

One can combine persons of different ages with good result. A young lady of twenty, combined with her mother of sixty, gives a lady of about forty years of age. A still more striking case is, when a girl and her grandmother give as a composite a middle-aged woman much more like her mother than like the girl herself, or her grandmother, although a family resemblance runs through the group.

As Mr. Galton says, the effect is often to idealize the faces. A composite of two photographs of the same person gives a composite far better than any photograph actually taken of the individual. The combination of a photograph of a person at one age, with that of the same person at a different age, is very much like what the person looked at an intermediate age. The effect of hair, costume, &c., often spoils the results.[†]

While the combination with an ordinary stereoscope is very satisfactory, there are a few advantages in using the original form of the instrument as it was invented by Wheatstone. This consists of two mirrors set at right angles, and two bars running out perpendicularly to the faces of the mirror. Along these bars, uprights, holding the photographs, can be moved. One eye looks into each mirror, and the combination of the two images takes place. Differences in size of the photographs can be accounted for by moving the larger one further off, and the smaller one nearer. As soon as the two images, as seen side by side, are of the same size and position, the bars are moved on their common axis until the images coalesce. The composite thus formed is even better than the Brewster stereoscope, and the arrangement lends itself to a greater variation in the experiment. Two cautions may be useful: First, the head must not be moved. A prong of wood attached to the instrument, and held between the teeth, will be an aid. Second, the illumination of the two pictures must be alike, or else the more strongly illuminated will give the character to the composite.

While composite photography has always made use of photographs, there is no impossibility in making a composite directly from the original sitters. A Philadelphia photographer has been successful in producing a composite of two sisters from actual life. The method is, doubtless, more troublesome than the usual one. With the Wheatstone stereoscope, one can combine living faces by having two persons assume appropriate positions; and, as before, by guiding the movements of their heads, uniting the images in the mirrors. Both the full face and the profile give a peculiar and life-like effect.

The most common difference in the position of photographs, as ordinarily taken, is the direction of the head; that is, whether more of the left or the right side of the face is shown. Two photographs looking in opposite directions cannot be combined by any of the above methods. A simple device overcomes the difficulty. A piece of mirror is held directly in front of the face between the two eyes. The two pictures are set side by side; one is looked at directly with one eye, while the other is seen reflected, and, of course, reversed in the mirror. By moving the photograph until its reflection coincides with the other, a perfect blending takes place.

I have tried combination by means of the zoetrope. Simple figures can be satisfactorily combined; but so complicated a design as the human face is accompanied by a vagueness of outline and detail which render the process useless. By using five or six of each of the two photographs to be combined, a distinct face is seen. Even then the result is not nearly so good as in the stereoscopic combination. Besides, there is no way of accounting for small differences in the photographs. In combining several pictures, one gets nothing but a jumble of faces.

The fatal objection to all these hand-processes is, that but two photographs can be combined at once. To unite the resultant composite of two or more stereoscopes, is, perhaps, possible, but would certainly prove very troublesome. An apparatus that, by a system of mirrors, would superimpose a series of images, suggests one method of extending the processes above described. —*Science.*

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[*] Inquiries into Human Faculty.

[†] I would suggest that this method offers a means of studying the nature of the expression of the emotions.

ELECTRICAL ILLUMINATION OF OBJECTS FOR PHOTO-MICROGRAPHY.

BY DR. H. VAN HEURCK.

The Author observes that the electric light enables the observer to see, without difficulty, details which are invisible, or but imperfectly visible, with ordinary means of illumination. The reason he gives for this is, first, because the electric light contains more blue and violet rays than the light of lamps or gas; and secondly, because it has a specific intensity considerably greater than other artificial light, and therefore permits the use of much more oblique rays. The results obtained by Dr. H. Van Heurck have been confirmed by Dr. Von Voit, of Berlin; Dr. Stein, of Munich; and Prof. Max Flesch, of Berne, who have satisfied themselves that the incandescent form of electric light affords the illumination *par excellence* of the micrographer.

The electric illumination of the microscope has entered upon a new phase through the Trouvé apparatus, which can be used for the most difficult investigations in micrography and photomicrography. The battery consists of a small ebonite box, the inside of which is divided for two-thirds of its height into six compartments, communicating at the bottom by a small aperture between each. The elements, each consisting of two rods of amalgamated zinc placed beween three carbon rods, and attached to the cover, being coupled in tension, and may be let down into the liquid, or withdrawn therefrom, or more or less immersed according to the power required at the time.

The illuminating apparatus, attached to the front of the battery, or made to slide with universal joint on a standard, so as to throw its light in any direction desired, is the Hélot-Trouvé photophore, originally devised for surgical operations and the examination of the cavities of the body. The photophore consists of a nickelised brass tube, in which the incandescent lamp, of special form with a straight filament, occupies the middle. At the back end is a reflecting mirror, and at the front a condensing lens with adjustment, by which converging, diverging, or parallel rays may be obtained. As the light from the reflector might be objectionable in certain very delicate observations, a small blackened disc is added for covering the reflector at will, and a diaphragm may be placed on one or other side of the lens for intercepting the light from its edges.

The battery is capable of maintaining the lamp for two hours, producing a light which may be utilised in certain cases of photo-micrography, but which is much too intense for ordinary microscopic research. By a slight modification of the battery, however, by which only three or four of the elements are coupled, and the rest added as the battery becomes exhausted; or by employing a lamp of slighter power, the exact degree of light required may be obtained. The battery evolves no fumes, and the expense of maintenance is very slight. The charge, including loss of zinc, costs 2d., that is to say, 1d. per hour, or a halfpenny an hour if the small Stearn lamp be used.—*Society of Arts Journal.*

Notes.

The Photographic Exhibition. All exhibits must be in on or before Monday next, the 24th instant. Information from the Assistant Secretary, E. Cocking, 57, Queen's Road, Peckham, S.E.

A correspondent writes to tell us of a novel use to which he, as an amateur photographer, says he has lately turned his camera. He is a dweller in a south-western suburb, and, being an ambitious horticulturist, his garden has naturally been chosen by the cats of his neighbours as their favourite *rendezvous.* His complaints led to no practical results, each of his neighbours persisting he must be mistaken in supposing their cat took part in the feline revel to which he alluded. He accordingly waited for the first bright moonlight night, and having stationed himself at his back window with his camera in position, and his best flower-bed in focus, used his skill to such purpose that by the morning he was in possession of evidence which incriminated every cat in the terrace as a trespasser on his domain.

It was comparatively easy work, he goes on, to prepare the photograph, and to despatch to each neighbour the cat-carte in which their feline was most clearly *en evidence.* With each carte he sent, too, a short written communication, pointing out that the guilt, of which he had before communicated his suspicions, being now fully established, he should give no further warning; and, last of all, came this minatory postscript: "I shall not focus your tabby with my camera again; the next time I focus it will be with a shot gun!" Our correspondent does not tell us how he managed instantaneous photography by moonlight; and as he did not enclose us any of the pictures, we will merely credit him with a lively imagination, and assume that his skill in the use of the long-bow is at least equal to his adroitness either with camera or shot-gun.

Another drop of nearly one penny per ounce in the price of silver, which has taken place since our article of last week was written, points to a still further decline before long; and even if Mr. Norman's ultimatum of one shilling an ounce be altogether wrong, we may, before many years have gone by, be able to buy our silver very much cheaper than at present.

If a humorous contemporary may be credited, a photographer has done for Mr. George, the famous runner, what an American artist some time previously accomplished for "Maud S.," the celebrated trotting mare of America, that trotted a mile in the phenomenal time of two minutes eight seconds and three quarters. He has secured a series of negatives of the positions assumed by our wonderful champion of the cinder-path whilst taking his fastest strides, so that amateurs in years to come who have never seen George will be able to closely study the manner in which, as the sporting reporters say, "he made his running."

The exhibition of a young lady's photograph in the show-case of a suburban photographer the other day very nearly brought about disastrous results. The young lady in question sat for her portrait, and she being exceeding charming in appearance, the photographer could not resist the temptation to put a copy in his case. It had not hung there two days before the young lady came to him in sore distress and implored him to take it out, because, as she explained blushingly, she had had it taken unknown to her parents, to give to—well, not a lady friend. If any of her friends or her relations saw the picture—which they were pretty sure to do—it would be so embarrassing, so she said, for her to account for her having been photographed. The photographer was a gallant man; he sacrificed his feelings, took the portrait out of the case, and the damsel tripped away happy in her mind.

By virtue of the Patent Laws Amendment Act, which has just been published, those applications for patents which have been abandoned in their first stage will not be open for public inspection.

The Dusseldorf and Dresden artists have entered into a solemn compact to wear a distinctive dress. The latter have chosen the costume of Rubens, and the former that of Rembrandt. A contemporary remarks that "the idea is capable of wide application, and each profession or trade might wear a suit of clothes by which his calling could be ascertained." In the early times of photography, the dress *de rigueur* for a professor of the art was a velvet coat and a slouched felt hat, of Brobdingnagian width of brim. Where is the photographer who would dare thus to attire himself now-a-days?

The funeral of W. B. Woodbury took place on Saturday afternoon at Abney Park Cemetery, in accordance with our note last week. Besides the family and friends, many persons well-known in photographic circles were present.

Photographs of the notable buildings and picturesque places in London are plentiful enough. Would it not point a valuable moral if somebody photographed the ugliness of London? We refer more particularly to the hideous blocks which are everywhere rising up for the accommodation of the working classes. The dwellings in which they used to live were dirty and miserable, but they were not so depressing as are their successors. Is it really necessary that these buildings should be like barracks? Antiquity very often renders a house picturesque, but these "blocks" are apparently built to defy time. The main thoroughfares of London promise to be a collection of palaces, but everywhere else we are threatened to be surrounded with buildings positively appalling in their ugliness and monotony. If a photographic exhibition of all that is ugly in the way of London street architecture could only be organised, perhaps public attention would be drawn to the matter, and the evil, if not averted, at least mitigated.

For the depth of despair in regard to the photographing of children, commend us to the operator who, in the recesses of his dark room, after a twentieth attempt to secure the features of an unruly youngster, thus delivered himself:—"Joshua commanded the sun and moon to stand still, and he was obeyed; but I'm hanged if he'd have succeeded with this young imp!"

The memorial which has been erected in honour of Poitevin, at St. Calais, was unveiled on the 7th instant, a representative assembly of photographic notabilities being present. Particulars will be given next week in a communication by M. Léon Vidal.

It is odd how such a little thing as a photograph serves to set a fashion. We read in a fashion journal that "since the appearance in many shop-windows of a certain photograph of the Duchess of Albany and her baby-son, in which the cot of the tiny child formed a prominent feature, a new interest seems to have been aroused in the matter of the decoration and construction of babies' cradles generally." Here, obviously, is a hint which the portrait photographer should not fail to heed. Why, among his "properties," should he not include a tastefully-decorated cot? Babies look far prettier in their cradles than anywhere else, and are certainly far more comfortable. The only drawback is, that some babies are extremely knowing, and have a strong objection to entering a cot other than their own. But this difficulty does not occur in every instance, and might be overcome by coaxing. We know a cynical photographer who advocates the use of chloroform where babies are concerned; but we scarcely go as far as this.

A photograph more gloomy in its suggestiveness could not be imagined than that of the tickets of the passengers who were in the ill-fated train which was swept away with the Tay Bridge. These tickets are fifty-five in number, and have been photographed, together with the portraits of the guard and engine driver. There are few people, even of the strongest nerves, who would care to have such a melancholy memento about them when on a long railway journey.

Papers which are publishing portraits just now of the various parliamentary candidates are treading a very hazardous path. Thus a local paper of Liberal proclivities has got into sad disgrace with the Conservative portion of its readers because its portrait of one of the Conservative candidates is not quite as flattering as he and his friends think it ought to be. Of course they put it down to party bias, quite ignoring the fact that the candidate in question is by no means good-looking, and that under no circumstances consistent with truth could he be made so.

A fancy fair in these sensational days must, above all, show originality in its conception or carrying out; and the difficulty now is for the organizers of these charitable carnivals to hit upon a really novel notion. Already are the plans for next season being laid, and one of these, we hear, will result in an elaborate fête, the scene of which will be a realistically arranged beach of a popular watering place. There will be a painted sea for the background, whilst the foreground will be donkeys, goats, carriages, nigger-minstrels, itinerant photographers, and all the usual accessories of the sands. Instead of stalls, the ladies will have their fancy goods set out on rocks, on the steps of bathing machines, in tents, and other appropriate places, amongst which it is hoped the public will freely wander.

So far photography has been only mentioned incidentally; but it is hoped that in connection with the same fancy fair there may be a photographic adjunct in the shape of a wholly original album, which, if the intention of its designer is carried out, will contain a series of representations of the Prince of Wales attired in the numerous uniforms and costumes he occasionally assumes. It is calculated that, including the twenty military uniforms, English and foreign, which he is entitled to wear, the many orders of knighthood he belongs to, and his numerous miscellaneous offices—such as Grand Master of the Freemasons, President of the Royal College of Music, &c.—more than seventy different views of him will be included. There is one little difficulty in the way, however: how are the negatives to be obtained? No information on this important point is as yet forthcoming.

The suggestion we threw out a few weeks since that copies should be made of the pictures in the National Portrait collection, so that in case of fire or other injury we should still preserve mementoes of the historical personages of the past, has been endorsed by the *Daily Telegraph*. The *Telegraph* quotes with approval Mr. Ruskin's proposal that "a certain number of dull persons should always be employed by Government in making the most accurate copies possible of all good pictures; these copies, though artistically valueless, would be historically and documentally valuable in the event of the destruction of the original picture." These words were written a good many years ago, before the capabilities of photography for copying purposes were developed, and were Mr. Ruskin writing now he would probably for the words "dull persons," substitute "skilled photographers."

Patent Intelligence.

Application for Letters Patent.

10,594. John Rudolph Gotz, 19, Buckingham Street, Adelphi, W.C., for "Improvements in or connected with photographic cameras.—September 8th 1885."

10,714. William Henry Richards and William Dyke Wilkinson, 216, Bradford Street, Birmingham, for "An improvement in their method of making adjustable photographic holders."—September 10th, 1885.

10,741. Joshua Giles Benster, 53, Chancery Lane, London, W.C., for "Improvements in shutters for photographic cameras."—(*Solomon Sylvester Benster*, United States).—September 10th, 1885.

10,757. Henry Johnson, 13, Castle Street, Holborn, E.C., for "A crystal horse-shoe photograph frame."—September 11th, 1885.

10,808. William Trenemen, 2, Highgate Hill, London, N., for "Improvements in producing and colouring photographs in permanent pigments, &c."—September 12th, 1885.

Patents Sealed.

11,212. John Veda Robinson, 39, Lower Sackville Street, Dublin, for "Photographic cameras."—Dated August 13th, 1884.

Patent Granted in America.

325,636. George Sutherland, Adelaide, South Australia, "Method of producing typographic blocks or plates from photo-negatives."—Filed, January 22nd, 1885. (No specimens.) Patented in England June 16th, 1884, No. 9,026.

Claim.—The method of producing from photographic negatives blocks or plates for typographic surface-printing, which consists in attaching to a photographic relief a film or sheet of any material which has been impressed with the form of an engraved surface capable of printing in a typographic press a series of marks producing the effect of an even tint or shade, and then rubbing or pressing the surface so produced with a smooth-faced instrument, whereby the size or breadth of the marks on the elevated portions of the relief are increased, so as to render them capable of printing a series of marks having the effect of a darker shade or tint than the rest, the surface so produced being thus adapted to print a series of marks large in the darker portions of the picture to be reproduced, and smaller in the lighter portions thereof, substantially as described.

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"SHOTS" IN THE EASTERN COUNTIES.

BY A. W. BEER.

Of all subjects suitable to the Cyclopian eye of the amateur's camera, to my taste, the relics of a bygone age and the works of our "forbears" are by far the most interesting and fascinating; and I think I may safely say yield a larger average of successful results than what we commonly understand as landscape photography. *I* hunt after Saxon doorways, Norman arches, and unrestored country churches; I stray into world-forgotten corners of the counties in quest of quaint towns and picturesque hamlets, with their gabled manor houses and "magpie" granges reflected in the black stagnant waters of half dry moats; or priory ruins, crumbling slowly away, leaving only a semblance of their once perfect architectural beauty. And fortunately there are still, notwithstanding the determined efforts of ignorant—I had almost said brutal—vandalism, and the still more fatal endeavours of the iconoclast, sufficient to reward the ardent and diligent seeker.

With this confession, therefore, and to those brother amateurs who can see a beauty in other pictures than those composed of such fickle subjects as water, foliage, or clouds, this record of a short tour among the historic sites of the eastern counties—whose history and associations are indissolubly twined with those of "the land we live in"—is offered. It was no *dolce far niente*, going for a fortnight in the country with a pocket ¼, and a packet or two of plates, and taking a "picture" (save the mark!) now and again.

We—my chum and I—wanted, and meant having, good presentable pictures; consequently we took a reliable kit, viz., a whole plate and 10 by 8 cameras, 7 in. and 9 in. R. P. sym., and 13 in. D. R. R. lenses, with a stock of proved plates in a travelling lock-up tin case made specially for them.

It is a far cry from Liverpool to Lincoln; but one fine morning late in August, we found ourselves crossing the sluggish Trent by the picturesque ruin of Torkey Castle, and entering Lincolnshire; while away across the level fenland, the tower of Lincoln Minster could be plainly seen.

Lincoln is reached about midday, and we make at once for the Cathedral. Along the Dutch-like canal, to the ancient covered bridge, through the city gate, past the Jew's house famed in story, and we are before the grand front of Lincoln Minster. Entering, we of course commence by interviewing the courteous Dean, and are at once given a written permit which makes us free of the interior. The cloisters are not so attractive as they were at one time, the effigy of the old monk being gone from its accustomed place; and time only permitting one view of long exposure, we "open fire" on the nave and aisles from one corner of the latter, giving 15 minutes $\frac{f}{45}$ R. P. S., and secure successful results.

The west front, with its decorated Norman doorways, three great alcoves, rows of arcading, stately towers, and quaint seated cross-legged statues, next claim our attention. But the open space in front is so limited that the widest angle lens will not take all in. So, after exposing a couple of plates each, we pass out by the precints gate, and across to the castle; from the leads of the old tower where formerly the scaffold was erected, we obtain a magnificent view of the Cathedral and Chapter House, rising over the gables and red tiles of the old city houses. This secured by the help of 18 in. focus, we return and obtain another fine picture of the Cathedral tower over the old gateway, with the overhanging storeys of the Elizabethan house in the foreground. On the river side by the station a charming picture of "the city on the hill" is found, with the cathedral bathed in evening sunshine crowning the summit; but we fear the light is too far gone for an attempt to secure it to be successful.

Through the fast closing shades of the autumn evening we sped across the fens to Boston, noticing *en route* the charming village and church of Sutterton, enclosed amongst trees, quaint, and unmistakeably English; and, indeed, the lover of village studies "far from the mad ling crowd" can, in this district, find an inexhaustable supply of subjects for pencil or camera.

Towering high above the level fens, the stately tower of Boston Church is visible for many miles across both land and sea, alike a mark for the fenman or the sailor. Dull and grey is the morning, but we have come so far out of our way to obtain a particular view, that we do not care to be disappointed; so, finding a favourable point of vantage from the billiard room of the Liberal Club, we obtain a picture that only wants the charm of sunshine to make it perfect. At our feet is the dark river, boats moored to water steps on the opposite bank; red-tiled gables amid clustering trees, backed by the grand storied tower reaching its lantern into the clouds.

There is nothing more of interest in Boston, so on to Crowland Abbey; over the dead level of the Lincolnshire fens, across the long straight "drains" that run away into the horizon, stopping now and again at a roadside station, by the side of which is almost sure to be a curious old ferry with a picturesque inn and ferry-house combined, with groups of market people waiting to be ferried over, the flat-bottomed boat being punted across in mid stream; on through Spalding town, where once, nearly a thousand years ago, the invading Norman went out quicker than he entered—Spalding, that was a town in Saxon England, and is still a thriving agricultural centre.

Arriving at Deeping St. James—a roadside station about nine miles north of Peterborough—we charter a county gig for a drive across the famous Deeping Fen to the Isle Crowland.

Wierd, eerie Crowland! Quite a "creepy" feeling comes over one as we drive up to and over its encircling bank of earth-wall, from the level fen road, and into its wide, grass-grown, deserted streets of low, heavily-thatched cottages, possibly not very much changed since Hereward the Wake rode in on mare Swallow, with the remnant of true English Saxons, and turned like a stag at bay, keeping the Norman invaders outside for many a long weary month, aided by the treacherous fen which fought well for its sons. But we are in the 19th, not the 11th century, and 800 years have made some changes in Crowland. Gone is the Abbey fortress that sheltered the "last of the English," and in ruins is the Palatial Norman Minster that succeeded it. Dry are the two rivers that met under its triangular bridge; and drained is Deeping Fen, that so long enabled the devoted band in Crowland to bid defiance to their cruel foe. In the great west front of the minster, crowded with mutilated statues—once of great beauty—and with the beautiful remains of the doorway, we find subjects for several plates; but the day being showery and dull, full exposures are given, and the pictures obtained are of far better quality than might have been expected. The east end of the abbey, with the shell of a magnificent "dog-tooth" arch and carved panelling of the choir screen, are also secured. While the trap is waiting to drive us to the station we secure one or two negatives of the ancient triangular bridge, with the crowned effigy, possibly, of one of the Saxon kings, built into the parapet. In our picture a child is clinging, frightened, to the stone knees of the statue, a poem of infancy and antiquity.

Through the autumn afternoon we drive along the embankment that holds in check the River Weland. In front and on one side or the other a long-legged heron now and again starts up, beating the air with his great wings; while behind, quickly in the dull, heavy light, we see the last of one of the special objects of our tour, Crowland Minster.

Peterborough is our next halt for work, and here the Cathedral and precincts are the only objects of photographic interest.

PETERBORO' CATHEDRAL.

The imposing and graceful west front, with its three magnificent arches (notwithstanding Ruskin's strictures), its innumerable pinnacles, statues, carvings, with the rose window crowning all, claims first attention, and the afternoon light being perfect, we soon obtain the pictures we want. Further views are taken (by permission) from the Bishop's garden, and the "picture" of the day secured. Imagine, at our back, tall, well-grown far-spreading trees, throwing beautifully broken-up shadows across the lawn in front; in the foreground the Episcopal Palace, quaint and artistic; and in the near distance, framed in foliage, are the beautiful spires, arches, and carvings of the Cathedral front, all flooded with a rich wealth of golden sunshine.

The interior of Peterborough is well worthy a day or two's careful attention by the amateur photographer, but on the occasion of our visit it could not be attempted, owing to the re-building of the central tower. But the finely decorated doorways in the Cloister Court, and the Prior's gate, should not pass unnoticed.

(*To be continued.*)

A NEW DEPARTURE IN PHOTOGRAPHY.

BY L. WARNERKE.*

Though photography is the youngest art science, many radical departures from the paths indicated by the first inventors are registered in the history of this fascinating art.

First, images produced by light were on the copper silvered plate; these images (Daguerreotype) were direct positive, and each image required separate exposure in the camera. The first departure was made by Talbot, who used paper as the base; this was treated by iodide, followed by immersion in solution of silver nitrate, with a view to form sensitive iodide of silver in the pores of the paper. After exposure, development, and fixing, the image was reversed as regard light and shade (so-called negative), capable of giving a quantity of images by sun printing. The paper forming the base was opaque, and to facilitate the printing, recourse was had to certain modes of rendering it transparent, by waxing it—sometimes before sensitizing, sometimes after fixing. 1839 to 1851 was the epoch of great scientific development of the art; the brightest luminaries in the scientific world of that time helped considerably to the elucidation of many new questions presenting themselves. Memoirs and treatises of that epoch are monuments, glorifying their authors, and till the present moment forming indispensable reference books for investigators.

About 1851, the invention of collodion was the signal of a new departure. Paper was abandoned in favour of collodion. Collodion being a solution of pyroxyline in a mixture of ether and alcohol, when poured on the glass formed a film on it, as transparent as the glass itself; some salts of iodine or bromine, when introduced in the collodion, and treated with solution of nitrate of silver, formed sensitive salt of silver in the film of the collodion, and after exposure, development, and fixing, the negative image was obtained of surpassing beauty, grainless and transparent, a great deal more sensitive than oiled paper, and the manipulations were simpler.

No wonder that such superior qualities caused the abandonment of the oiled paper, and without regret. Here began a new era. The ease of obtaining likenesses fascinated everybody, especially persons looking for an easy mode of earning their living. The number of photographic studios increased, but the social level lowered considerably; photography ceased to be the fashionable occupation.

The number of amateurs, on the other hand, decreased. The new wet collodion process necessitated the use of heavy and cumbersome paraphernalia, such as water tank, baths, tent, glass bottles, &c. This inconvenience was especially felt by the landscape photographer and by the amateur, and that was the cause why attention was directed towards dry plates. The first dry plates were prepared after the pattern of wet collodion, only submitted after sensitizing to the action of preservatives. A great many different systems of dry plates were proposed, but generally the result was very uncertain, until Sayce and Bolton, inventing new collodion emulsion, laid the foundation of the really practical system. According to this new system, haloid salts and silver nitrate were introduced in the collodion. Bromide of silver, formed by the double decomposition, was precipitated together with pyroxyline by pouring the emulsion in water, washed, and re-dissolved in alcohol and ether. The sensitive collodion emulsion was a ready means of preparing dry plates. The advent of collodion emulsion was hailed with delight by landscape photographers, but professionals despised it, in consequence of its inferior sensitiveness as compared with wet collodion.

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* Lecture delivered on September 11th at the meeting of the Balloon Society of Great Britain.

After thirty years' undisturbed reign of collodion, either in wet, dry, or emulsion form, a new departure slowly came in the shape of gelatine emulsion. No striking discovery or new principle was the origin of the new departure. The foundation was laid by Sayce and Bolton's discovery, but it took twenty years to bring it to the perfection and modification that secured the triumph of the revolution that upset the wet collodion. The advantage of gelatine plates is quite patent even to the most superficial observer. Extreme sensitiveness, and the possibility of having the plates always ready in stock, at once recommended them to the professional.

The amateur's appreciation was still more marked; with the introduction of dry plates of superior sensitiveness, all voluminous and cumbersome paraphernalia become unnecessary, and there was no need to have the fingers blackened by the solution of silver. These conditions caused the number of amateurs to become larger and larger; many ladies swelled the ranks; the social standard again rose; persons of royal rank yielded to the charm of instantaneous photography; and at the present moment the reign of gelatine emulsion is general and undisputed.

The introduction of the dry plate contributed considerably to comfort in the practice of out-door photography. However, these dry plates, being prepared on glass, the weight, brittleness, and bulk of glass were always the dark spots on the bright horizon of the enthusiastic tourist.

Having to suffer this inconvenience in my photographic excursions, I decided to eliminate it, and taking advantage of the newly-introduced process at that time—collodion emulsion—I found a substitute for glass in that devised in 1869—*sensitive collodio-bromide tissue*. The film of collodion, as transparent and as textureless as glass, produced on enamelled paper, was the base, which, covered on the surface with collodion emulsion, offered a very handy material, capable of giving a result equal in every respect to the best collodion negative.

This material was successfully manufactured for many years. The negatives made some fifteen years ago are just as good now. Not so very long ago the opinion was expressed that a collodion film negative could not be kept, it becoming mere powder; but I have not observed this in my negatives.

Analysing the reason of the various departures described, we cannot leave unnoticed the fact that superior sensitiveness was always one of the important causes of adopting the new system in preference to the old one.

Gelatine plates are, perhaps, the most striking proof of that assertion, because, generally, the quality, not being superior to the wet, we must look for the preference in superior sensitiveness. The superior sensitiveness of gelatine plates rendered the existence of collodion tissue anomalous.

A series of experiments were made to produce the tissue with gelatine emulsion. Pumphrey in Birmingham, and Stebbing in Paris, introduced films of gelatine. These had the disadvantage of very great difficulty in drying. After the collodion-tissue experiments, it was evident to me that a temporary support, firmly cemented with the gelatine film from the beginning, to the end of the operations of development, fixing, and drying, was unavoidable. In consequence, my first gelatine tissue was produced on paper, easily detachable after fixing and drying.

A few years ago I patented a process based on the fact that gelatine emulsion submitted to the action of light and pyrogallol developer, becomes insoluble in hot water in the parts affected by light. A sheet of paper, covered with emulsion, is used in the camera instead of a glass plate; it is next developed with pyrogallol, put in contact with a glass plate, and immersed in warm water. All gelatine unaffected by light will be dissolved, and removed by washing together with the sheet of paper, serving as temporary support; and the negative image alone will remain firmly attached to the glass.

This process is capable of giving negatives superior to the finest gelatine plates, and being amenable to intensification by silver, permanganate of potash, or any other film-staining. It is the best gelatine process for optical lantern slides. It forms a base for Woodburytype, phototype, and the finest photo-engraving process. In fact, I consider it the most valuable and most perfect.

However, this is not the process that can be appreciated by photographers now-a-days. The modern photographer—even the most enthusiastic—does not like complicated manipulations; he wants only to obtain a result as good as possible with the least possible trouble. In former times we considered it a heresy to use any preparation that was not made by our own hands. We delighted in complicated manipulations. We often manufactured our own ether—always our pyroxyline, plates, paper, &c. The tedious development of the negative was our acme of pleasure. Now, photographers are grumbling that plates require development; and if any good genius should realise the photographic dream of a modern enthusiast, I think it will be a sort of snuff-box with a tiny handle, one revolution of which will produce at once a large photographic image mounted, rolled, finished, and framed.

With such a prevalent disposition it is clear that hot water development, besides pyro, is out of the question. It was manufactured for the purpose of enlarging gelatino emulsion paper, in which ordinary plain photographic paper was covered with emulsion on the surface. Modern disposition chose this paper as the material for negatives. Manufacturers, sensitive to the signs of the times, detected in this disposition an indication of a new departure, and considerable improvement in the manufacture of the paper and its photographic preparation followed rapidly. The firm of Morgan and Kidd, of Richmond, the Photographic Stores, Warnerke and Co., at Herne Hill, Eastman, from New York, and others supply this paper regularly. The last-named firm announce the paper in sheets of over 1,000 feet. There are, for your examination, a few sheets from the Herne Hill laboratory. We are not so big in this country, but you will observe that a sheet of 15 feet by 25 inches is capable of satisfying the most extravagant test.

Very fine results can be obtained on this simple paper. Grain of the paper is the first evil to be avoided. Opacity of the paper is the second.

The thicker the paper, the less perceptible is the texture in printing; but with thickness there is increase of the opacity.

Some people have recourse to waxing, others recommend oiling (castor oil is recommended at boiling temperature by Eastman); however, oil or wax improves the transparency of the paper, but the operation is unpleasant, and the result not quite permanent; after a time opaque spots appearing, which can only be removed by re-oiling. Everything is ripe for the advent of the new departure, which will be the beginning of the paper era. But it is evident that the imperfections and complications mentioned must be removed. The sensitive paper must be textureless and transparent, and these qualities must be completed by the manufacturer, and not left to the care of the consumer.

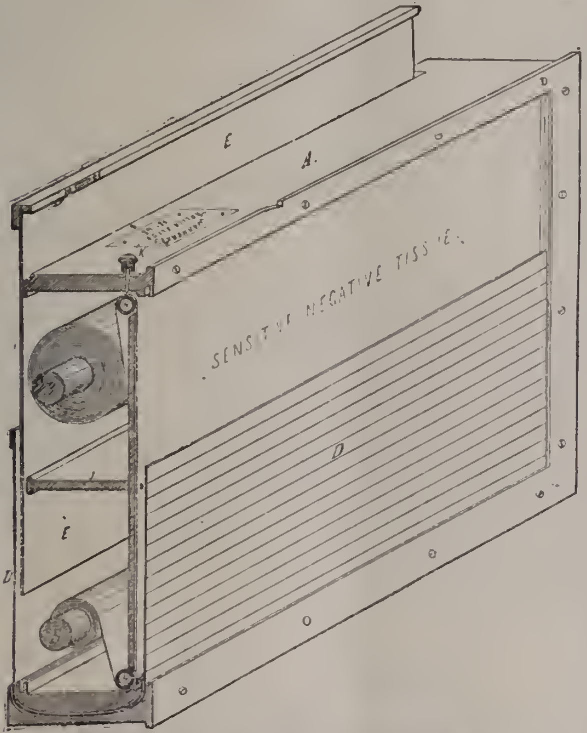
A description of the next process will acquaint you with my view as to how this end can be attained. Some short time ago I found that if a sheet of paper is covered with emulsion on both sides, and exposed in the camera or otherwise to the light, the light affected first the front surface of the paper, but, penetrating the paper, affected also the back sensitive surface. When such a sheet of paper is next developed, two images are produced, one on each side of the paper. By closely examining these two images we can soon perceive that the back image bears the impression of the imperfections, if any, of the paper itself. This impression—being the reverse, as regards opacity, of what the paper was—neutralizes them to such an extent, that even in the case of a very coarse-textured paper, a smooth and textureless image is the result of printing. The negative thus obtained has also the advantage of producing rounder and better prints, generally observed when double printing is resorted to.

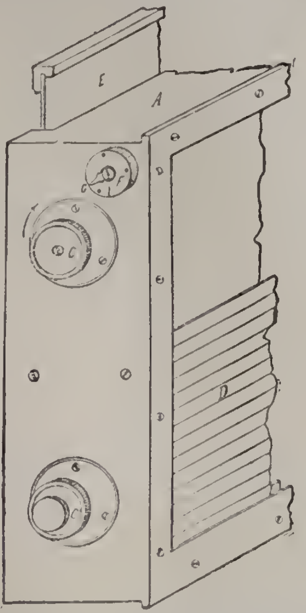
This principle I applied in the production of my new patent double-coated negative tissue. Paper used in the manufacture of this tissue is as transparent as glass, being of the thickness of ordinary writing paper. It is impervious to water, but being coated on both sides with emulsion there is no tendency to curl. The tissue is used like the ordinary glass plate; development with pyrogallol or oxalate is followed by fixing, washing, and drying. This last operation can be accomplished either by hanging, or on the surface of talced glass or ebonite, and printed, either having the negative sheet loose, or squeezed to glass if preferred.

Having thus far exhausted the question of the sensitive material, it remains to describe to you the apparatus most suitable for its use. It is evident, I presume, to everybody, that using sensitive paper behind a glass plate is to be avoided, because, amongst other disadvantages of this system, reflection and refraction cannot improve the image. The tissue being transparent, it must be taken into consideration that behind the tissue only a dead black surface is admissible. The readiest means of using the tissue in the ordinary dark slide will be by attaching it by the four corners to some rigid support capable of being introduced into the slide. There are also devised special carriers based on the principle that the paper is secured by pressure on all four sides. This system, introduced some time ago by myself, also answers fairly well when exposure follows rapidly the insertion of the tissue in the carrier; but is not applicable for excursions, when it is made ready a long time before exposure takes place, gelatine-covered tissue having a tendency to extend or contract with change of temperature, or hygrometric condition of the air. To obviate that difficulty, I am now making some rigid board prepared with a sticky material. The tissue put in contact with such a tablet sticks all over, and consequently remains perfectly smooth; moreover, the nature of the tablet is such that the tissue can be easily removed after exposure.

The most rational apparatus, however, for the use of the paper, is the roller slide. The history of this apparatus is as ancient as photography itself. We found mention of one described by Melhuish; another is described many years ago in *The Illustrated Photographer*. I have been making roller slides since 1871. The roller slide is a box containing two rollers on which the sensitive paper can be wound. This box is provided with a shutter, like an ordinary slide, acting on the end of the roller; paper in succession is brought from one roller to the other, and each time a fresh surface is ready for exposure. It is only necessary to know when the requisite quantity of paper is unwound. In my roller slide, made for the collodion tissue, a small opening protected with red glass permitted the number printed on the tissue to be seen. But since the introduction of gelatine, with superior sensitiveness, this system could not be applied, and my next slide was provided with an electric alarum. The tissue was perforated at certain intervals; a very small electric bell acted on by chloride of silver (dry element) was fixed in the slide; a lever connected with the electro-magnet of the bell completed the electrical circuit; when the perforated hole occupied a certain position, the alarum bell ringing indicated that the band of tissue was in position. The next simplification was in substituting a lever and indicator for the costly bell. And now I submit for your appreciation the last form of the roller slide.

A is the box; B B, the two rollers, made of wood or light brass tube; C C′, the two milled-heads of the rollers; D is the revolving shutter; E is the sliding door provided with lock, which is removed when tissue is to be introduced in the slide; H H are two rollers made of brass tube covered with india-rubber. The tissue, fastened by the end on the roller B, is passed over the tube H. Rigid wooden board J, and the other tube H, is next pasted by the other end to the second roller, B. By revolving the roller-head, C, in the direction indicated by the arrow, the band of the tissue will be passing from one roller to the other, and tube H will revolve also, moved by the friction of the paper band. This tube H is provided at the end with indicator G, and a box F. The movement of the tube H will cause the revolution of the indicator G, and the system of cog-wheels, inserted in the box F, is calculated in such a manner, that the complete circles made by G correspond exactly with the width of the plate. When the requisite quantity of the tissue is wound, it must be marked on the band, and this is accomplished by means of the spring punch K. The top roller B is provided with a ratchet wheel, and the milled head, C′, is made double in order to tighten the band of the tissue. The roller can hold a band of tissue for forty to eighty negatives.





Quite recently, a roller slide of different construction was introduced by the Eastman Film Company. Details of the mechanism of this apparatus elicits general admiration. It is made on the interchange system so useful when large numbers of the apparatus of uniform size is to be produced; it is devised and made, like Americans are in the habit of doing, by special machinery. Register is secured by the four audible clicks producing four perforations on the paper. They are made to hold a spool of paper for twenty-four negatives.

Without passing criticisms on this slide, I must confess that the simplicity, compactness, and lightness of my last model makes it certainly a very valuable instrument, that can victoriously stand competition with any rival production.

It shall not be complete without mentioning that, a few years ago, I constructed also a roller-slide for special use from a captive balloon. This roller-slide had clock-work attached to the head of one of the rollers. This clock-work, when set in motion by the liberation of a catch actuated by an electro-magnet worked from below through a wire inserted in the rope of the captive balloon, let pass the tissue from one roller to the other, and exposed it by acting also on the shutter. This slide was made for the exposure of twelve whole plates.

The narrative of the President of this Society of the incident accompanying the ascent in company with Mr. Cobb, and the breakage of all the negatives secured with such risk and labour, are self-suggestive of the special value of paper for balloon photography.

POTASH DEVELOPMENT.

BY A. W. BEER.*

The potash developer having become somewhat noticeable just now, several enquirers after "something new" have been not all equally fortunate in the use of the potash salts, and considerable variations have been experienced in practical working. So it was imagined that a few notes from actual practice might give an impetus to this beautiful developer.

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* A communication to the Birkenhead Photographic Association.

We do not think that the majority of amateurs care particularly what number of the "32 Puzzle" can be forced out of a certain plate—after a prolonged soaking in the developer—but they do want to know, with some exactitude, that, given an ordinary light, soft sunshine, or open light without sun (as we usually get in this part of the world), what developer will best develop a smart negative, after a tried and proved correct exposure.

We may venture the opinion that in *sunlight* any plate with any development will give a satisfactory negative; the difficulty is to fail, always excepting over- or under-exposure. So our endeavours were directed to much more uncertain work, viz., correct exposures and development in the shade; or, without any sunshine at all.

Several makes of dry plates were used. The first developer tried was what is known as the "American Standard" formula, published several times during the last few months, viz.:—

No. 1.

Water	32 ounces
Ferrocyanide potash	3 „
Carbonate	3 „
Soda	3 „

No. 2.

Water	32 ounces
Soda sulphite	3 „

To develop.—Take (for 8½ by 6½), No. 2, 4 ounces; No. 1, ½ ounce; *dry pyro*, about 4 grains; if over-exposure is suspected, dilute with half water.

I send round a negative exposed recently—9 inch R.P. Sym. 7-25, 3 seconds. This subject is down in a valley, among the hills of Snowdonia—soft open light—heavy foliage—whitewashed cottage—dark background of hills. It is very full of detail—nearly too much so—and almost every grain of plaster under the whitewash of the cottage clear and distinct. Special note.—No "blocking-up" of high lights with this developer. This picture (as, in fact, always with this formula) comes up slowly, taking about fifteen minutes to finish; but is it not better to rely upon slow and careful development for a first-class negative, than rush a full strength solution on the plate and obtain a thin, flat, and unworkmanlike result? No. 2 was exposed shortly after, only the light was infinitely worse, heavy dark clouds resting on the mountain-tops. Same stop, same lens, five seconds' exposure, slow development, but fully exposed negative, and, considering the attendant circumstances, a good negative. The print is a little over-printed.

We next tried the formula known as "Beach's," compounded by the President of the New York Amateur Photographic Association, and editor of the *Scientific American*. The quantities are different, and the ingredients vary; but the results are remarkably similar.

Beach's Potash Solution.

No. 1.

Water (hot)	4 ounces
Soda sulphite	4 „
When cool, add—	
Sulphurous acid	3¼ „
Pyro	1 „

No. 2.

Mix—	
A.—Water (hot)	4 ounces
Soda sulphite	2 „
B.—Water	4½ „
Pure carbonate of potash	3 „

Correct exposure.—To 2 ounces water add 40 drops No. 1, and 1 drop No. 2.

With this developer the image is about one minute to one and a half minutes before making its appearance, then slowly gathers density until completed.

To sum these hasty notes up shortly, I find the following distinct advantages with the potash development:—Clearness of developer during use; absolute immunity from stained fingers; great facility in correcting errors of exposure; developer can be used until exhausted; several negatives can be developed in the same tray at the same time, in consequence of the slow rate of development; high-class quality of negative produced; developer always ready for immediate use; high lights clean and sharp; halation reduced to a minimum.

It has been said that the ferrous oxalate will give all this. Possibly so. I know the oxalate development to be good, but with the potash you have not the constant risk of a beautiful precipitation all over the plate. You have not the same opportunity of irredeemably spoiling an over-exposed negative. You have your solution very much more under control, and density is much easier to obtain, not a solid "weed in sunshine" print density, such as is occasionally met with when using the washing soda formula, "not too much density, but just density enough." I like my negatives developed to the point that, when the sky has printed through enough to tint the finished print, the print is exactly right.

In conclusion, I rather prefer the American Standard formula to the one entitled Beach's.

Correspondence.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

Dear Sir,—Will you kindly permit me to remind intending exhibitors that packing-cases from the country may be sent so as to be delivered *before* September 24th, but they must not arrive *later* than the morning of that day; and that pictures delivered by hand must be left at the Gallery, 5a, Pall Mall East, on the same day, viz., Thursday, September 24th (open until 9 p.m.) Also, that any information respecting the Exhibition may be obtained from yours faithfully, Edwin Cocking, Assist. Sec.

57, Queen's Road, Peckham, S.E.

FERROUS OXALATE DEVELOPMENT.

[*To* G. B. Thorneycroft.]

Sir,—It is not necessary to wash or wet the plate previous to immersion in the ferrous-oxalate developer. If the plate carries water with it into the developer, it will nearly always cause a sulphur-coloured precipitate of ferrous-oxalate, which is nearly insoluble in water. If a plate is so horny and hard as not to take the developer kindly, it may be soaked for a few seconds in the stale oxalate. Should a deposit form, through having inadvertently used too weak a developer, it may be removed after fixing by rubbing lightly, with the moistened finger, under a running stream of water.—Yours truly,

S. Bottone.

BICHROMATE POISONING.

Dear Sir,—Just prior to reading an account of bichromate poisoning in your last issue of Photographic News, my attention was accidentally drawn to a small packet called the "Boy's Photographer," sold as a toy at 1d. On examination I found it contained about a quarter of an ounce of bichromate of potassium as the sensitizing agent. The purchaser has forwarded it to authorities at Scotland Yard, who are at present investigating the matter. If you could draw the attention of your readers to the nature of the contents of these packets it might prevent them unwittingly placing such dangerous materials in the hands of their children.—Faithfully yours, Frank Piper.

Maidstone, September 17th.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 10th inst., Montague L. Troupe in the chair.

A discussion on preserving pyrogallol in solution was initiated by

W. M. Ashman, who showed two samples mixed on September 8th, 1884, which had not deteriorated in any way. The strength of one solution was as follows:—

Pyrogallol	30 grains
Sulphurous acid...	60 minims
Water	1 ounce

the other:—

Pyrogallol	4 grains
Oxalic acid	2 ,,
Water	1 ounce

The first-named yielded excellent negatives when diluted and the usual proportion of ammonia added, but that alkali was unsuitable for the solution preserved with oxalic acid, owing to a crystalline deposit of ammonia or lime oxalate upon the film. By substituting the ordinary proportions of sodium carbonate and sulphite, no deposit occurred, and the resulting negatives were indistinguishable from those developed with freshly-dissolved pyrogallol.

A. Cowan, who was the first to recommend citric acid for a similar purpose, said that an eighth of a grain of that acid to each ounce of a four-grain pyro solution would keep as well as oxalic acid had done. The quantity of the latter would neutralize a larger percentage of the alkali than in his formulæ.

The previous speaker did not think the presence of sodium oxalate in a developer was disadvantageous, but rather the contrary. Restraining bromides, he said, were quite unnecessary to use with either of the solutions.

The Chairman used citric acid as a preservative, but objected to the fungoid growth produced by that agent.

W. H. Harrison, referring to the deposit spoken of when using ammonia with oxalic acid, remarked that if tartaric acid had been used, a bi-tartrate of ammonia would have been thrown down in the form of heavy crystals, insoluble in cold water, but soluble on the application of heat. He thought it likely that oxalic acid might act similarly.

A dark-slide sent by Ishael Todd was then passed round for inspection, and certain claims of novelty were set forth in a communication from the sender. These were not, however, admitted by those present.

Several chloride transparencies from negatives taken at Hale End, Essex, were shown by A. Cowan, who referred to the long exposures required in order to obtain full detail in trees within the forest; one negative of a tree with the sky in the distance received ten minutes' exposure. The plates were backed with vandyke brown in dextrine. Ferrous oxalate developer was used both for negatives and positives, for since S. Bottone's article appeared in the Photographic News, he (A. Cowan) had discarded pyrogallol. The plates were put directly into the developer with the backing upon them, as any attempt to remove it resulted in scum.

A short discussion on paper negatives followed, in which opinions were expressed regarding the relative merits of castor oil, vaseline, solid paraffin, linseed, and drying oils for the purposes of making the negatives transparent.

The Chairman then announced the sudden decease of W. B. Woodbury at Margate on Saturday last.

W. H. Harrison suggested a series of experiments with pure sodium thiosulphate, with a view to replace the common sort now so largely used.

H. S. Starnes handed round a few transparencies made by a modified formula of the gelatino-chloride of silver process as follows:—

Gelatine	40 grains
Sodium acetate	8 ,,
Water	12 drams

Dissolve.

Silver nitrate	23 grains
Water	6 drams

Dissolve, and add to above.

Sodium chloride	4 grains
Sodium acetate	6 ,,
Water	6 drams

Mix with the foregoing. A hundred and sixty grains of swelled gelatine was then added, and the temperature raised to 150 ° F. for fifteen minutes, when the volume was made up to six ounces, and became ready for use. Borax toning was recommended, and extreme redness was destroyed by bleaching in an alum solution acidified with sulphuric acid

T. Kerr was elected a member of the Association.

Manchester Amateur Photographic Society.

A meeting was held in the Technical School on Tuesday, the Rev. J. H. Palmer presiding.

The subject of railway companies granting privilege tickets to members of photographic societies was discussed, and it was decided to unite with the Liverpool amateurs in petitioning the various railway companies in the district to accord the same privileges that they granted to the Anglers' Association.

The Rev. J. H. Palmer stated that he made a large number of lantern slides from negatives taken by him on his recent tour in Italy, and should be glad to exhibit and explain them some evening, and he had no doubt that other members would do the same.

The Council was instructed to arrange for several lantern evenings, several members promising their lanterns.

Several members brought negatives and prints taken during their recent excursions.

The visit to Liverpool on August 22nd was conducted by the Secretary, Mr. William Stanley. Instantaneous views were taken of Lime Street, with St. George's Hall, L. and N. W. Railway Station, Walker Art Gallery, and the Museum; after which the members crossed over to New Brighton, and spent the rest of the day in photographing the lighthouse and shipping, and taking views of the various objects on the sands.

The twelfth excursion of the season was on Saturday last to Chester, under the leadership of J. G. Jones, who had obtained permission from Mr. Pike, a well-known photographer in Chester, to use his dark-room. Many interesting "bits" of the old city and its cathedral were brought home by the members in their dark slides.

Birkenhead Photographic Association.

The ninth ordinary meeting was held on the 10th September, at the Free Public Library, H. Norwood Atkins in the chair.

James L. Chapman and J. C. Forrest were elected members of the Association.

At a meeting of the Council it was decided that the prize competition should take place on the evening of the annual meeting, Thursday, 12th November; that all pictures competing must be mounted upon suitable cards, without restriction as to size of mount; must bear the distinguishing cypher of the competitor, and be handed in accompanied by a sealed envelope, containing the name and address of sender, to the Secretary of the Association, at the Free Public Library, Hamilton Street, not later than 7.30 p.m. on the date fixed. All pictures sent in for competition must have been taken during the present year, and entirely the production of the individuals competing.

A point was raised at the meeting by F. Evans as to whether a cloud printed into a picture intended for competition, from a negative which had been purchased, would be construed a breach of the conditions of competition.

P. H. Phillips thought that as the notice stood upon the monthly circular, there could be no question but that it would.

A. W. Beer expressed the opinion that it was a thing which was constantly done, and until now had never been questioned, and that if bought cloud negatives could not be used for such a purpose, neither could a developer which was made up at the chemist's, nor a mount obtained from the dealer; and, in fact, it would become impossible to know where to draw the line.

T. Cragg James did not consider the cases alluded to by A. W. Beer at all parallel, as the cloud undoubtedly formed a part of the composition of the picture, whereas the developer and mount did not.

The Secretary (J. H. Day) suggested that if clouds supplied by professionals could be used, and the combined result be put forward as the *bona fide* production of the competitor, it would be just possible a moot point whether—given an extra fine cloud subject—a competitor might not, under such circumstances, consider himself entitled to reverse the state of things, and tack on a *professional landscape to his cloud !*

The general feeling of the meeting seemed to be one of surprise that the question had not, apparently, been ventilated before, and that the entire composition, as far as the picture itself was concerned, should be the competitor's own work.

A. W. Beer then read a paper upon "Potash Development" (see page 605). He passed round a number of excellent 10 by 8 negatives and prints to demonstrate his remarks, and a vote of thanks was accorded him for his interesting communication.

Talk in the Studio.

The Antwerp Exhibition.—There were only two exhibitors of photographs in the English section who received awards—G. West and Sons, Gosport, instantaneous views of yachts, &c.—silver medal; and A. G. Tagliaferro, amateur, Malta, view of St. John's Church, Malta—bronze medal.

Photographic Society of Great Britain.—The next Monthly Technical Meeting of this Society will take place on Tuesday next, September 22nd, at 8 p.m., at 5a, Pall Mall East. Open at 7 p.m. for journals, &c.

The British Association.—The *Standard* says :—"Some of the proceedings of the British Association will not, perhaps, appeal very forcibly to the general reader. Miss Lydia Becker appeared and fell foul of grammar, which she thought—as so many think with her, or by their mode of speech suggest adherence to her doctrine—of no practical importance. She would not have it banished altogether from school—which is kind of Miss Becker—but she would have it taught in simpler form. Surely, however, it is the object of schoolmasters to teach it as simply as possible. An accurate method of speech is allied to an accurate method of thought, and grammar has more advantages than at first sight appear. An amusing example of the reformers who reform for the sake of reforming was furnished by Sir George Campbell, who is dissatisfied with the rule of the road, and wants to reverse the English custom of passing vehicles in driving. The present custom is not sufficiently scientific, though what science has to do with the matter it is hard to see."

Rice Paste, which is clear and transparent, may be prepared by mixing rice, flour, and water, which mixture is then heated to boiling-point until the required consistency is obtained. This paste possesses great adhesive power, and is recommended where it is desired that the objects to be pasted on or together should undergo no change in colour or shading.—*The Lithographer.*

Action of Light on Glass.—The *Pharmaceutist* says:—"Many vegetable powders adhere to the sides of the glass jars in which they are kept. H. Hager explains this phenomenon to be caused by an electric state of the glass caused by sunlight. When a perfectly dry test glass, kept in a dark room for some time, is partly filled with tannin or powdered gum guiacum, closed with a cork, and then placed in sunlight in such a manner as to expose the glass and not the powder, the latter will, when being shaken, stick closely to the exposed parts, leaving free the others. With essential oils this electric action appears to be very strong. The oils are predisposed to oxidation and the generation of ozone.

The printing of steel engravings on celluloid is a new industry which appears to have a promising future. Marshall's engraving of General Grant, recently finished, has been reproduced by this process, and is a handsome work of art. The picture is said to be the best portrait of Grant in existence, and the manner in which it is brought out by the celluloid process is even superior to printing on india paper. George Wm. Curtis says of the picture, "It is by far the best likeness of him (Grant), as he appeared in these latter days, that I have seen, and it is very fortunate that so admirable a portrait has been obtained." D. Huntingdon, President National Academy of Design, says: "The celluloid print represents the engraving remarkably well, retaining the extraordinary refinement and power of the original work."—*The Mart.*

Photographic Club.—The subject for discussion on Wednesday, September 23rd, will be "On the Best Method of Stopping out Skies, &c." Saturday afternoon outing at Earlsfield. Train leaves Waterloo Station at 1.50.

To Correspondents.

⁂ We cannot undertake to return rejected communications.

⁂ Correction.—Either a slip of the pen or a compositor's error alters the sense of Mr. Sayce's remarks quoted on page 591, and for the benefit of any reader who did not at once see through the error, we may mention that in the eighth line of the paragraph (Dinner in honour of Sayce and Bolton), "and" should be read instead of "had."

John Terras.—The information is given in another column.

C. D. D.—1. The photographs are excellent, and may be classed among the very best examples we have seen of work in this direction. 2. As regards the other matter we will write to you.

T. R. Young.—If you have the Photographic News for 1884, read the lessons in Carbon Printing which are contained therein. There is also a short account of the process commencing on p. 184 of the Year-Book for 1885. You can buy carbon tissue from dealers in photographic materials.

Jas. Tyler.—Scolik's method of intensification will probably suit you. The fixed and well-washed negative is allowed to remain in the following until the film is thoroughly whitened:—

Mercuric chloride	1 part
Potassium bromide	1 ,,
Water	50 parts

The mercuric solution is now rinsed off, and the negative is immersed in a mixture of equal parts of a saturated solution of sodium sulphite and water. When thoroughly darkened, wash the plate.

F. G. Rieder.—1. Rather less will suffice, but a moderate excess will do no harm. One ounce to half a gallon of water is a good proportion. 2. Thick gum freshly made.

Sulphite.—1. Fog and stains. 2. It has become partially oxidised by exposure to the air.

J. F. Houghton.—Thanks; but as regards the latter point, it is to be hoped you will alter your determination.

St. Albans.—See Mr. Bottone's letter in our present issue.

J. J. Dodds.—1. If they refuse to return your property, it is probable that your best course is to summon them before a police magistrate, to show cause why they should not do so. 2. If you can satisfy a court that the work is not reasonably well executed, you may be able to recover what you have paid.

C. H. C.—Wortley's glycocoll solution can be prepared in the following manner:—Take 320 grains of gelatine, and soak all night in 10 ounces of water, to which 2 drachms of glycerine have been added. Pour off the surplus water, and stir up the swelled gelatine with an ounce and a half of pure sulphuric acid; but if the whole does not dissolve, a little more acid may be added. When cold, dilute with 10 ounces of distilled water, filter, and neutralise very carefully with ammonia. Finally, add 3 drachms of pure glycerine.

Photographs Registered.

F. S. Seed (Hereford)—Photo. entitled "Who was at the gate last night, Mary?"

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1412.—*September* 25, 1885.

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NITRATE OF SILVER.

To return to the matter of silver nitrate, briefly treated by us in our issue of September 11th, the first question naturally is, "In what departments of photographic industry may it be worth the time of photographers to prepare the article for their own use?"

It is probable that dry-plate makers consume silver nitrate on a larger scale than any other photographers, a consumption of many thousand ounces a year being, we believe, nothing very extraordinary in the case of a large factory.

From our own point of view, however, we think we may disregard the question of the private manufacture of silver nitrate by dry-plate makers. The substance is, for the purpose indicated, required in a state of considerable purity. It is true that a photographer who happened to be a thoroughly practical chemist might quite well manufacture silver nitrate of sufficient purity to answer, and might do this with economy in the case of batches of (say) a thousand ounces at a time; but then such instructions as we can give here will not be required by the practical chemist, nor can they be such as will educate the ordinary photographer up to the level of an experienced chemist.

The preparation of sensitized albumenized paper is probably the photographic industry in which the consumption of silver nitrate comes next in quantity to that in dry plate making. It is probable that in some establishments where printing is done on a large scale, thousands of ounces of silver nitrate are used in the year. Certainly, in the factories of "ready-sensitized" papers, such must be the case. In the case of sensitizing paper, a far lower standard of purity than that required in emulsion work is sufficient in the silver nitrate, and there is no reason why it should not be made by the photographer for his own use. Indeed, we know of one case, at least, where this is done, and can describe the precise method used.

Roughly speaking, 10 ounces of silver will produce 16 ounces of silver nitrate; or rather, to avoid the confusion produced by the use of troy and avoirdupois ounces, 10 units of silver will produce 16 units of silver nitrate.

For every 10 troy ounces of pure silver there will, in fact, be produced more than 17 avoirdupois ounces of silver nitrate. A knowledge of this fact will give the operator sufficient data for determining with what quantity of metallic silver he must start.

The silver, the price of which is quoted in the markets, is, as we have already explained, bar silver, containing 7½ per cent of alloy. This is not suitable for making silver nitrate except on a very large scale, as it would be necessary, in the first place, to go through a process for getting rid of the copper used as alloy. For manufacture on any moderate scale, the so-called "fine" silver should be used. This is very fairly pure; it is, moreover, generally sold in the convenient granulated form. Its price is a little dearer than the bar silver—that is to say, its price is somewhat more than that of bar silver, even after allowance is made for the alloy in the latter. From enquiries made from several silver merchants, we find that, purchasing in quantities of several hundred ounces at a time, we could get "fine" silver at a rate of about 2d. per ounce above the price of bar silver, allowance being made for the alloy. This makes the estimate which we gave of the price of nitrate of silver on the 11th September a shade low; but against this is to be set the fact that the price of silver has fallen nearly 1d. since the date of the issue of the *Pall Mall Gazette* from which we quoted.

We may safely say, we think, that from fine silver the nitrate may be made at the rate of 2s. 7d. per ounce for the silver used.

To return to the practical manufacture, we take for every 17 ounces of silver nitrate that we require, 10 ounces troy of fine silver. This is placed in a large evaporating basin, and enough water is poured on to the silver to wet each particle of it. This is to prevent a possible very violent action when the nitric acid is added. Common commercial acid may be used. This is added to the wetted silver at first to the amount, say, of half a pint for every 10 ounces of silver. Action in the form of ebullition may commence at once; if it does not, gentle heat is applied to the evaporating dish. The result will be that ebullition will set in before long, which may become so violent as to require moderating by the addition of cold water. When the action is once started, no farther application of heat is, as a rule, required. The liquid sputters a good deal, and to prevent waste, and destruction of everything around, it is necessary to cover the dish with a glass plate. As the ebullition ceases, more nitric acid is added, the whole being quickly stirred with a glass rod during the addition.

When the silver nitrate is nearly all dissolved, we can proceed in either of two ways. If we are making the nitrate only "once in a way," we add nitric acid till every trace of the silver is dissolved. If, however, we are making the nitrate continuously, from day to day, from week to week, or even from month to month, it is best not to add quite enough nitric acid to dissolve all the metal, but to let the action gradually cease, and to allow the basin to stand for some hours after this, with the result that comparatively little free acid remains to be got rid of. Of course the residue of silver is retained till the next brew is undertaken. If the whole of the silver is dissolved, the final operation may proceed in the same vessel. If a residue of silver be left, the liquid must be poured off it into a second evaporating basin. In either case gentle heat is applied to the liquid to expel the excess of nitric acid, and to dry the nitrate of silver. This heat may be applied so as to produce moderate ebullition. A point is reached when the liquid commences to solidify, most of the nitric acid and water having evaporated. If very pure nitrate of silver be desired, the liquid will at this point be allowed to cool, and only the nitrate which crystallizes out will be retained, to be recrystallised; but for the purposes which we have indicated this is not necessary. The evaporation may be carried on till the salt of silver is quite dry, the whole being continually stirred. This gives silver nitrate in the form of very small crystals—almost as a powder—and this nitrate is pure enough to prepare a sensitizing bath with direct. Indeed, we can state that it has been extensively used for such a purpose, the slight remaining excess of nitric acid being neutralized by an addition of carbonate of soda, which leaves only nitrate of soda as an impurity, a substance which, as is well known, is harmless in the sensitizing bath.

Although the crude salt can be used for sensitizing paper as we have described, it is certainly advisable to recrystallize at least once, when it is intended for emulsion or the bath. This is done in the following manner:—The powdered silver nitrate is dissolved in several times its weight of distilled water, and the solution is carefully filtered. Evaporation is now conducted as before, but not to dryness. Whenever the solution becomes so concentrated that a thin crystalline film begins to make its appearance on the surface, it is allowed to cool slowly. The nitrate which crystallizes out is retained for use, whilst the remaining liquor is put on one side, either to be poured into the residue tub, or to be added to the next brew. It will be understood that almost all impurities remain with the liquor, so that if this is continually added to the next brew there is a gradual accumulation of impurity. This involves, as a necessity, the occasional rejection of the residual liquor. It is generally a sufficient criterion to observe the colour of it. When it becomes badly discoloured it may be rejected—that is to say, poured into the residue tub—or treated at once with salt to precipitate the silver as chloride.

It is pretty certain that, unless the quantity of nitrate of silver made be very large, and the cooling for crystallization be exceedingly slow, the crystals will not be so large or of so fine an appearance as those met with in the commercial article. This is, however, of no real importance.

It may be well to remark that the process of dissolving should be performed under a chimney, or in such a position that the fumes of nitric acid which are given off may be quickly carried away, as they are exceedingly poisonous, and also very corrosive.

FOCUSSING.

Given a good subject well lighted, a suitable point of view, high-class apparatus, with the best plates that can be made, and the most advantageous method of development, &c., if the focussing is badly done, the picture is a failure. Focussing is so simple an operation in most cases, that photographers are liable to think that it must always be simple, and that if a picture sharp all over does not come by working the pinion or screw with a sufficiently small stop in the lens, that the subject is an impossible one for the camera. Is not the use of a very small stop often expressive of laziness and rule-of-thumb work, rather than the result of an intelligent carefulness?

The sharpness that is so much sought after by a certain class is, after all, only a matter of degree. The precision that must be obtained in technical copying, where the resulting print has to bear magnification, is out of place, and may even be repulsive in a landscape or portrait. At the same time, it must not be understood that we view smudginess or indecision with any other feeling than disgust; the point is, that absolute sharpness is unknown, and that what we call sharpness is only a comparative quality.

The old rule is doubtless a very good one—to get the object of interest in focus, and make the best you can of the rest; but, like many other excellent rules, it is broken every day with advantage. Indeed, what is the "object of interest"? In a portrait, undoubtedly, the face, goes without saying; but where is the face in the picture of a back view, which may be as strikingly like as any other view of a person? And this difficulty is enhanced in simple landscape. We cannot say of this tree-stump, this rock, or this very ordinary-looking basket or wheel-barrow in the foreground, or of this group of persons in the middle distance, any more than of the hills beyond, that it is the object of interest; each part is good, but the whole is beautiful; it is not an object of interest with accessories—it is a picture.

But we cannot photograph this picture, because we cannot get it all in focus at once. A small stop makes it all sharp, as it is called; but an exposure of forty—or even thirty—seconds will not be suitable for the group of persons, although they are standing still, and those fine cloud-shadows with such an exposure would be nothing but ill-defined patches of fog. We try to divide the picture for two plates instead of one, but the two plates must be exposed simultaneously from the same point of view, if they are to match—an obvious impossibility.

In many cases such a difficulty would disappear if we were bold enough to purposely have rather less sharpness in the near foreground than in the middle distance; but, by doing so, we should break one of the Ten Commandments of photography. Whether such a procedure is good or not in any particular case, cannot be decided upon general grounds, but we think there are reasons for definitely allowing this licence to the photographer who knows how to use it.

We want the picture to suggest the reality. Now, most persons enjoy binocular vision, or, in other words, they see from two points of view simultaneously. But these two points of view are so near together that a distant object appears as if from only one point of view, while the representation to us of a near object is the result of the merging of two different pictures, one on each retina. This gives the well-known sensation of solidity, but at the expense of *sharpness*. We venture to think, therefore, that a sharpness somewhat toned down in the foreground may be pictorially advantageous at the same time that it is practically convenient; and that if the "object of interest" method of focussing were sometimes to give place to such general considerations, the careful photographer who knows how to bestow his care would sometimes be less troubled when focussing.

DIETKIRCHEN.—PHOTOGRAPHED BY J. C. RODGERS.

We to-day present our readers with a picture which must fascinate, not only from its artistic and technical excellence, but also from the quaint character of the original scene—a character so typical of Rhineland. Not that this particular subject is situated exactly on the Rhine, for it stands on the river Lahn, a tributary—and a very beautiful one, too—of the Rhine; but those who know anything of what is called Rhineland are aware that some of the finest scenery is to be found up the numerous valleys which run right and left from the Rhine, and of which valleys that of the Lahn is one of the richest.

The interesting church of Dietkirchen, so picturesquely situated on a fine rock close upon the right bank of the Lahn, is the sister church to the Cathedral of Limburg.

The legend runs that, in the year 351, the body of St. Lubentius, who died at Dieblich, on the Moselle, floated in a boat down that river, past Coblence, towards the Lahn, and then up against the stream of the latter until it reached a spot where St. Lubentius had formerly built a wooden prayer house, and there the body landed. The good people, as in duty bound, after such a manifestation, then built the present church to his memory, and called it Diekirche. The church, with its double towers connected near their tops, is built in the Roman style, and is well worth a visit. The inside is of a very primitive character.

◆

ROYAL CORNWALL POLYTECHNIC SOCIETY'S EXHIBITION.

List of Awards.

Professional Section.

First Silver Medal—H. P. Robinson, W. W. Winter, West and Son.

First Bronze Medal—W. Gillard, E. Milner (Frith and Co.), Morgan and Kidd, J. P. Gibson.

Second Bronze Medal—Geo. Smith.

Highly Commended—G. Brenwick.

Amateur Section.

Second Silver Medal—A. Pringle.

First Bronze Medal—E. Brightman.

Second Bronze Medal—G. Bankart.

Photographic Appliance Department, &c.

First Silver Medal—Eastman Negative Film Company.

Highly Commended—Geo. Hare, Geo. Smith, Sands and Hunter.

A full report will appear in our next issue.

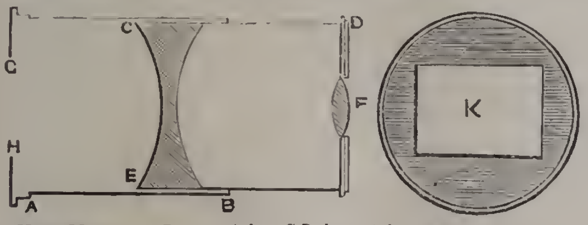
◆

A USEFUL VIEW METER.

BY W. JEROME HARRISON, F.G.S.

A view-meter which I have lately been employing has proved so useful that, although I believe there is nothing particularly new about it—I got the idea from my friend, Mr. G. M. Iliffe—I think a description may be of service to some readers of the Photographic News.

It consists of two brass tubes each $2\frac{1}{2}$ inches long and $1\frac{3}{4}$ inches in diameter, one being made just a little smaller than the other, so as to comfortably slide within it. The outer tube has a brass cap fitting on the end farthest from the eye, and in this cap an opening is cut proportionate to the dimensions of the plates which are in use. Thus, in my own case, as I use 5 by 4 plates, the opening measures five quarter-inches by four quarter-inches; that is, $1\frac{1}{4}$ inches by 1 inch. The cap can be removed and replaced by another bearing a differently proportioned opening when desired. For a whole-plate ($8\frac{1}{2}\times 6\frac{1}{2}=34\times 26=17\times 13$) the opening might be $\frac{17}{16}$ of an inch by $\frac{13}{16}$, or $1\frac{1}{16}$ in. by $\frac{13}{16}$ in. This opening serves to frame the view, and it limits its extent according to the distance to which the inner tube is drawn out.



View-Meter. A B, outer tube; C D, inner tube; G H, opening to limit view; C E, double concave lens; F, double convex lens for eye-piece; K, cap (front view).

The inner tube has a double concave lens of $1\frac{1}{2}$ inches focus at one end, and a double convex lens of 3 inches focus at the other. It is, in fact, a Galilean telescope reversed, the result being that a landscape or building is viewed in miniature when the eye is applied to the convex lens.

To use this instrument it must first be adjusted to the lenses which are to be worked in the camera. Erect the camera, and carefully focus a landscape, or place it some distance from a brick wall, or fence. Note upon the ground glass any two objects which occupy the extreme limits of the field of view to the right and left hand respectively. (In the case of the wall, or fence, this can be done very precisely by getting a second person to mark the points boldly with chalk while you direct his movements from beneath the focussing cloth.) Now, let the view-meter replace the camera, and slide the inner tube backwards and forwards until the landscape, wall, or fence is seen with exactly the same limits as when viewed upon the ground glass. Then mark upon the inner tube the exact distance to which it was drawn out by boldly scratching the tube with the point of a knife, and mark the focal length of the lens used in the camera by the side of this line. The lens in the camera may now be replaced by any other in your possession, and the process repeated.

In the field such a view-meter as I have described is of the greatest utility. Standing on any given spot, the instrument is applied to the eye, and adjusted until the exact limits of the view which it is desired to include are seen within it.

Looking, then, at the marks on the inner tube, we see at once which lens to screw into the camera mount. Or, if we possess but one or two lenses, we can adjust the view-meter to the marks of those lenses, and tell in a moment whether it is of any use to set up the camera on that spot: moreover, we can walk over the ground with the view-meter applied to the eye, until we find the exact spot from which our lens will include the picture we desire. The amount of trouble which this preliminary inspection saves is very great.

Another advantage is that we get a good idea of the *composition* of the picture by viewing it through this little instrument; the places where figures are required can be selected, and so on. By slipping a circle of thin blue glass inside the cap the arrangement and massing of the rays by which the silver salts are mainly affected can be studied, and the ultimate appearance of the scene in the negative be more correctly judged. My view-meter was made for me by Mr. J. Place, of Bull Street, Birmingham, at a cost of a few shillings; but with the above illustrations it will be easy for any amateur to construct one himself, or to have it made by the nearest working optician.

◆

HOW TO SUCCEED IN TAKING GOOD PICTURES ON GELATINE PLATES.—No. VI.

BY S. R. BOTTONE.

C.—*How to Develop Pictures of Unknown Exposure.*—It is in cases such as these that the photographer shows his greatest skill. Here is wanted not only general knowledge, but quickness and a ready appreciation of what is taking place.

The operator must have at hand—

1st. Stale ferrous-oxalate solution.
2nd. Strong ferrous oxalate solution.
3rd. Potassium bromide solution, 1 in 20.
4th. Water.

He then proceeds as follows:—

Having poured a sufficiency of stale developer into the developing dish, he prepares a similar dish, in which he places a like amount of weak potassium bromide solution, made by mixing 1 part of the third solution with 4 of water, so that it contains about one per cent. of bromide. This dish must be placed close alongside the developing dish.

The plate is then removed from the dark frame, and plunged into the weak developer, the operator watching carefully all the time while rocking. Should the picture appear at once, he must *instantly* take it out of the developer, and plunge it into the bromide solution, where he may leave it for a few seconds, while he adds a few drops of the third solution (potassium bromide) to the weak developer. The exact amount to be added will depend very much upon the rapidity with which the image appeared; if it showed itself immediately on immersion' then 1 part of bromide solution to 3 of developer will not be too much. Should thirty seconds elapse before the image appears, then no bromide need be added until the picture shows signs of "greying" in the shadows. It may then be placed in the adjoining bromide dish, while an eighth or even a twelfth part of bromide solution is added to the developer. The plate is then to be returned to the developer, and development continued until printing density is obtained, *provided that the shadows do not get veiled.* Should the slightest tendency to veiling show itself, the plate must be instantly removed from the developer, again plunged into the bromide, and fixed. It is better to intensify by an after process, a thin, but clean image, than to spoil the shadows by pushing the development, which always results in a negative giving a flat, poor print.

If one minute elapses before any image shows itself, no addition of bromide must be made: but the plate must be kept rocking for another minute or so, breathing on it from time to time as the wave of solution uncovers the plate.

If no image appears after the lapse of three minutes, the stale developer is to be poured off, and replaced by a sufficiency of freshly-mixed developer of normal strength, viz.:—

Sat. sol. ferrous sulphate	1 part
Sat. sol. potassium oxalate... ...	3 parts

The image, unless the plate has been very much under-exposed, will now shortly begin to appear. Should it appear but slowly, after rocking and breathing on for a few minutes, it may be covered and set aside for five minutes. After this interval it may again be visited, again rocked, and if any improvement appear, the development allowed to continue for another five minutes, and so on for half an hour. Should the picture now show itself pretty vigorous, but somewhat wanting in half-tone, the addition of one drop of ordinary fixing solution (sodium thiosulphite; hypo) to each 4 ounces of the developer, will, if any half-tone exist in the picture, bring it out.

As stated in the beginning of these articles, it is almost impossible to get a good printing negative from a plate that is much under-exposed, for it is evident that it is impossible to get an image on a plate where none is impressed. How nice it would be were it otherwise! We should only have to wish, say, for a portrait of the defunct Roger Tichborne, as he appeared on board the *Bella*, just before the wreck, and taking an unexposed plate, with a sufficiently powerful developer, bring out those lineaments which would set at rest many a disputed point.

It is therefore better that a picture should receive rather more, than less, exposure, than is absolutely necessary to impress every portion. It must, however, be borne in mind, that it is very seldom that all parts of a picture receive the correct exposure. This is specially the case with views. Either we wish to secure the distance—then the foreground must be under-exposed; or we expose for the foreground—and then the distance is over-exposed. So we must mix brains very largely with our developers, and with our exposures.

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SODA DEVELOPER WITH AN ADDITION OF AMMONIA.

BY DR. J. M. EDER.

This developer is a small but practical modification of the usual soda developer, and it tends very much to give negatives of a greyish-black colour which approximates very nearly to the tint of wet collodion plates, or of gelatine plates developed with oxalate developer. This developer was originated by Schaschek specially for the gelatine plates of Eder and Plener, but it is also well adapted for most other emulsions.

The developer is prepared as follows:—

A.—	Distilled water	1,500 cub. cents.
	Neutral sulphite of soda ...	100 grammes
	Pyrogallic acid	15 ,,
B.—	Distilled water	500 cub. cents.
	Pure crystallized carbonate of soda	50 grammes
	Strong ammonia solution ...	2½ cub. cents.

Both solutions are to be kept in well-stoppered bottles. A will keep good for two or three weeks; B for several months.

For use, one mixes 100 parts of A with 20 parts of B, and as this mixed developer will keep for a day in a well-stoppered bottle, sufficient for a whole batch of plates may be mixed at once. In this developer the image should appear in ten to fifteen seconds if the exposure has been correct, and the development should be completed in four to six minutes.

If over-exposure is feared, the developer is diluted with half its bulk of water, or a commencement should be made with some of the developer which has been used for previous plates.

If, on the other hand, it is desired to force the development, there is added to each 100 cubic centimetres of the developer 2 to 5 drops of the following solution (C).

C.—(Accelerator).

Strong ammonia solution ...	50 cubic centimetres
Water	150 ,, ,,

On the other hand, the developer may be made more active by increasing the proportion of B.

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THE OBTRUSIVE AMATEUR.

One thing, at least, could be said for the roller-skating mania—if one didn't like it he could stay away from the rinks. Managers did not bring their floors around bodily, and slide them under your feet, and boys did not insist upon carrying skates to unwilling extremities. It is different with amateur photographers. The devotees of this amusement seem to look as though they owned the earth, and held the sun as security for loans. Animate and inanimate, all created things are at their mercy, and they use their power with an unscrupulous freedom that proves them equally oblivious to manners and *Magna Charta*. Human assurance has developed step by step with the instantaneous process in photography. The Daguerreotyper of thirty years ago was as unobtrusive in his professional behaviour as an undertaker or a dentist—a man was thought in those days to have the same exclusive right to his personal experience as to his toothbrush. A lady would no more be photographed than kissed without permission. It is different now. A man cannot kick a dog, or smash in a blind beggar's hat, or help a lady over a barbed wire fence, without incurring the hazard of having the conditions of the instant perpetuated for all time. You take the lady's hand to steady her as she jumps, there is a snap behind you, and, before you can turn, your likeness has been raped. As you stoop to pick up a rock he has you again, and scuds away with his spindle-legged machine and mendacious plates under his arm. The plates lie; that is the worst of them. In the case in point you hold the lady's hand perhaps ten seconds: politeness is not satisfied with less. But the ruffianly dry plate, catching the fleeting expression of the instant, makes you look as if you had been that way all the morning, and liked it, and hoped it would be a long day.

There is but one remedy for the amateur photographer. Put a brick through his camera whenever you suspect he has taken you unawares. And if there is any doubt, give the benefit of it to the brick; not to the camera.

The rights of private property, personal liberty, and personal security—birthrights, all of them, of American citizens—are distinctly inconsistent with the unlicensed use of the instantaneous process. The pursuit of happiness and of amateur photography, when not united in the same individual, conflict; and if the instantaneous process is not wholly suppressed, the public weal demands that at least those who practise it shall be licensed, and wear numbered hats and cow-bells.—*Cutting from an American Paper.*

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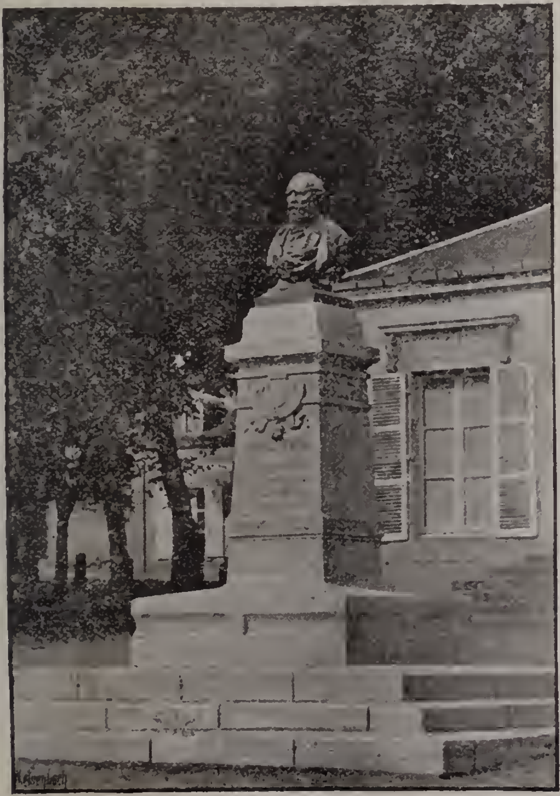
FRENCH CORRESPONDENCE.

Poitevin Memorial—Photography in France—Bibliography.

The Poitevin Memorial.—The ceremony of unveiling the Poitevin monument took place on the 7th inst., at St. Calais, Sarthe, in the presence of all the notables of the department as well as the town, including the deputies, the prefect, and members of the general council. The Government sent a delegate in the person of M. Roger Ballu, Inspector of Fine Arts. M. Hédin represented the Association of the Scholars of the Central School and the members of the committee of the subscription fund. MM. Davanne, Léon Vidal, De Villechole, Thouronde, Guilleminot, and Audouin were also present. Five speeches were made during the ceremony: by M. Davanne, in handing over the monument to the town of St. Calais; by the Mayor, accepting it; M. Roger Ballu spoke on behalf of the Government; M. Léon Vidal in the name of the Chambre Syndicale of Photography; and M. Hedin for the Association with which Alphonse Poitevin was connected. The inauguration was followed by a banquet to a hundred and fifty guests at the invitation of the municipality of St. Calais. Toasts were proposed by the prefect of the department, the President of the General Council, M. Cavagnac, Under-Secretary of State for War, &c., &c. The proceedings terminated with a general illumination and firework display. Three monuments have been raised in France, in a short space of time, to the three men who have done most in the invention and improvement of photography—Nicéphore Niépce, Daguerre, and Alphonse Poitevin. There remains but the memory of Talbot to be honoured in a like manner, but that would be on English soil.



Photography in France.—There has been so little doing in photography during the last few months that I have not been able to record anything of interest. It is very remarkable that although in the winter season there is but a minimum of light, many more interesting results and researches are made. Therefore, while rusticating in summer at watering-places, and exploring picturesque country, work is carried out on the lines laid down by previous invention, resulting from the winter's experience. Now, as the summer is drawing to a close, I take up my pen in the hope of continuing my fortnightly summary. The number of amateurs is greatly increasing with us, but among them, many ignore the scientific principles of our art, and fail to practise photography seriously, seeking to bring out new improvements. There is a tendency to buy apparatus at the lowest possible cost, and to expect results equal to those only attainable with superior instruments, and a knowledge of chemistry and optics. Many, therefore, turn back after repeated failures from these causes, and abandon it altogether. It would be so much better to have a little patience, and study for a short time the how and why of photography, and then to proceed to work with suitable apparatus in an intelligent manner, which cannot but give great pleasure. Evidently a methodical photographic course of study is wanted. The State institutions have not yet provided it, and perhaps it has not been thought remunerative enough to allow of the necessary expense of providing apparatus necessary for such a school. I am convinced that sooner or later it will form a branch in an establishment for applied science—as the *Conservatoire des Arts et Métiers*, for instance, where a complete course of applied photography could easily be organised for the benefit of everyone wishing to learn.

Bibliography.—Meanwhile photographic manuals are not wanting while awaiting oral and experimental teaching. The house of Gauthier-Villars has just published *Procédé du Gelatino-Bromure*, by M. Geymet, and *Guide Pratique du Photographe Amateur*, by M. Vieuille. Besides these, a new weekly photographic journal, *L'Amateur Photographe*, has just come out under editorship of M. François Veynes. All this sounds promising for the amateur, but still more important is the practical teaching by which, alone, photography will be successfully cultivated by the greatest number.

Leon Vidal.

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REPORT ON PHOTOGRAPHY AT THE INVENTIONS EXHIBITION.*

BY W. B. BOLTON.

The period covered by the present Exhibition may, roughly speaking, be said to comprise half the life-time of photography—a science which has sprung into practical being within the last half century. The first portion of that time saw the young art struggle through various forms of existence, in some of which it was little better than a scientific curiosity; but, five-and-twenty years ago, it had fairly assumed a practical and industrial position, and had commercially, as well as from an art point of view, secured a firm hold on popular favour. Since then, the growth and progress of photography have been rapid and important, and its applications have extended into nearly every branch of art, science, and industry, though comparatively few of these applications are exemplified in the present Exhibition.

So far as the early processes are concerned, these are fairly represented in the collection brought together by the Photographic Society of Great Britain, which, though less complete than could have been wished, gives a tolerably good idea of the various stages through which the early science passed previous to the Exhibition of 1862. Commencing with some specimens of heliographic engraving, executed by Nicephore Niepce as far back as 1827, this interesting collection comprises examples of each successive process of importance since introduced, including in turn Daguerreotype, the first really practical method of "sun-painting," Calotype or Talbotype, the earliest negative process, together with the subsequent modifications of plain and waxed paper pictures. Next come the glass processes with albumen, and, later still, Archer's great discovery of the value of collodion as the vehicle in which to carry the silver image. It was this introduction which did more to render photography practical than all the preceding processes, and the year 1851 may be looked upon as marking the birth of popular commercial photography. Examples of the modification of the collodion process, known respectively as "ambrotype" and "ferrotype," are shown, and we then pass on to the earlier attempts to produce "preserved" or "dry" plates. One of the earliest of the processes coming more correctly under the former title is that of Spiller and Crookes, in which the layer of sensitive collodion was retained in a moist condition for periods of from three to twenty-one days by the application of hygroscopic or deliquescent substances. Dry plate processes are scantily represented by a few examples of the collodio-albumen process, the oldest and, in many respects, one of the best of its class.

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* Official report presented to the Society of Arts.

As showing the degree of perfection to which the collodion process was brought at a very early date, attention may be directed to the instantaneous views of England and Blanchard, taken from 1855 to 1860.

Turning to printing processes we find little variety, the earlier specimens consisting almost wholly of silver prints on plain paper, and a frame of prints in various metals, dating back to 1839-42. Photo-lithographic reproductions by Bullock, and examples of the photo-galvanographic and surface-block processes of Paul Pretsch, produced between 1856 and 1860, complete the record of printing processes previous to 1862. Early specimens of processes of later date are included in this collection, some of which, in their perfected forms, will be noticed—as the carbon and Woodburytype and platinotype methods. The aniline process of W. Willis, sen., now superseded and almost forgotten, is also represented.

Amongst the miscellaneous examples of apparatus are many which are interesting from an antiquarian and an historical point of view, no less than from the contrast they present to more modern instruments. Old Daguerreotype apparatus and ancient cameras with a curious old world look contrast oddly with the adjacent exhibits of modern cabinet work, while the optical instruments of the past present an even more remarkable difference. Amongst these are the early specimen of the "fluid lens" of Archer, the "panoramic" lens of Sutton, which is also a water lens—*i.e.*, a lens in which the correction is secured by a combination of glass of suitable curves, enclosing water or other fluid of a different refractive power. The most interesting object in this class is, however, undoubtedly a lens constructed by Andrew Ross in 1841, which claims to be the first compound lens ever made for photographic purposes. Archer's first photographic camera, and the earliest silver bath employed in his own practice, are relics of merely antiquarian interest; and a curious old adjustable diaphragm of the date of 1851 shows how closely, in some cases, our modern apparatus follows the earliest lines. A collection of portraits of the fathers of photography is worthy of mention, and deserves to be reproduced in a more permanent form before the evanescent images have entirely disappeared.

The Photographic Society's collection forms a condensed summary of the progress of photography anterior and up to the Exhibition of 1862, from which period it will be necessary to trace the story elsewhere. At that time the collodion negative process and albumenized silver prints held full sway; the Daguerreotype process had nearly disappeared, and the glass positive was rapidly following the example; the "carte mania" was at its height, and the comparatively cheap carte-de-visite was surely supplanting its rivals in popularity. The greater facilities afforded by the collodion process had drawn a large number of landscape photographers into the field, both professional and amateur, the former of whom adhered almost entirely to the wet collodion process; the latter, to a great extent, preferring to replace the old waxed paper processes by one or other of the dry preservative processes. It is matter for regret that so few specimens of the work of these processes subsequent to 1862 are on view, since results of the highest technical excellence were attainable, though at the cost of a considerable amount of trouble as compared with later methods.

In 1861, Major Russell had introduced his tannin process, in which a glass plate, prepared with bromo-iodized collodion, was sensitized in a solution of silver nitrate in the ordinary manner, washed, in order to remove all traces of the soluble silver salt, and, after treatment with a solution of tannin, finally dried, in which condition it retained its sensitiveness for a very considerable time. Later, the process was improved by the substitution of a plain bromized collodion for the bromo-iodized hitherto employed, by which means a greatly enhanced sensitiveness was gained. This substitution of bromide alone for bromo-iodide formed the starting point from which the first step in the direction of improvement was made. The preparation of the dry plates by the bath process was tedious, and occupied a considerable length of time in consequence of the numerous washings it was necessary for the film to undergo. So far back as 1860 the attempts had been made by Gandin in Paris, and Captain Dixon in England, to dispense with the nitrate of silver bath by forming iodide of silver in the collodion itself, and, subsequently, Liesegang worked in the same direction; but all these failed in securing a sufficiently fine suspension of the particles of silver iodide, unless by the aid of such an excess of soluble iodide that the films were too insensitive for practical use.

In 1864 Sayce and Bolton conceived the idea of substituting bromide for iodide of silver in a similar manner, and succeeded so well that in that year their process—subsequently called "collodio-bromide"—was published. This formed the first practical "emulsion" process, and was the first step in the direction of modern dry-plate improvements. The capabilities of the process from its very introduction are shown in the exhibit No. 2,254, which consists of some of the earliest negatives taken by Sayce in 1864 and 1865. Some of these in point of quality could scarcely be surpassed at the present day. In course of time the process was improved and greatly simplified, the improvements taking the form of increased sensitiveness, while in the way of simplification the necessity for washing each individual plate was dispensed with by removing all soluble matter from the emulsion in bulk. By this means the preparation of the plates was reduced to the single operation of applying the emulsion to a clean plate of glass, and allowing it to dry.

The next advance consisted in the substitution of gelatine for collodion as the vehicle in which to suspend the sensitive silver salt. This was suggested by Dr. Maddox, and carried out in practice in 1871, the earliest results of his process being included in the collection of the Photographic Society. This process, though crude, and its earliest results imperfect, has been demonstrated to be a practical one; but more recent improvements have supplanted it. In 1873 Burgess attempted to introduce commercially a gelatine emulsion, but failed from imperfect knowledge of its physical requirements. Later in the same year Kennett patented his method of preparing a sensitive "pellicle," consisting of gelatine and pure silver bromide; and about the same time Johnston showed how the useless soluble constituents of a gelatine emulsion might be removed by washing. From that time the gelatino-bromide process became a workable one, but it was not until Bennett, in 1878, startled the world by showing the wonderful sensitiveness attainable with gelatine emulsion that it secured any great share of favour. Bennett's process of "prolonged emulsification" involved no new principle, nor probably did the resulting emulsion excel in sensitiveness others that had been previously made by different means. The secret of the apparent increase of sensitiveness lay rather in the extra precautions adopted to secure the already existent but unsuspected sensibility, and the marvellous results exhibited by Bennett at once attracted the attention of the profession, who were not slow in availing themselves of the new facilities thus afforded them, and in a very short time gelatine dry plates had come into general use.

Two remarkable examples of the exquisite sensitiveness of these plates, as compared with wet collodion, are found in the exhibits of E. Dunmore and Boldireff, of St. Petersburg, the one being a view taken by moonlight, the other a series of pictures taken by artificial light, and evidently with extremely brief exposures. Dr. Huggins' photographs of star spectra form another instance of the opening up of an entirely new field of scientific research hitherto impossible, and many others could be instanced, such as the admirable photographs of yachts shown by the Paget Prize Dry-plate Company.

Before leaving the subject of negative processes, the replacement of glass by paper or other lighter and less fragile material should be mentioned. In this direction Warnerke has worked for years, and has recently considerably improved his process of preparation, by means of which the natural grain of the paper-support is hidden or masked. The Eastman Dry-plate and Film Company, of Rochester, New York, have also made great improvement, not only in the preparation of films, but also in the machanical arrangements for exposing them. The "roller-slide" of this Company—a piece of apparatus by which a continuous band of tissue can be manipulated—is a marvel of constructive perfection; and though the principle is upwards of thirty years old, this instrument is the first to thoroughly fulfil requirements. Messrs. Morgan and Kidd (No. 2227) also exhibit specimens of paper negative work.

One other recent advance in negative work should be alluded to, namely, the system of "isochromatic" or "orthochromatic" photography, by which the colours of objects are rendered in monochrome in truer relation to their respective appearance to the eye. Many years since, Draper, Waterhouse, Carey Lea, and Vogel pointed out that photographic films might be rendered more or less sensitive to certain colours by increasing or decreasing their power of absorbing rays of the particular colour; but it is only comparatively recently that Attout-Tailfer and Clayton in France, Vogel in Germany, Warnerke in England, and Ives in America, have availed themselves practically of the fact. Tailfer and Clayton, as well as Warnerke, exhibit interesting examples of their respective methods.

Turning now to the printing processes, the first in chronological order is the carbon process of Swan, known generally under the title of autotype. This is based on the discovery of Poitevin of the sensitiveness to light of a mixture of gelatine and bichromate of potash, or similar salt of chromium. Fargier, Pouncy, Blair, and others experimented with films of coloured gelatine rendered sensitive to light by means of chromic salts, and which, after exposure, were treated with warm water to dissolve the portions unacted upon, leaving a picture in insoluble gelatine attached to the paper or other support. The chief difficulty experienced was in obtaining half-tone, since upon exposure to light under a negative the surface of the gelatine layer was rendered insoluble, and so imprisoned beneath it that portion which remained soluble; consequently, except for black and white subjects, the process was long impracticable. In 1864, however, J. W. Swan patented a practicable method by which such a layer—bichromated gelatine—could, after exposure to light, be developed from the back or under side; this was effected by cementing the "tissue" temporarily, after exposure, to a plate of glass or metal, and by means of hot water dissolving away the under layer of soluble gelatine, and with it the original support. The resulting picture could be allowed to remain upon the surface on which it was developed, or transferred to a second sheet of paper. Subsequent improvements by Johnson, Sawyer, and others, gradually brought the process to its present high degree of perfection, as shown in the exhibits in Groups XXVI. and XXIX.

In connection with this process, an interesting exhibit by E. W. Foxlee (No. 2277), shows in a graphic form the effects of what has been termed the "continuating" action of light on carbon tissue. It was discovered that if insolated carbon tissue be kept in the dark for any length of time before development, the action of light went on in the same manner as, though in a less degree than, if a longer exposure to light had been given; in fact, that light might be economised by storing the tissue away for a few hours before development. Conflicting opinions were expressed on the subject, some authorities denying *in toto* the existence of any such effect, until the careful experiments of Foxlee demontrated that the presence of moisture was absolutely essential to its production, and that it was accelerated by heat. The value of these observations, from an industrial point of view, removing as they do a considerable amount of uncertainty, can scarcely be overrated.

The next process that comes under notice is that known as Woodburytype, and which was the joint invention—though unknown to one another at the time—of W. B. Woodbury and J. W. Swan. In September, 1864, the former of these patented "an improved method of producing or obtaining by the aid of photography surfaces in relievo and intaglio upon aluminous, vitreous, metallic, or other suitable materials." In the following July, the latter secured a patent for "improvements in the production of printing surfaces by photographic agency, and in obtaining prints therefrom," this being apparently the first mention of the method of printing, the production of the mould being the same, or nearly so, in both cases. A layer of bichromatised gelatine of sufficient thickness is prepared, and, after exposure to light under a negative, is developed upon a suitable support, as in the carbon or autotype process. The result will be a "mould" in gelatine in which the shadows of the original stand in relief, while the high lights form depressions. From this mould a reverse is taken, either by electrotype or by pressing it into a sheet of soft metal, and this forms the printing surface. The ink consists of coloured gelatine, a small quantity of which is poured on to the intaglio, previously rubbed with an oily rag, a sheet of paper superposed, and the platen of a suitable press brought down, by which the superfluous ink is squeezed out, leaving a cast of coloured gelatine in the hollows of the intaglio. This adheres to the paper, and, when dry, forms a picture in perfect half-tone. The process has been brought to a high degree of perfection by the Woodbury Permanent Photographic Printing Company, at whose stall, No. 2260, examples of the various applications of the process are shown.

A simplification of the mode of preparing the printing mould is shown by Messrs. Woodbury, Treadaway, and Co., No. 2258, in which the gelatine relief itself forms the printing surface, being "faced" with tinfoil in order to prepare it to receive the ink. This process, to which the name "Stannotype" is given, is useful for small numbers, but does not offer the same facilities for large production that the older process does. The printing is identical with the "Woodbury" method.

Another valuable addition to the list of printing methods is Willis's platinotype process, which is demonstrated by the Platinotype Company, at their stall No. 2261. In this process the picture is composed of the metallic platinum in a fine state of division, in consequence of which an image of almost absolute permanence is secured, the most powerful reagents, with the exception of *aqua regia*, having no action on it. Paper is prepared with a solution containing ferric oxalate and a platinum salt; upon exposure to light, the ferric salt becomes reduced to the ferrous state, ferrous oxalate being a powerful reducing agent in connection with metallic salts. An image is formed in insoluble ferrous oxalate, which, so long as it remains in that state, exerts no effect upon the platinum salt in contact with it; but the instant the print is wetted with a hot solution of potassium oxalate, which is a solvent of the ferrous salt, the latter acts upon the platinum salt, and reduces it *in situ* to the metallic state, forming a rich black image of great beauty. Amongst the specimens exhibited by the company, a number of reproductions of works of art by Mr. J. Thomson show the suitability of the process in the rendering of the most exquisitely delicate subjects.

The newest departure in printing consists in the recent introduction of gelatine-chloride of silver paper, or paper prepared with an emulsion of chloride of silver in gelatine. Developed with ferrous oxalate or citrate, or with Mr. Arnold Spiller's hydroxylamine, it is capable of giving results scarcely distinguishable from albumenised silver prints, and with but a few seconds' exposure to light. Very fine examples are shown by Marion and Co., Warnerke, and Morgan and Kidd, but the process is still on its trial.

A. L. Henderson (No. 2229) and Count Ostrorog Walery (No. 2265) exhibit fine specimens of ceramic work, one of the most beautiful and permanent of photographic processes, the picture being burnt-in upon a suitable enamel surface.

Of photo-mechanical printing processes in Group XXVI., there is a good and representative show in every branch except photo-gravure, which is conspicuous by its absence. Dallas, at stall No. 2023, exhibits specimens of Dallastype and Dallastint, modifications of the photo-galvanographic process, worked formerly by Pretsch and himself. The Meisenbach Company show examples of their surface blocks for printing with type, in which an artificial half-tone is secured by breaking up the gradation by means of a series of dots or lines. A novel feature in connection with this style of process is found in the American section, where Ives, of Philadelphia, exhibits the latest development of the surface block process. In this a swelled gelatine relief is first produced from the photographic negative, and a cast in plaster taken from it. A sheet of rubber, the surface of which consists of a series of minute pyramidal projections, is inked and pressed into the plaster cast, and from this last an impression is taken, which is transferred to zinc to form a "resist" in the etching process. Sprague and Co. exhibit the working of their process of photo-lithography, in which the "grain" is produced by chemical meane upon a gelatine surface, from which a transfer is made on to an ordinary stone.

The collection of apparatus, though complete in its way, and comprising all that is new, is somewhat disappointing, since the different exhibits present a sameness which destroys the general effect. The cabinet work in general is of considerable excellence notably the exhibits of Hare, Rouch, Sands and Hunter, Marion and Co., and Collins, but there is little that calls for special notice. The same may be said in every department of the mechanical portion of the collection; while a vast amount of ingenuity and inventive power have been brought into play to meet the requirements of photography, there is nothing amongst the results that can be singled out as possessing super-excellence.

It would not be right to close this brief notice without calling attention to Mr. A. A. Common's remarkable examples of astro-photography, in the production of which the marvellous facilities afforded by modern processes have been supplemented by an unusual degree of perseverance and manipulative skill. Professor Hartly's labours, in photographing on an extensive scale the spectra of various metals, form another instance of valuable work performed in connection with a most difficult branch of science. The exhibits of these two gentlemen deserve most careful study.

Notes.

Many a valuable lens has been spoilt by injudicious cleaning. With an old soft silk handkerchief, a small stick of soft wood, or piece of cork, and a little alcohol, all dirt may be removed without injury. Some use a camel-hair brush, but this will not remove dust, to say nothing of dirt, satisfactorily.

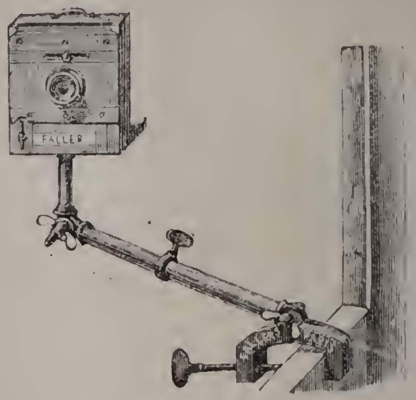
If we may believe the journalist who has recently published his experiences with matrimonial newspaper offices, these agencies should be the cause of much business to the photographer. The *modus operandi* is somewhat after this fashion. If, after an experimental skirmish in the advertisement department, a couple desire to correspond by letter, they each send a fee of five shillings to the editor, accompanied by a full description of themselves, and illustrated by a carte-de-visite; but sometimes the parties prefer not to meet at the outset, but to send their portraits to the editor, and negotiate through him. Some idea of the number of these portraits may be gathered when the writer describes the editor of one of these matrimonial organs sitting at a table "behind a mountain of photographs!" A mountain of photographs! Why, it would almost pay the proprietors of these papers to keep a photographer permanently engaged on the staff.

It will be recollected that one of the first observers of the new star in the Andromeda nebula was A. A. Common, who, in photographing the nebula, noticed a star which had not been seen in previous photographs. Dr. Wentworth Erck, writing to a contemporary, throws some doubt on the value of Mr. Common's evidence, contending that the difference noticed by Mr. Common between the light of the so-called star and that of the nebula was only one of "photographic energy," it being "well-known that the photographic energy of a faint star far exceeds that of a comparatively light nebula." Dr. Erck is inclined to think that the new object is not a portion of the nebula, and that its apparent connection with it is only optical, not physical.

From the thousand and one different photographs which the Prince of Wales has had taken of himself, one would think that he, of all men, would be known all over the globe. Yet we are told in the *World* that the Norwegians were much surprised to see him so stout! Perhaps since his inclination to obesity, the Prince has not been so assiduous a patron of the photographer as formerly.

A curiosity in photography would be a photograph of the new Pavilion Music Hall, the erection of which has been going on without cesssation since the foundations were put in. A photograph of the scene at night time would be quite possible.

Scarcely a word of description is needed to explain M. Faller's portable clip for the camera, as the accompanying diagram should give all necessary information to the amateur mechanic who may desire to make one.



Photography has been the innocent means of getting two more gentlemen into trouble during the past week. In the one case, which happened at Geneva, the Swiss police seem to have succeeded in acting even more foolishly than the German police acted at Frankfort the other day. They went in full force to the house of an English gentleman whose family has resided at Geneva for some five years past, and, photograph in hand, arrested him because, forsooth, his beard was cut like that of "a party" they wanted for forging a cheque. As a matter of fact, in all other respects the photograph of the absconded forger bore no resemblance to the gentleman so unnecessarily arrested. Independent observers declare that it was not a bit like him; but the police evidently have a peculiar way of judging of facial resemblance, which, after the repeated blunders into which it has led them, they would do well to reconsider and revise. For the sake of photography itself, in fact, which has rendered police authorities all over the world such marked assistance, they ought to be particularly careful not to abuse its aid as they have been doing of late. To make the *carte* a vehicle for the conveyance of the proper man to goal is right enough, but we must protest against its being transformed, so to speak, into a prison van for taking off innocent individuals to durance vile.

It was in Ireland that the other photographic *contretemps* of the week occurred. One Captain Foster, strolling through the streets of Middletown, saw a photograph of Mr. Parnell in a shop window, and, having purchased it, proceeded, in ill-advised demonstration of the right to do what one likes with one's own, to knock it about the street with his walking-stick. His improvised game of "bandy ball," or rather "bandy carte," quickly attracted attention, and the outraged subjects of the "Uncrowned King of Ireland" began to gather round the Captain in a threatening crowd. The end of it was that the police had to intervene to prevent Captain Foster being maltreated; or rather, this was not the end, for the result of his undignified proceedings has been the "boycotting" of the gentleman with whom he was staying, by the local butcher and baker and other tradesmen. It is to be hoped, therefore, that Captain Foster will, for the sake of his hosts, not make a hockey ball of Mr. Parnell's *carte* again when he is on a visit. He would do well, indeed, not even to look at, much less buy, a portrait which seemingly affects his equanimity so greatly. At all events, he must really refrain, when next struck by a likeness of an Irish patriot in a window, from striking it back.

The first volume of Dr. Carnelley's "Physico-Chemical Constants" is now ready for issue. It includes the melting and boiling points of the elements in organic compounds, and of those organic compounds which do not contain more than three elements—altogether 1,900 data. This book ought to be in the library of every photographic society.

At the recent meeting of the British Association, the great services rendered to science by Major (now Lieut.-Col.) Waterhouse, were fully recognized. The President of the Geographical Section (Gen. J. T. Walker) spoke at length of the splendid work done by the Survey of India, specially referring to "Lieut.-Col. Waterhouse, who has for many years superintended the office in which photography is employed in connection with zincography and lithography for the speedy reproduction of the maps of the Survey. Col. Waterhouse has done much to develop the art of photo-gravure, whereby drawings in brushwork and mezzotint may be reproduced with a degree of excellence rivalling the best copper-plate engraving; and almost as cheaply and speedily as drawings in pen and ink are reproduced by photo-zincography."

A heartless monster, with a pretty turn of amateur photography, and a strong stomach, has been grossly abusing the facility he has acquired in the manipulation of a portable camera. The fiend in human shape has, in fact, availed himself of the opportunities afforded him during several abnormally rough passages from Dover to Calais and back again to secure a series of what he calls "Mal-de-Mer-y-thoughts." In other words, taking advantage of the generally limp and passive state of his suffering fellow-passengers, he has secured a series of photographs of them at the various stages of their decline and fall." It is said—but we cannot believe this to be true—that the cruel artist intends to publish a selection of his "Mid-Channel Cartes" under the title of "*Sic Transit*." Heartless as he may be, he will surely stop short of this final outrage on his suffering fellow-men?

It is now possible, by dropping a penny into an opening in an automatic apparatus to be found in most places of public resort, to procure a post card, a box of wax vestas, or a box of fusees, as the case may be. You merely have to drop in your coin, and pull open a drawer, and there lies the desiderated article at your disposal. Doubtless these automatic contrivances will be developed further—a contemporary suggests that umbrellas might be dispensed on hire in a similar way—but the correspondent who proposes that automatic cameras shall be stationed all over London should have waited until the "silly season" before penning his letter.

"Surely it would be simple," he writes, "to construct an automatic photographic apparatus on the plan of the 'Post Card and Match Supply Company's' contrivances. The would-be sitter would only have to stand on a prescribed spot and drop in the fixed fee, be it a shilling or what not, on which a flap would fly back, a focussed and prepared camera shoot out, and the portrait of the operator be instantaneously secured." He gets rather hazy in his subsequent details, but the end of the matter is, that after certain automatic operations in the interior of the apparatus, the incident would end by the shooting out of a drawer in which the finished portrait would be found, the camera meanwhile having returned to its normal place and charged itself with a fresh plate. That the novelty of the notion would "take" we agree with our correspondent in thinking; but whether the automatic camera would "take" the portraits of its patrons is quite another matter.

No doubt the "funereal album" has a melancholy interest, but it cannot be said that the idea is a pleasant one. The "funereal album," according to a society journal, is usually bound in black velvet, and mounted in silver, while at each corner of the cover, in place of the usual rests, are delicately carved sculls in ivory, beneath which are the usual accompanying cross-bones! Let us hope that this extremely realistic notion is the invention of an imaginative writer, and not a reality. It is a wonder the album is not described as coffin-shaped.

A. Ainslie Common has recently discovered a new comet. It is only visible through a powerful telescope, so that we fear there will be little likelihood of getting a photographic record of its spectrum.

In the technical division of the Birmingham Board School, to which the boys proceed after they have passed the sixth standard, W. J. Harrison has just completed a short course of lectures on the history and practice of photography.

Early next year Norman Lockyer will lecture to the members of the Midland Institute on "Astronomical Photography."

Patent Intelligence.

Applications for Letters Patent.

10,896. Charles Day Durnford, 1, Castle Terrace, Edinburgh, for "Improvements in photographic shutters."—15th Sept., 1885.

10,897. Friese Greene, 34, Gay Street, Bath, for "An improved method of changing plates, films, or tissue for photographic purposes."—15th Sept., 1885.

11,020. Alexander Anderson, 60, Academy Street, Elgin, for "Trays or baths for developing or fixing photographic plates."—17th Sept., 1885.

11,055. Alexander Melville Clark, 53, Chancery Lane, London, W.C., for "An improvement in photographic cameras."—17th Sept., 1885.

Patent Sealed.

12,772. Fox Shew, 23, Southampton Buildings, Middlesex, for "Improvements in means for increasing the usefulness of photographic cameras."—Dated 24th Sept., 1884.

Specification Published during the Week.

15,193. James Ashford, Photographic Apparatus Maker, 179, Aston Road, Birmingham, for "Improvements in stands for photographic cameras and other similar purposes."—Dated 12th August, 1885.

I declare the nature of my invention to be as follows, and that the object of my invention is to so arrange the parts of the stand—which I will describe hereafter, and, for convenience, call the camera stand—that the legs or supports may be made movable, and easily attached to or detached from the part on which the camera rests, and which I will call the stand head, so that the camera stand, when not in use, may be arranged compactly, and is, in consequence, exceedingly portable. I propose effecting my purpose in two ways, as described below. Firstly, I form the stand head of proper material in angular or other shape suitable to my purpose, and leave projecting ends from same, each projecting end to engage with one of the legs or supports of the camera stand. Across the top of each leg or support, I place a metal pin having a greater diameter one way than the other, and in the projecting ends of stand head I cut corresponding slots or notches, with the ends towards the centre of stand head enlarged. I so arrange the metal pins in the legs or supports that they can only pass into the slots or notches in the projecting ends of stand head when the said legs or supports are in a horizontal position, then being forced to inner ends of slots or notches and turned towards the perpendicular; they are securely held until again placed in a horizontal position, and withdrawn. Secondly, I form the stand head with projecting ends as previously described, but do not enlarge the slots or notches at inner ends, nor do I use the flattened pins in legs or supports, but furnish proper round pins of equal diameter throughout in place thereof. On the under side of the stand head I affix short plates or other springs, having their loose ends so arranged that they will cross the slots or notches in projecting ends of stand head. The loose ends of springs I form as inclined planes at convenient angles, and immediately behind these, and towards the centre of stand head, I form abrupt shoulders. The inclined planes at ends of springs are placed in such positions that the cross pins in top of legs or supports shall, when forced into and along the slots or notches in projecting ends of stand head, compress the springs until they have passed over the inclined planes of same, when the action of springs will bring the abrupt shoulders against the cross pins in legs or supports, and so hold the cross pins between the abrupt shoulders of springs and inner ends of slots or notches, where they remain secure and safe until released by pressure of the hand directly on the spring or other arrangement for this purpose. By preference, I use sliding legs or supports to my camera stand, but not necessarily.

I claim as new—

Firstly, the enlargement of the inner ends of slots or notches in stand head, and corresponding pins in legs or supports; and—

Secondly, the spring attachments when the slots or notches in stand head are not so enlarged.

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BACKGROUNDS.

The *Photographic Times* says:—

It never fails to elicit an expression of pleasurable surprise when, having bestowed a due meed of attention, and, possibly, admiration at a photographic portrait or group of friends well known, the discovery is made that the scenic surroundings, but especially the distance, represent scenes well-known in connection and associated with the individual portrayed.

We are acquainted with an amateur, who, in far less time than it will take us to tell the story, can sketch a background on a large sheet of common paper so as to present the salient features of any landscape or other scene desired. For groups he employs calico.

We had shown him a little view in Central Park, with trees on each side, a grassy slope as immediate foreground, a glimpse of one of the lakes in the middle distance, and some of the Fifth Avenue Church spires in the extreme distance. This is an *entourage* and background to a group, or even a single figure would, in the estimation of our friend prove perfect, could it only be imported into the garden in which he operated. How was it to be accomplished? The directions we gave, and by which he so quickly profited, we now propose giving to such of our readers, whether amateur or professional photographers, as choose to take the hint, and not only so, but to carry it out in an infinite variety of ways, such as will undoubtedly suggest themselves to the minds of intelligent readers.

The paper to be employed for this purpose should be in one continuous piece, if possible, for although a neat junction of two widths may be effected, yet, notwithstanding, it is a little out of sharp focus, and will scarcely show at all if left plain, yet it may slightly interfere with the evenness of the drawing in the subsequent operation. The paper we advise for the purpose is that known as Roll Manilla. It can be cut to any length desired, its width being as great as four and a-half and five feet.

Having obtained a magic lantern, stereopticon, sciopticon, or one of the instruments for projection, no matter by what name it is known in commerce, place in it the transparency or negative of the subject which is to form the background. To one who possesses common sense, it will soon become immaterial whether the *cliché* thus projected is a negative or transparency. We shall suppose that a large sheet of Manilla paper is to form the material of the background; let it be stretched flat on the wall of a darkened room, and then allow the image from the lantern to fall upon it. Now trace the outlines by means of charcoal, which can be obtained in sticks of suitable dimensions at all artists' colour stores, and let special care be taken this be done in only a sketchy style, carefully abstaining from working in much detail. From time to time examine the progress of this work of tracing by capping the lens of the projecting lantern, and examining the handwork by means of a candle.

Let it never be forgotten that what is wanted in a background is not a finished drawing, but only a suggestive sketch. If it be carefully finished with much detail, it will not properly fulfil the purpose for which it was intended; hence it is well to avoid all matters of minuteness which some, especially the mere tyro, will regard as a *sine qua non*.

It is marvellous with what rapidity an individual who is handy with the charcoal or crayon will outline a background in this way, and for the purpose now proposed. All that is wanted is to get the salient points well and accurately drawn; and there is no difficulty in this, seeing that the operator has merely to trace the outlines already projected on the sheet.

Crudities in this mechanical process of outlining may be palliated by the expedient of covering the forefinger with a piece of calico, and applying gentle friction here and there where found necessary. Where failure is apt to occur will be from the bestowing of too much work upon details. A background should be suggestive, never pronounced. Whenever it is the first thing that arrests the eye in the examination of a portrait, it is faulty.

From what has been said, it will be seen that we here abstain from entering upon the technical details of applying colour or pigment to the background. This alone would demand more than one article for its consideration. It may, however, prove useful to some if we describe briefly a method of preparing and applying pigments, which has long been a favourite one with several photographers. Mix together fine whiting and lampblack in such proportion as experience dictates. Incorporate with these a little powdered dextrine, and mould the mixture into sticks by mixing with a little water. This is applied to a sheet of unbleached calico, tightly stretched on a frame, by using it as a crayon. When the work is finished, it may be fixed by the application of water from an atomizer.

PHOTOGRAPHIC APPARATUS AT THE ENGLISH PATENT OFFICE.

BY CHAPMAN JONES.*

Camera Fronts.

Devices for focussing by means of the lens-tube will be referred to in connection with lenses.

About two years after the Daguerreotype process was made known, A. J. F. Claudet (December 18, 1841) used a camera with an open front with grooves, so that any of an assortment of lenses might be readily slid in, each lens being mounted on a board or loose front. But the first suggestion to change the position of the lens for the sake of the picture appears to have been made by J. C. Bourne (March 27, 1855), who supports the camera-front on a horizontal curved track, the centre of the curve being under the centre of the sensitive surface, so that wherever the front rests on its track, a ray of light normal to the surface of the lens impinges upon the centre of the photographic plate. The object of this adjustment is to enable the operator to get objects at different distances, but in the same horizontal plane, into good focus at the same time, a result that is now obtained much more conveniently by a lateral swing of the back. The front is carried on standards, and may be raised to get a similar effect in a vertical direction. J. B. Dancer (September 5, 1856) has a front raised or lowered by a vertical screw which has a milled head. A front sliding laterally, that the same lens may give the pair of stereoscopic pictures, is mentioned by J. Purnell (April 9, 1857). A. J. Melhuish (November 10, 1859) has a sliding adjustable front to his metal camera, and A. Ceileur (February 21, 1863) makes the front to slide vertically for getting the lens opposite different parts of the plate, to enable several pictures to be taken on one plate; the back is adjustable vertically and horizontally.

The movement of the front to and fro for focussing is an arrangement that is considered advantageous by many inventors. The portable camera of J. Mawson (November 13, 1855) had a front sliding in a groove by means of a "regulating screw." J. B. Dancer (September 5, 1856) moved the front for focussing by means of a rack-and-pinion; or else had a chain lying lengthways under the sliding part of the base-board that carried the front, which was fastened at one end to a lever arrangement, to keep it taut, and made one turn round a fluted spindle fixed to the stationary part of the base-board. By turning the spindle, the sliding part was drawn backward or forward. A rack-and-pinion arrangement is also employed by S. W. Rouch (April 11, 1878), and the frame in which the base of the front slides may be attached to the base-board at different parts, to allow of the use of lenses differing in focal length. A box-camera for wet plate work is described by J. Tiator (August 12, 1878), in which the front moves to and fro within the walls of the camera by means of a screw from behind. The inside of the camera and the edges of the front are covered with plush to make the join light-tight, and as a precaution in case of this plush wearing, a curtain is fastened to the front edges of the camera, and drawn round the lens by a cord.

The lens is carried by a tube projecting from the camera-front, by A. J. Melhuish (November 10, 1859), to lessen the bulk and weight of his metal camera; and by H. Neville (July 24, 1861), to provide for focussing telescope fashion. J. E. Grisdale (March 12, 1862) secures the lens by three or more pairs of hinged flaps, which can be readily adjusted for different sized lens-bearings, taking the necessary care to make the place of attachment light-tight.

The need for a front, to carry more lenses than one, appears to have arisen with the desire to make stereoscopic pictures photographically. J. Brett (July 8, 1853) combines two cameras, so that the pictures may be taken "at the same time and on the same plane"; but gives no further description. A camera with two lenses, side by side, is described by L. F. Saugrin (May 15, 1854), who also arranges two or three lenses vertically, and has a second similar camera to get two or three stereoscopic pictures at once; or each camera may carry six lenses. But the most wholesale operator is W. G. Helsby (January 3, 1867), who "manufactures photographic pictures" by getting a large number of impressions simultaneously. He illustrates his invention with a camera that has twenty-five lenses, and a back that may be shifted slightly to get a second set of pictures between the rows of the first set. J. Raine (July 20, 1868) has two or more lenses arranged horizontally, with corresponding divisions in the camera for getting panoramic pictures; and T. Bolas (November 3, 1881) employs a pair of lens worked by one pinion, one opening into the camera proper, and the other only into an outer case, with a reflecting prism and eye-piece for focussing.

Fronts that turn about are supposed to be advantageous in these days of many-motion cameras; but the utility of throwing the front out of parallelism with the back is not yet obvious. Swinging fronts are in no way the counterparts of swinging-backs, for, however the back may be tilted, the lens points straight to the centre of the plate, while the least swing of the front in any direction immediately upsets this important condition. It is true that by combining a sliding and swinging movement of the front, an equivalent for a swing-back is obtained; but it is a retrograding ingenuity that gives two movements where one is sufficient, and especially two movements that it is almost impossible to correctly combine. Where, however, for constructive reasons, the back cannot be made to swing, a front that not only rises, falls, and slides, but swings also, may be a desideratum. Tilting both the back and front in the same direction, and to the same extent, is equivalent to pushing the lens away from the centre of the camera front; and this may be a convenient way of getting such a displacement, without awkwardly exaggerating the sliding capabilities of the front, when it is desired to use only a part of the sensitive plate, as in McKellen's new camera. But it does not appear that such a procedure was contemplated by either W. B. Woodbury (April 27, 1877) or S. W. Rouch (April 11, 1878), who give a lateral swing to the front by securing it to a vertical pivot

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* Continued from page 581.

THE BEST PROCESS OF PHOTO-ZINCOGRAPHY.

BY C. CLAUSNITZER, SAN FRANCISCO, CAL.

I shall aim to be as explicit as possible, so that the reader, by following exactly the directions given, will be enabled to do the work at once, and make his plates and his own impressions, provided he is able to handle the roller and make himself acquainted with zinc etching.

I speak here merely of a process for reproducing drawings, wood- copper- and steel-engravings, crayon drawings and the like, of which reversed and intense negatives are obtainable by the aid of photography. Very fine steel or copper engravings yield good results only when the drawings are enlarged a trifle, whereas, from pen drawings or wood cuts, excellent results may be secured even with a considerable reduction.

The main features and advantages of my process are the following:

1. All transferring and repeated copying is done away with.
2. The work can be obtained in greasy transfer ink sufficiently strong without any rubbing up or strengthening, such as is necessary in other processes; and
3. In half an hour's time, including the making of negatives, the plate can be made ready for etching.

The requisite reversed negative must be made on a perfectly level glass plate, so that the same afterward may get into the closest contact with the zinc plate. It is necessary that the negatives show all lines and dots of great intensity, as only such a negative will give satisfactory results.

Taking it for granted that not every photographer is thoroughly acquainted with and able to make a negative as is required, I shall here give some explanation on the subject. The principal thing to be looked to is the exact time of exposure. By over-exposure (exposing too long to the light), the fine lines will be filled up later on by the developing in strengthening the negative.

In the ordinary development process, the developing should be stopped as soon as the drawing appears distinct in all its details, and the plate should then be washed off at once, fixed with cyanide of potassium, and after this washed again for a longer period. Next a solution of

Sulphate of copper	1 ounce
Bromide of potassa	1 drachm
Water	8 ounces

should be poured over the plate, and left until the film appears nearly white (the solution may be used again); after that the plate should be thoroughly rinsed, and a solution of nitrate of silver, 1 part to 10 parts of water, poured over the same.

It will be found that the plate turns at once black. Should it happen that the fine lines fill by the application of sulphate of copper, then the negative was exposed too long to the light, or over-exposed; but if the exposure has been properly timed, all the white parts (of the paper) will show opaque, and the line work will be perfectly transparent.

The negative having thus been made ready, a well-polished zinc plate of the proper size should be taken and polished once more with the finest pumice powder and water. After washing the plate with clear water, in a dark room, over the still wet zinc plate should be poured the following solution:—The white of a fresh egg, beaten to a froth, with 6 ounces of water and 30 grains of finely-pulverized bichromate of potassa, allowed to settle, and then filtered. The first quantity poured upon the plate may be allowed to run waste, but after that the solution may be run off again to the bottle to be used repeatedly. The plate, held somewhat at an inclining angle, should be dried over an oil-stove or a gas burner, but care must be taken not to get the plate hot. When dry and cooled off, the plate is ready for exposure. Lay now the negative face downward upon the prepared zinc plate in a regular printing frame, such as photographers use for their printing; apply, by means of the springs, a good pressure, so as to bring the zinc plate and the negative into close contact; then expose the frame to light for a period of two to four minutes, according to work. It is best to make the exposure in good sunlight. Take now the frame back to the dark room, and roll up the zinc plate with a good, fine-grained lithographic roller, using good transfer ink not too thin. The stiffer the ink, the better will be the result. The plate, thus rolled up, has to be put into a vessel with clean water, and with a thoroughly wet cotton dabber the superfluous transfer ink washed off in the not exposed places. This should be done by moving the hand in narrow circles, and ought to be tried at first in the corners, proceeding nearer and nearer to the work very slowly and carefully, as a rapid movement might take away isolated fine lines and marks. If the exposure was properly timed the drawing will be easily developed; if the plate was over-exposed, the ink will stick to the plate, and cannot be easily removed, and there is always more or less danger of hurting the work. If the exposure to light was not sufficiently long, or an under-exposing, the work is readily washed away, especially in places where there are fine parts. In both instances it is best to polish the plate once more with a strong solution of potassa and fine pumice powder, wash off clean, and repeat the entire procedure.

From a careful noting of what has been said, and with a little practice, the experimenter will readily determine the proper length of exposure. If this was correct, and all superfluous transfer ink removed, clean the plate in water and dry by warmth. When cold again, put resin upon it in the finest powdered state, rub in well, and remove the superfluous resin; next warm the plate until the resin begins to melt. This may be detected by its taking a trifling darker appearance; then etch, allow the plate to get cold, repeat the rolling up, and resin again; heat, and continue the operations until the necessary deepness has been secured; this is fully described under the heading of "Zincography," in vol. i. [see PHOTOGRAPHIC NEWS 1882, p. 690-706].

The above description ought to enable anyone, who has ever practised zinc etching, or who has some knowledge of it, to obtain good results.—*The Lithographer.*

THE CAMERA IN THE CORAL ISLANDS.

A PHOTOGRAPHER'S DIARY OF THE "WAIRARAPA'S" SECOND TRIP TO THE SOUTH SEAS.

BY A. H. BURTON (BURTON BROS.).*

Saturday, July 19th.—Hurrah! 'Tis all right! After the usual formalities by the authorities of Apia, we rush for the boats, and soon set our feet on Samoan ground. On the previous visit here, a good deal of surreptitious trading in curios was done while the police boat was temporarily absent from the duty of preventing communication between the polluted Wairarapa and the shore, and fancy prices were asked, and readily paid. This time business was attempted to be done on the basis of last trip's prices, but buyers were shy, and the market eventually steadied, and goods were quitted at not more than say twice their value. It is needless to say that the camera was soon "at it" in the native village, illustrating, as thoroughly as the limited time would permit, "The Samoan at home." Some fine examples of tattooing were secured. As is perhaps pretty well known, the men tattoo the body from the hips to the knees in most elaborate and beautiful patterns, following the curves of the body. On the outer sides of the thighs, the work is laid in a solid mass of blue, while inside the legs a sort of lattice-work is depicted, giving the idea of laced pantaloons. It is scarcely possible to think without a shiver of what the pain of the operation must be. It evidently marks the assumption of the *toga virilis*, and would seem to be universal, though we were told that the missionaries discountenanced the practice. Devoted the afternoon to the Roman Catholic mission grounds, and one of the views is reproduced below, snatching "bits" all the way up the hill, and finishing with the church and other buildings, and groups of pupils. Father Gavet speaks no English, and it would have been "a caution" to a linguist to have heard the French of the photographer. However, they managed to understand each other, and eventually a bowl of kawa was made in his honour, and, with the usual formalities, handed to the visitor. After dinner, a mysterious whisper was passed round a select circle that a *proper* Samoan *mèkè* would be given at a private house in Apia. Accordingly, all who were in the secret showed up at the rendezvous, and were regaled with the usual sing-song and hand-clapping business by Samoan girls, somewhat diversified by the archness (not to say "impudence") of their fair leader. Still, some of the younger members of the party, on leaving, expressed the opinion that the affair was a "sell"—that it was not a *proper* mèkè—or, rather, that it was far too "proper." To add to their chagrin, they learned afterwards that a mèkè took place in another part of the town, at which no disappointment was expressed or felt.

Sunday, July 20th.—Considered that no overt photography would be seemly, so did another day's "prospecting." Passing through a native village, got a youthful guide to show *the* fall, and some most delicious bathing places. At one of these found a large party from the ship disporting themselves in primitive, even biblical, fashion, for *they* were naked, and the native ladies on the bank were evidently not ashamed. In the evening, persuant to invitation, Father Gavet, his two assistants, and about thirty native pupils came on board, and after a wondering examination of the ship, the latter gave us the best sample of Samoan sitting-dances and songs we have yet seen or heard. It was shrewdly suspected that some of these were "secular," but as they were judiciously sandwiched with "hymns," nobody was seriously shocked.

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* Continued from page 589.

Monday, July 21st.—As per usual, spent to-day in taking views prospected yesterday. Among other items, secured a fine view of a Samoan interior with the process of kawa-making going on. About half-a-mile out of Apia is a little stream, and over it some speculative individual has thrown a foot bridge at a probable outlay of at least five pounds. In return he exacts a toll of threepence, going or returning—double fare after dark. This seemed a piece of such thorough go-aheaditiveness, that a plate was expended on the scene in commemoration. At 4.30 p.m., weighed anchor and started for the second Samoan stopping-place—viz., Pango Pango—which we reached early on

Tuesday, July 22nd.—A goodly number of those on board had been, at some time or other, to the Fjords of the South Island of New Zealand; and almost with one voice these exclaimed: "Why, if it were not for the cocoa-nut trees, we could think ourselves in the Sounds." Doubtless, they were thinking of the *Southerly* Sounds, such as Preservation or Chalky Inlets. There was nothing, of course, to suggest Wet Jacket and Hall's Arms, or Milford Sound. It was an agreeable change, after the roadsteads within the coral reefs that had been our anchorages hitherto, to find ourselves in a real land-locked harbour. Well might we admire, for [illegible] is the Queen Harbour of the Pacific, and is destined, says [illegible] *disant* far-seeing ones, to be a place of great commercial and political importance in the not very distant future. Here we found flourishing the "flend" system, of which most of us have read in books of South Sea travel. The arrangement is very simple. The inhabitants flock down to the landing-place to meet the [illegible], and by a process of "elective affinity," each one attaches him or herself to one of the strangers with the naive query: "You be my flend?" Should the answer be favourable, the bond is supposed to continue as long as the ship stays. Many little services are assiduously rendered, and then, at parting, the propriety of a present in return is delicately suggested. Sometimes, it must be confessed, there is no advance beyond the baldest mercenary idea, as, for instance, in one case: "You be my flend?" "Oh, yes, certainly!" "You give me two dollar?" Alarmed visitor backs out, and unsophisticated Samoan goes in search of another "affinity." The photographer was fortunate in arranging with two "flends"—one of each sex—though he had grave doubts if this were not an infraction of the unwritten law; and he must admit, at the expense of his reputation for gallantry, that his female "flendship" partook somewhat of a practical, not to say selfish, character—that, in fact, he meant just to use this "flend" as a model for his pictures. Indeed, the pact had lasted a good part of the day, and she had submitted to be posed time after time, when, suddenly realising the position, she turned abruptly on her heel, saying, "Me go now," and this photographer saw her no more. The male "flend," William, at once fell into his proper position as beast of burden for the necessary impedimenta, and all went well for some time; but as the party proceeded higher and higher up the harbour, working the country *en route*, it became evident that William was growing very uneasy. By alternate coaxing and bullying a few hundred yards more were made, when William unmistakably struck. It then transpired that we had passed the boundary of his enemy's country, and that if he ventured further there would probably just be a row. Taking pity upon the gallant chief, he was allowed to transfer the most indispensable boxes to the shoulders of his young son, when he at once beat a masterly retreat to the landing-place, which, it would seem, was regarded as neutral territory. The photographic party were now arrested by a request to turn aside, and take a group who were ready posed in a beautiful little dell. Here were a number of the *jeunesse dorée* of the "Wairarapa," paired off with the prettiest maidens of the country. The centre of the picture was occupied by a popular globe-trotter and his flend, the fair Faaolttana, a young lady of the highest social standing in the neighbourhood; while others were arranged around in positions of the most delicious abandon. It was evident that the sensuous influence of the climate and the other surroundings were beginning to tell upon the impressible visitors. There was a perceptible relaxation of the moral fibre. "Very suggestive of Solomon's song, ain't it?" whispered an irreverent fellow passenger in the photographer's ear. Noticing that the remark was received with a disapproving frown, he hastened to add, "Of course I mean without the orthodox headlines." No one, indeed, could be starched and square-toed among the children of nature who frollicked around. Even Mr. X——, at home one of the most decorous and rigid of church-goers, a tax-paying "citizen of credit and renown," could be seen lying upon a mat in a native house, his head pillowed upon the lap of a dusky charmer, who fanned him with one hand, while the other toyed seductively with his hair. "What's your name, my dear?" The fair one told him, and in return demanded his. X—— pulled out his handkerchief, on which his name appeared in "permanent ink." Circe at once begged this, and X—— could not refuse. The next question was, "You got wife?" when the photographer left, and diligently minded his own business.

The scene on the decks on the "Wairarapa" this afternoon was one long to be remembered. Crowds of Samoans—of both sexes and of all ages—pervaded the ship, diffusing a decided, though by no means disagreeable, aroma of cocoanut oil. Most were impelled by curiosity and wonder; some on trading thoughts intent, and others perhaps full of tenderer feelings. As to the trading community, it must be said that a new experience awaited us. Many of the vendors of curios—clubs, kawa bowls, &c.—could not be induced to quote a money price, being intent solely on clothes. A shirt or an old coat would "fetch" where the offer of silver and gold would be quite unheeded. As this was our first experience of the kind, so was it our last; for ever afterwards, as ever before, the "almighty dollar" reigned as supremely as in any civilized country.

If anyone doubted the perfect suitability of the native dress to the climate and conditions of life around, he would have been convinced had he seen what a transformation could be effected by a slight change in costume. Here, for instance, is a girl dressed but little according to civilized ideas, very much of her form, her bosom, her shapely limbs being freely revealed. She is just a poem, and no thought of impropriety suggests itself for a moment; but see, someone has added to her garb boots, stockings, and garters! "Faugh! what a very objectionable young person! Really, she ought to be sent on to the shore forthwith!"

Wednesday, July 23rd.—We were to sail at 10 a.m., and no ship's boats were available for the shore. The morning was so glorious, though, with so perfect a calm, that it was not in photographic nature to resist the temptation of trying to add to the twenty-four plates of yesterday. Accordingly the pilot boat was secured, and from the opposite side of the harbour to the scene of yesterday's operations, some grand pictures were obtained. Two love-sick swains—rivals for the attention of the lovely Sauimatane—dubbed "the beauty with the languishing eyes," had persuaded that charmer to come across in her canoe to be photographed.

Standing with reluctant feet,
Where the brook and river meet—
Womanhood and childhood fleet—

Her form just perfect—her face charming—with dreamy eyes fringed with the longest lashes (her admirers said) ever seen,—Sauimatane was elected by acclamation the "Belle of the Coral Islands."

The steamer's whistle warned us that time was up. We hurried on board just in time to get half-a-dozen snap shots at the fleet of canoes of all sizes, full of natives, that crowded round the ship, and then up came the anchor and we were soon fast leaving Pango Pango behind, and bidding good-bye to Samoa and the Samoans. Almost the last thing noted was a little canoe a long way astern, carrying a single person waving farewells with a handkerchief to some one on board the steamer. A binocular told that this was "the beauty with the languishing eyes."

Thursday, July 24th.—We had hoped to reach Vavau, in the Tongan group, this afternoon; but through a head wind and heavy sea, we could only sight it and dodge about till daylight.

Friday, July 25th.—The first hitch of the trip here occurred. The health officer of the port of Neiafu—to our great horror—boarded us at the outer anchorage, and forbade us to come any further, serving us with a notice signed by H. M. Vice Consul, as to all vessels ariving from "Samoa or any infected ports." However, after some correspondence, no end of formalities, and the loss of several precious hours, all was declared to be right; we were admitted to pratique and allowed to move to the anchorage off the town. In the afternoon the launch, with two boats in tow, took a large party to the Coral Cave, which Miss Gordon Cumming thus describes:—

"We were guided to a truly exquisite cave, about five miles distant. Never before in all my wanderings had my eyes been gladdened by such an ideal fairy grot. We rowed along the face of beautiful crags; suddenly we steered right into a narrow opening, and found ourselves in a great vaulted cavern like a grand cathedral—a coral cave, with huge stalactites hanging in clusters from the roof, and forming a perfect gallery on one side, from which we could almost fancy that white-veiled nuns were looking down on us. The great outer cave is paved with *lapis lazuli*, at least with water of the purest ultramarine, which was reflected in rippling shimmers of blue and green on the white marble roof. For the sun was lowering, and shone in glory through the western archway, lighting up the mysterious depths of a great inner cavern, which otherwise receives but one ray of light from a small opening far overhead, through which we saw blue sky and green leaves. No scene painter could have devised so romantic a picture for any fairy pantomine. Altogether it was a scene of dream-like loveliness." This is a capital bit of word painting, and the exaggeration of description—if any—is really very pardonable.

(*To be continued.*)

THEORY AND PRACTICE OF PHOTOMICROGRAPHY.

BY MAURICE N. MILLER, M.D.*

Let us now select and arrange our apparatus. We are to use sunlight—we must have a heliostat. Of the almost numberless forms of this, ranging from the most simple to the most complicated, I unhesitatingly give the preference to the simple and inexpensive instrument invented by Mr. Rutherford, and brought to our notice by one of our oldest and most useful members—Mr. D. C. Chapman. This apparatus is familiar to most of you. It is described in *Sulliman's Journal*, 1863-65, and I will give the essential features. The works of an ordinary Yankee clock, with balance, are made to rotate a steel mandrel, which is inclined so as to present a continuation of our polar axis. This mandrel carries the mirror. It is easily adjusted, and, when regulated, performs with sufficient precision for the best work. Secretan, of Paris, makes an instrument on this plan, entirely of metal, which is necessarily less liable to loose adjustment by exposure than one made partly of wood. Inasmuch as we do not work except in pleasant weather, the heliostat of Chapman will remain in adjustment for a long time if properly cared for when not in use.

Time affords me no opportunity to say anything here about the adjustment or regulating of this piece of our apparatus. I cannot refrain, however, in passing, from suggesting that a great deal of valuable time will be saved by carefully regulating the clockwork before attempting to use the heliostat in actual work.

Having adjusted the apparatus, we find the proper position for it on the shelf outside our window, and by some means affix it so that we may always be sure of securing the same position. This is preferable to attempting to box it in, as the storms are almost certain to injure and alter it. The heliostat is so placed that a beam of sunlight, the size of the mirror—say four inches by eight inches—is projected against the outside of our stationary window shutter at a point about one foot above the window-ledge. The mirror should be of glass, silvered, and not covered with amalgam. At this point in the shutter a hole about six inches square is to be made, with cleats entirely around it inside, so that with buttons we may quickly fasten therein a piece of board, which will carry our secondary mirror. The beam from the mirror of the heliostat will pass through the hole in the shutter at an acute angle, and so on up to the ceiling of the room, and this is precisely where we do not want it. We have got the light into our room, however, and if everything be working as it should, the spot of light will remain unmoved for hours. But we want to bend this beam so that it may come through the opening in the shutter at right angles to the same, and so pass on through the microscope, &c. This we accomplish by means of a second mirror, also silvered, placed just outside the square opening in the shutter; this is attached to the perforated board which fits therein. This mirror must be susceptible of movement in two directions, so that we may always catch the beam from the primary mirror, and direct it with accuracy and delicacy as we desire. This is best accomplished by using the arrangement employed in the old solar microscope, and which is also used in solar photography by reflection. Suffice it to say that the mirror with its attachments is affixed to our perforated board, so that when the latter is in place we may have the mirror completely under our control, as the rods which accomplish the adjustments pass through the board and terminate in milled heads inside the shutter.

Our light is at last passing through our shutter and into our room parallel with and above our shelf. The latter must be so adjusted for height that when the microscope is placed thereon, and the optical body placed horizontally, the beam of sunlight may pass throu h the optical axis of the lenses. As to the microscope, the great desideratum is solidity. You will have noticed that this solidity crops out very frequently in my remarks. It is the natural outgrowth of the use of apparatus which the mechanician seems to think cannot combine solidity with delicacy of adjustment.

The microscope should have, first, a mechanical stage; second, a centering sub-stage; and third, a fine focussing adjustment that does not alter the length of the optical body. The tube of the microscope should be large and short. Schrauer, of this city, makes a special stand for this work that answers our purpose admirably. Cleats are affixed to the shelf so that the microscope may be moved to and from the shutter, but remain fixed, as far as its lateral adjustment is concerned.

Our beam of sunlight coming through the shutter we will suppose to be about two inches in diameter. Now is our time to correct one of our original defects with the first simple apparatus. The scattering rays must be picked up and be made to arrange themselves in proper order. In a short piece of tubing, fastened in the opening in the shutter, we slide a second piece of tubing, which, in turn, carries a plano-convex or double convex lens of nearly the diameter of the sunbeam. I believe nothing is gained by more light; even an inch is probably sufficient, and an achromatic lens here is not only useless, but less serviceable than the single glass This lens should have a focus of not less than eight to nine inches. Immediately in front of this lens, and supported on a little stand, we place a cell containing water that has previously been boiled. This cell is best made by separating two pieces of thin plate glass by a frame of wood one half inch thick. Bore a hole in the upper side of the frame, saturate it with melted paraffin, and while hot press the glasses against either side of the frame, and keep them in place by means of two rubber bands, or by thin binding wire. This makes the most perfect and permanent cell with which I am acquainted. Just before the beam of light is brought to a focus by means of the lens, another cell should be placed, which must be filled with freshly filtered solution of ammonia-sulphate of copper. This cell may rest on a stand by itself, although a more elegant way is to attach it by a mounting to the sub-stage.

To the sub-stage is affixed a good achromatic objective. A good one half inch objective answers an admirable purpose, although, for special work, the condensers of Abbé and others can be used. The microscope should be so placed that when the achromatic condenser is in proper position, the cone of rays from the primary condenser, or the plain lens, may just cover the larger or bottom lens of the former. This is an important adjustment, and in order to secure it, and, at the same time, keep the microscope stand immovable, I have added a rack-and-pinion movement to my primary lens.

It might now be supposed that we might place an object upon the stage, and an objective on the microscope, and proceed to work; but should we do so we shall find that more light will reach our plate from extraneous sources than will pass through the microscope. Several methods have been devised to cut off these stray rays by means of curtains, but they are all cumbersome, unsatisfactory, and inefficient. I have devised a little arrangement which answers the purpose admirably, although it must be seen to be appreciated. I construct a light framework of wood which completely covers the apparatus on our shelf, being of the width and length of the latter, and about twelve inches high. This frame, except the bottom and ends, I cover with heavy straw board. This, if put on wet, glued, and well tacked, will, when dry, be as light as a drum. The sides are hinged so that when let down completely expose the microscope and all the accessories, rendering the adjustments of easy accomplishment. One end of the frame (or box, as it now presents) is fastened tightly to the shutter, while the opposite end through which the end of the microscope tube projects is covered with broadcloth or velvet, with a perforation and drawing-string through which the tube passes.

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* Continued from p. 590.

(To be continued.)

Correspondence.

HELP NEEDED.

Sir,—I have ventured to address you in the hope of enlisting your services and sympathies in the following case of truly deserving distress.

Your readers may remember the suicide of a Mr. Finch, due to causes not perfectly known—perhaps anxiety, perhaps a moment of mental aberration: suffice it to say that, in quitting his cares, he left far greater ones behind—namely, a widow and four children totally unprovided for, the youngest still in arms, the eldest seven years old.

Mr. Finch has been for the last twenty years connected with photography, his last situation being with Messrs. Sprague, which he held at his demise.

The favour I have to beg is to notify this case of distress to the consideration of the public, through the medium of the News, at the same time intimating my readiness to receive the donations of the charitably disposed. I shall be most happy to co-operate with them, both monetarily and personally, the more eagerly so as for many years Mr. Finch was my personal friend; and I shall be most happy to answer any communication.—I remain, yours obediently, J. B. Currie.

16, *Edgware Road, London, W.*

MR. BOTTONE'S PHOTO-MICROGRAPHS.

Dear Sir,—My attention having been called to several communications in your issues of August 14th and 21st, relative to my strictures upon the alleged magnification of a photo-micrograph by Mr. Bottone, as published by you on the 8th of May last, I beg leave to trespass upon your space for a brief reply.

I did say most emphatically that no quarter-inch objective would cover in its field the whole of the foot of a dung-fly, being led to that assertion by repeated attempts so to do with various makes of lenses of that power, a ten-inch tube and A ocular. In no case was I able to get more than the pads and the long hairs into the field; not one of the joints could be seen at the same time. By removing the eye-piece, and projecting the image directly upon the ground glass screen of my camera, however, I was readily enabled to include the foot and two joints in the field of view of any of these lenses, and with the French quarter (triplet) made a negative from which a print was sent you the 24th of last May. Observe, however, that this negative quite fills a plate (meaning $5\frac{1}{2}$ by $4\frac{1}{4}$ inches), and that the magnification was but 70 diameters; whereas Mr. Bottone pictures a similar foot with three joints in a circle $2\frac{1}{4}$ inches diameter, and claims the enlargement to be 250 diameters.

If—as there can be no doubt, from his statements and those of your other correspondents—the specimen from which his photograph was made could be clearly seen a foot and two joints in the field of a quarter, with A ocular, it follows that it is of a much more minute size than mine. For the sake of comparison, I would state that the foot, including pads and long hairs, of my specimen measures exactly $\frac{5}{100}$ths of an inch, as ascertained with a Best stage micrometer. Will Mr. Bottone kindly give the measurement of his specimen in return? If it should be as large as mine, then the magnification, as shown in his print of May 8th, is only about 25 diameters—one-tenth of that claimed. If his estimation is correct, how exceedingly minute must his specimen be!—not larger than some of the diatoms.

My sole object in referring to this matter in the first instance, was a desire to do my little share towards insisting upon accuracy in published reports as to the magnification of any object illustrated, and I insist upon it that, labelling an illustration +250 when it is very many times less, is misleading to the general reader. The *actual* amplification, as shown in the illustration, should alone be given, not that which the objective is capable of giving under other circumstances than those employed.

In conclusion, I would add, in confirmation of Mr. Forgan's results—as stated by that gentleman in your issue of August 21st—that my Beck $\frac{4}{10}$ths of 55° angular aperture, with the A ocular, gives a field of $\frac{4}{8}$ths (one hundredth) of an inch, so that it will not quite include the foot of my fly in the view; whilst the French quarter has a field of but $\frac{3}{10}$ths (one hundredth), and will not nearly include the same foot when used with the A ocular. If, however, the latter be removed, and the image projected directly upon the ground glass screen of the camera, it will show the foot and two joints, as before stated; but it would require a bellows extension of several feet, and a plate twelve inches in length, to receive the image if magnified 250 diameters.—Yours respectfully,

W. H. Walmsley.

Proceedings of Societies.

Photographic Society of Great Britain.

A technical meeting was held at the Gallery, 5a, Pall Mall East, on Tuesday last, the 22nd instant; A. Cowan in the chair.

A discussion having arisen as to whether the reduction of prints is more considerable in an "acetate" bath or in a "chalk" bath,

W. E. Debenham said he was inclined to think that in most instances the reduction is far greater when an acetate bath is used; but

W. M. Ashman inclined to the contrary opinion.

After this it was inquired whether a bath could be made ready for immediate use by using hot water in its preparation; and both A. Cowan and W. E. Debenham agreed that by the use of hot water a toning bath can be prepared which is ready for use as soon as cold. The latter speaker deprecated the common practice of very frequently reviving an old toning bath, and is of opinion that by the use of a fresh bath more certainty is attained. He also advocated a thorough washing of the prints before toning.

W. M. Ashman said that instead of troubling to wash very thoroughly, he often put common salt into the toning bath.

The conversation then turned upon the details of silver printing, but nothing new was elicited.

E. Cocking handed round some negatives which had been spoiled by imperfect fixation.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 17th inst., W. M. Ashman in the chair.

A question arose, from the reading of the minutes, as to whether chloride emulsions for direct printing, made according to the formula published on page 607, possessed such good keeping qualities as those in which a citrate or tartrate was employed. The questioner (W. E. Debenham) advocated the the use of a citrate salt.

In reply, H. S. Starnes explained that in his trials he had used ammonia nitrate of silver.

J. Barker had abandoned acetate salts because they would not keep; either a citrate or tartrate gave him all he required.

Several speakers had found acetate of silver in emulsion to be unstable.

W. E. Debenham remarked that it was curious all these new printing processes were claimed to be quicker than albumenized paper; yet Mr. Starnes had told them that paper prepared with his emulsion was one and a half times slower than albumen.

J. Barker said he had used gelatine-prepared paper exclusively for the past three months, and it was quicker than albumen by one half.

The Chairman concurred with Mr. Barker regarding the rapidity of some gelatine papers.

The HON. SEC. (J. J. Briginshaw) passed round a plate exhibiting a bright line referred to a fortnight previously; the line was distinctly visible in the microscope when focussing.

A. MACKIE said a very good illustration of the effect in question could be seen in the portrait by Ives in the current YEAR-BOOK; in the companion picture upon an isochromatic plate the lines were absent.

W. E. DEBENHAM pointed out that, in mechanical processes, an imperfect means of pressure might bring about a similar result, and instanced some productions by the heliotype process.

F. H. VARLEY, F.R.A.S., then sketched an illustration upon the blackboard of the path of rays reflected from an object through canada balsam and other media in microscopic examination, and showed the effect of marginal rays crossing those which were more central, thereby causing confusion of a portion of the image. In microscopic work, he said, the bright lines would be absent if an achromatic condenser were employed. He then drew attention to a new kind of flexible charcoal he had made in thick and thin sheets, as well as in lengths, resembling in appearance ordinary sash line. It was said to be a series of tubes bundled together, thoroughly tenacious, and would withstand an enormous heat. Coloured solutions could be filtered through the sheets, and in most cases decolourised; while for analysis the residue could be examined in a blow-pipe flame. The flexible tube was said to give a much longer arc ($\frac{3}{4}$ of an inch) than hard carbon, and the increase in luminosity would be equal to raising a 30-candle incandescent lamp to 200 candles. A current equal to 120 volts would give 250-candle power. He also showed a mounted print which had been soaked in permanganate of potash solution to check fading; this it appeared to have done, although it had darkened the image considerably. A conversation on fading then took place.

J. B. B. WELLINGTON showed two negatives of the same subject exposed two and ten seconds respectively; they were about equal in density and detail. The former was developed according to Col. Stuart Wortley's plan, recently published, of commencing with a minimum of pyro; the latter was treated with a normal developer for four minutes; the former, however, required twenty minutes to produce a like result.

Deterioration of plates then became the subject of discussion, several members observing that plates of high sensitiveness appeared to be more difficult to keep in good condition now than formerly.

Talk in the Studio.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The first meeting after the recess will be held on Thursday next, Oct. 1, when, at the Society of Arts, E. Dunmore will read a paper entitled "The Troubles and Pitfalls of Out-door Photography," and W. M. Ayres and other members will exhibit some novelties in apparatus.

HULL AMATEUR PHOTOGRAPHIC SOCIETY.—The Council of this Society invite the co-operation of amateur photographers to take part in a prize competition to be held in the month of February next, the exact date of which will be published in the photographic journals. All pictures to be taken in Great Britain or Ireland and adjacent islands. Entries close on the 15th day of January, 1886. For further particulars, rules for competition, and entrance fees, application should be made to Mr. Stoakes, Hull Amateur Photographic Society, Whitefriargate, Hull.

FIRE IN A PHOTOGRAPHIC STUDIO.—About two o'clock on the morning of Friday, the 18th inst., a fire broke out in a corrugated iron building used as a photographic studio, adjoining Upton Lodge, Victoria Road, Twickenham, the residence of Mr. Sage. The flames appear to have made great havoc in a short space of time, the whole building being wrecked, and a large number of negatives were destroyed. The origin of the fire is unknown, though Mr. Sage is inclined to attribute it to spontaneous combustion.

PHOTOGRAPHY AND PHYSIOGNOMY.—The *Pall Mall Reviewer*, in a notice of Rosa Baughan's "Hand-Book of Physiognomy," says:—"Physiognomy may now be scientifically studied by means of composite photography, a process of which, as Miss Baughan makes no mention, she can hardly have grasped the importance, if she is even aware of its existence. But, after all, the method of visual observation is essentially that of composite photography, as is proved by our instant recognition of the types portrayed by it. Miss Baughan's eye is perhaps not so dispassionate as Mr. Francis Galton's camera; but it is an uncommonly sharp eye. Some of her points are put with startling force. For example, she describes a certain forehead that denotes sweetness and sensitiveness of nature; and adds that a woman with this sort of forehead could never be a shrew.

REDUCTIVE PROPERTIES OF PYROGALLIC ACID.—Cazeneuve and Linossier introduced a boiled solution of ferrous sulphate, and a solution of pyrogallic acid in boiled water, into a tube filled with mercury. Air (with its oxygen) being thus excluded from the mixture, no colour was produced; but the introduction of a little oxygen at once caused a blue colouration. The oxygen combined with the pyrogallic acid and the blue colouring matter is the product of the oxidised pyro acting upon the ferrous salt.

PHOTOGRAPHIC CLUB.—The subject for discussion on Sept. 30th will be "Sky Shades, and Shading the Lens during Exposure." Saturday outing at Earlsfiield, trains leaving Waterloo Station at 1.50 and 2.50 p.m.

To Correspondents.

*** We cannot undertake to return rejected communications.

JOHN JACKSON.—It is probable that you do not wash your prints very thoroughly before putting them in the toning bath.

REV. THOS. EVANS.—We have written to you, and will write again as soon as we have more information.

C. F. W. S.—Thanks.

E. DE H.—1. Perhaps seven feet wide, seven feet high, and fourteen feet long will suffice; if made larger, you will have some difficulty in doing as you propose. 2. Take protosulphate of iron $1\frac{1}{2}$ ounces, and dissolve this in 5 ounces of water. Then mix with it $1\frac{1}{2}$ ounces of nitrate of baryta dissolved in 15 ounces of water, filter from the dense white precipitate, and add twenty drops of nitric acid. 3. Any dealer in photographic materials can procure them for you.

D. M. S.—As far as we know, the articles cannot be bought there, and you will have to arrange with European houses to send them out.

W. F. DIXON.—1. Three ounces of carbonate of soda, and the same weight of carbonate of potash. 2. The difference is unimportant.

RAYNOR S. STEPHEN.—In our volume for 1884 all details will be found. See pages 13, 30, 44, 613, 691, 722, 750, 785, and 794. You can refer to it at our office.

W. F. F.—1. Keep the sheets well compressed in a printing frame. 2. There have been several articles on the subject lately; but we cannot tell you which one was referred to by our correspondent.

READER.—Order it from any dealer in photographic materials.

J. J.—Mix the colour with white of egg, and, when dry, coagulate the albumen by moistening it with alcohol.

J. G.—However small it may be, the liability is incurred; but the law is rarely or never enforced when the apparatus is used for experimental purposes.

AMATEUR.—1. A saturated solution of mercuric chloride. 2. The usual hyposulphite solution.

A READER.—The triplet is as suitable a lens for the work as you could employ. Wet the canvas by means of a garden syringe; this will make it much more transparent.

M. M. W.—1. It is quite easy to believe what you say, but there would be considerable difficulty in supposing the contrary. 2. Thanks.

J. A. J.—Judging from your rough sketch, the instrument either is, or has been, a quarter-plate portrait lens; but it is impossible to form any opinion whether it still retains the original glasses. A London pawnbroker usually asks about half a sovereign for such a lens if it does not bear the name of a well-known optician.

J. HAMPTON.—1. Carbonate of soda. 2. Carbonate of potash. 3. There is not any absolute necessity to wash, but it is advisable to do so.

F. B. M.—The probability of being interfered with is very small, unless you photograph the fortifications, or make an obstruction in the streets; but notwithstanding this, it is desirable to obtain a permit from the central police authorities, as this will command the assistance and countenance of all the subordinate officials. It is very desirable to be provided with a passport. Thank you for the photographs.

The Photographic News.

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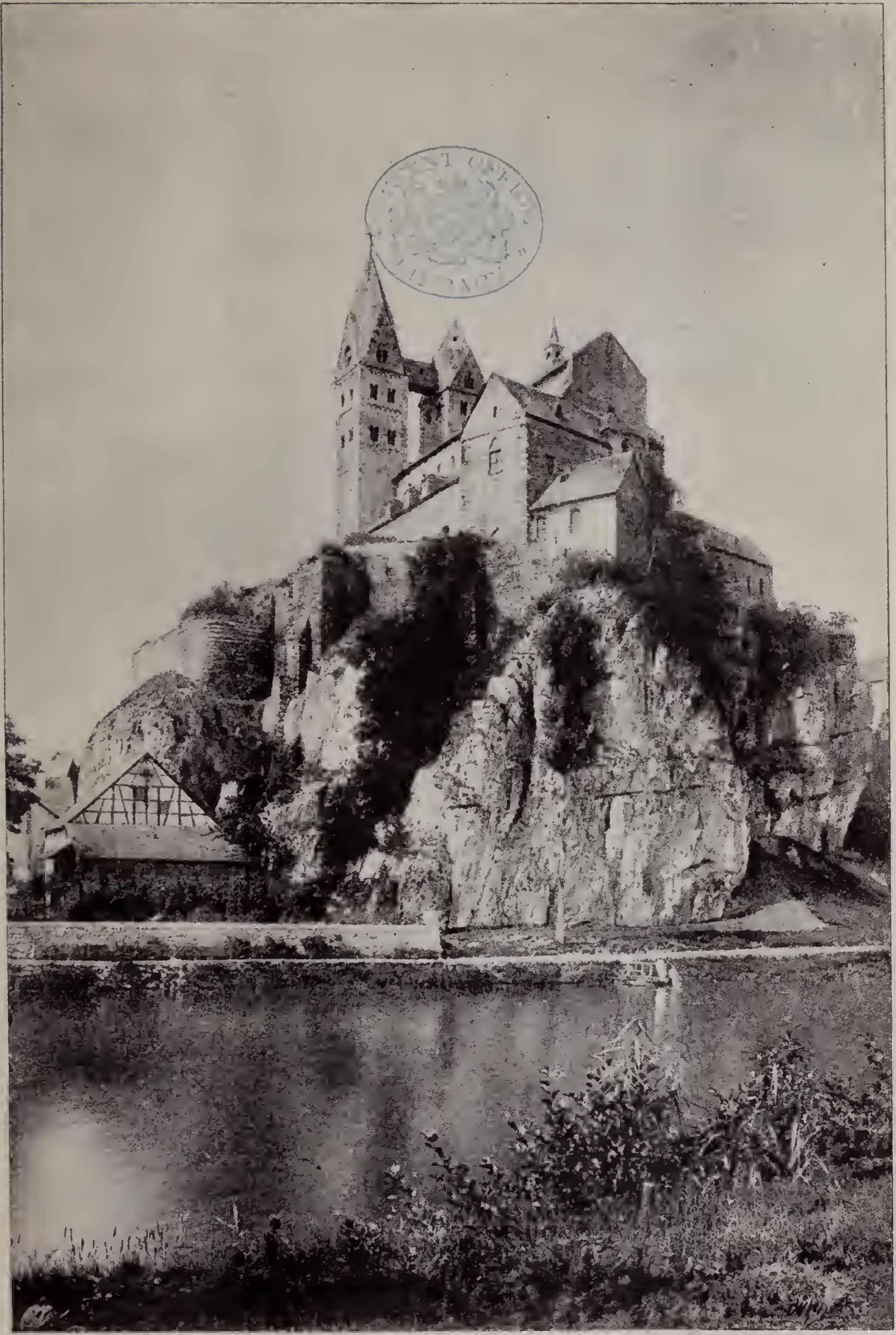

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1413.—*October* 2, 1885.

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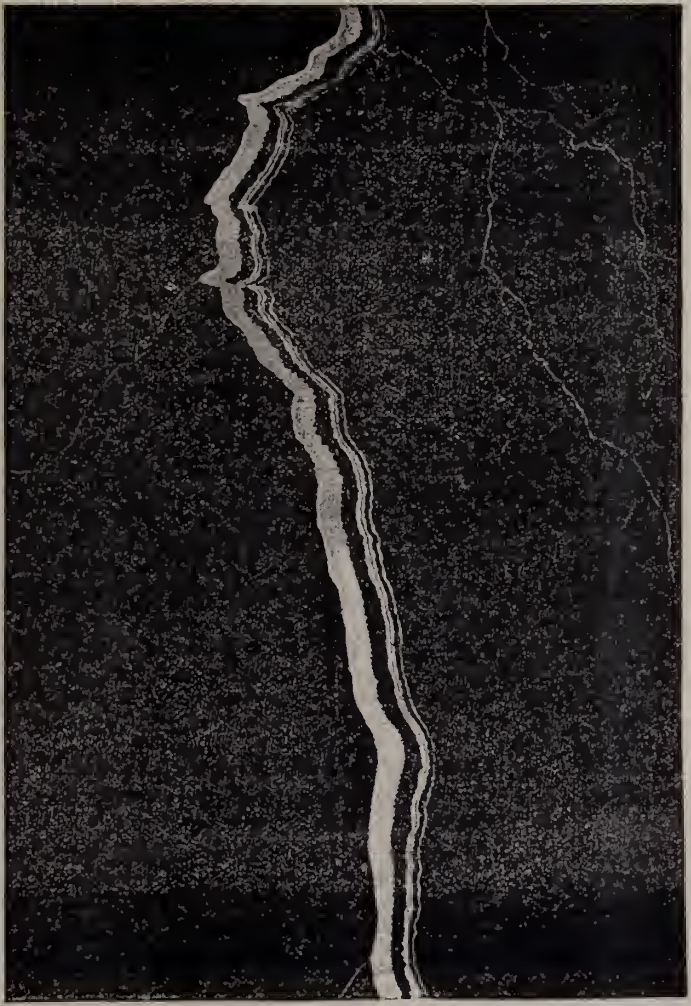
A NEW FEATURE IN PHOTOGRAPHS OF LIGHTNING.

More than once recently we have reproduced photographs of lightning in our columns, but a photograph by Dr. H. Kayser, which we now reproduce from the *Mittheilungen*, possesses characteristics which have never before been seen in a photograph of the electric discharge.



Not only are equatorial stratifications visible in the main flash, as is the case of a discharge in an exhausted receiver but there are four distinct lines of light running side by side, and these keep approximately parallel with each other through the whole course, as shown in the photograph.

As regards parallel lines of discharge, Dr. Kayser, writing in the *Mittheilungen*, points out that several theories may be propounded. To begin with, one may assume that the four lines do not belong to one and the same discharge, but are the result of four chance discharges from nearly the same point in the heavens; but the strict parallelism of the four discharges seems to disfavour this view. It is, indeed, clear that the four discharges must have passed through the same channel of heated air, and this within a very short time.

It may, indeed, be supposed that four discharges took place simultaneously; but here, again, the parallelism of the several discharges is unaccounted for, and it is perhaps more rational to assume that four discharges took place in rapid succession between the cloud and the earth. This assumes a very rapid flow of electricity towards the discharged part of the cloud, but this hypothesis would require the cloud to be a better conductor than we have reason to believe it.

The hypothesis that Dr. Kayser inclines to is that there are alternate discharges from cloud to earth and from earth to cloud, these discharges passing through the same channel of heated air; and he regards the separation of the discharges on the sensitive plate as a result of atmospheric movement or wind.

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METALLIC PACKING FOR DRY PLATES.

When one considers how many dry plates which have been kept much over six months bear obvious signs of having been damaged by vapours, which must either have originated in the packing material, or must have passed through it, one naturally asks whether a reform in the packing of dry plates is not much needed.

Not long ago we gave an account of the investigations on the deterioration of plates which were undertaken by the Society of Amateur Photographers of New York, the conclusion arrived at being, that both the wood of the ordinary plate box, and the paper of the usual dry plate package, are responsible for the ruin of very many plates.

Now there seems to us to be no valid reason whatever why paper and wood should not be abolished altogether in the packing of dry plates, and we may mention that we have kept plates packed in tin-foil for several years without observing any signs whatever of deterioration.

Two plates having been laid together face to face—care being of course taken to avoid any sliding motion calculated to cause abrasion of the film—the pair is wrapped in a sheet of tin or lead foil of such a size as to lap about half an-inch, and also to turn over at the ends to the same extent. The pairs of plates thus wrapped up may be piled into threes, and again wrapped in tin or lead.

Tin foil and lead foil—and more especially the latter—can be bought at a surprisingly cheap rate at the tin foil works in Leather Lane; so cheap, indeed, is the lead foil, that it is a question whether the mode of packing here suggested would not be more economical than the ordinary method.

A few words with respect to the efficiency of the protection against light afforded in the case of the metal-packed plates. In order to test this, we undid one of the larger packages in full summer daylight, laying the small packages of two on a table for two minutes; on exposure and development, no ill effect was noticeable. In order to further carry out our supposition that we had been unwrapping the package in order to satisfy an over-zealous Customs' House Officer, we took one of the packages of two to a rather dark corner, and unfolded the tin-foil at one end for an instant, so as to enable an observer to satisfy himself that the package contained two glass plates. These plates, when exposed and developed, merely showed a band of fog at one end, but this only extended an inch and a quarter inwards. It should be mentioned that a full exposure was given in the camera; had a short exposure been given, the fog would probably have overpowered the image, and been obvious over the greater part of the plates.

At the present time, metal plate-boxes are in the market, and, according to our experience, they are lighter and more convenient in every way than those of wood. Thus it will be seen that the photographer may, if he will, be independent of porous materials for packing his dry plates.

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ROYAL CORNWALL POLYTECHNIC SOCIETY'S EXHIBITION, 1885.

The fifty-third annual Exhibition of the above Society at Falmouth opened on Tuesday, September 22nd, when a large and distinguished company was present. The exhibition was opened at eleven o'clock a.m. for members, and at noon for the public, the address by the President (the Right Honourable the Earl of Mount Edgcumbe) being given at one o'clock p.m. On the platform (in addition to a large number of ladies) the company included:—Sir John St. Aubyn, Bart., M.P., Revs. Canon Tyacke, H. Molesworth St. Aubyn, B. Christopherson, F. R. Hole, W. Rogers, and C. W. Carlyon, General Alymer, Col. Tremayne, Colonel Maurice, Major Parkyn, Lieut. St. Aubyn, Dr. Jago, Lieut. Reed, R.N., Messrs. R. Carter (Mayor of Falmouth), M. H. Williams, Piers St. Aubyn, E. B. Beauchamp, E. S. Carns Wilson, Howard Fox, R. Fox, W. L. Fox, G. H. Fox, W. M. Grylls, W. N. Carne, H. Tilly, W. J. Genn, E. T. Anderton, H. S. McKenzie, J. H. Collins, F.G.S., W. F. Newman, T. Webber, R. N. Worth, F.G.S., G. Oliver, W. Brooks, E. Kitto, F.M.S. (Secretary).

The President, after expressing the pleasure that he felt at being present to open their Annual Exhibition, said that the Polytechnic still held its own, and was doing good work, and continued to fully deserve its name, by the large number of exhibits of so varied a character brought together annually within its walls. The President then mentioned several exhibits in the different departments—viz., mechanics, natural history, naval architecture, fine arts, and photography; and said he was pleased to tell them that the photographic exhibition was in advance of its predecessors, and that there was very little of what might be termed bad photography. He was very pleased to see that Mr. H. P. Robinson was again a contributor, his chief exhibit being very fine. Instantaneous photography was also very interestingly illustrated in the racing yachts by Messrs. West and Son, which were perfect in every respect. These had been awarded a first silver medal, as had also Mr. Robinson's exhibit. Mr. E. Milner's pictures of Henley Regatta, and the streets of London, were well worthy of careful inspection, and were masterpieces in their way, and had had a first bronze medal awarded them. The photographic appliance department was very good this year, and there was one special attraction which seemed to him to be very important, and that was, the roller-slide by Messrs. Eastman and Co., which had been perfected; and the paper used in it, when finished, was almost like a piece of finely-ground glass without texture. The Society had to thank Mr. Brooks for getting this important piece of apparatus down, and he (Mr. Brooks) was prepared to give demonstrations on it during the exhibition. This had also gained a first silver medal. The President said using paper instead of glass for negatives brought to mind the experiments he used to try in connection with *his uncle*, Mr. Henry Fox Talbot.

Sir John St. Aubyn then proposed a cordial vote of thanks to the Earl of Mount Edgcumbe, which was seconded by Colonel Maurice, carried with acclamation, and acknowledged by the President.

During the Exhibition, W. Brooks successfully demonstrated Eastman's roller-slide, paper, &c., to a great number of persons.

On Friday evening, at nine o'clock p.m., the annual drawing took place of the Art Union in connection with the Society. The awards made were in money amounts, and pictures *or photographs* on exhibition by professional artists were to be selected.

Subjoined is the Judges' Report of the Photographic Department.

The judges have great pleasure in congratulating the Society on the high excellence of the exhibits in this department, the number and quality of the exhibits being far above the average of past years, and they think it will not be saying too much by stating that it is their opinion that the present display is the finest that it is possible to bring together, and the matter of judging has been one of great difficulty in making the awards, owing to the high character of the work and the general evenness throughout. There are not so many landscapes as last year, but the Exhibition is strong in specimens of instantaneous work; this class of work is better than in previous years. In the amateur department several of the amateurs beat the professional workers. Transparencies and lantern slides are a strong feature this year by both professionals and amateurs. The photographic appliance department is well represented in cameras, instantaneous shutters, &c.; but the greatest feature of all in this department is the Eastman Company roller slide, which is well worthy of attention, being a new feature in photography, thereby making the photographer's luggage lighter, by using paper as a support for the sensitive film instead of glass. There are also several exhibits in the magic lantern department worthy of attention.

Professional Photography.—Mr. H. P. Robinson is again to the front with a very noble example of his work, "Dawn and Sunset" being in the opinion of the judges the finest picture he has ever produced; the conception is very fine, and the composition well carried out in all its points; this picture has been awarded the first silver medal. The same gentleman has also several other fine examples which deserve attention. Mr. R. W. Robinson has a very nice study, "'Twixt Cup and Lip," which is very fine. Mr. W. Gillard, of Gloucester, is represented in a different line of work; this year he sends some extremely fine examples of transparency work, which are most beautiful in tone, with force, brilliancy, and colour that cannot be surpassed: to this frame has been awarded a first bronze medal. The transparencies are made upon plates prepared by himself, and called the Pearl plates, which he has placed in the market, and by the same process he sends a frame of vignette portraits printed on matt opal, which are also very rich in colour.

In portraiture, Mr. W. W. Winter again secures a first silver medal for his portrait study, "Undecided," which is very graceful in pose, and well rendered in every detail. His other examples of the same character are very fine. Mr. L. Berry has some very careful works which are well worthy of notice. Mr. J. B. Maguire, of Jersey, contributes some very good work of a highly finished character. Mr. Whaite, who is an old contributor, sends some of his well-known studies, which are very soft and delicate; his frame of niggers is very amusing. Mr. J. Austin sends some examples which are fairly good. Mr. W. J. W. Stocks contributes some examples of his work. Mr. W. P. Marsh again sends some breaking seas on the beach, very similar to his previous exhibits. Mr. G. Renwick is highly commended for his picture "Preparing for a Rainy Day." Mr. E. T. Sheltor sends some good work, but highly finished. Mr. Fincham, of London, sends a frame of lantern transparencies which would have been better if of a warmer tone. Mr. G. Mold has a very good interior of St. Mary's Church, Banbury; his express train pictures are very poor; the time had better have been spent on a different class of work. G. Honey sends an enlargement of a small picture he sent last year, "Feeding the Swans," which is picturesque, but faulty in combination, part being apparently in the studio with a scenic background, and a part out of doors, which shows very plainly in the large picture. Mr. J. M. Brown contributes some 15 by 12 pictures of breaking waves, &c., which are good. Mr. John Terras sends some pretty little pictures (reminding us very much of Adam Distin's works) which show great knowledge, artistic taste, and careful study. Messrs. Morgan and Kidd show some good examples of enlarging on opal from carte negatives, but highly finished in black and white; another enlargement on paper of fishing boat, &c., No. 811, is awarded a first bronze medal, being very fine indeed. Mr. Hughes is represented by three frames, his figure study being the best.

Johnson Bros. have some very fair enlargements, the best of which is Henley Regatta. Mr E. Milner also sends two pictures of Henley Regatta, which are marvellous instantaneous productions, being perfectly sharp and fully exposed; also two London street views which are by far the best we have ever seen. Mr. Milner is in the employ of Messrs. Frith and Co., the eminent firm of photographers. Mr. J. P. Gibson has some charming pictures, beautiful in tone, and very artistically treated. "On the Allan" is awarded a first bronze medal. Mr. G. Whaley sends some very clever productions, one very amusing one which tells its own tale: "Only for my Ears," a postman reading a servant girl's love letter while she is stopping his ears with her hands while he reads. Mr. F. Argall, of Truro, has some clever figure studies, the best of which is "Rebecca at the Well," which is just a trifle too hard; but we are pleased to see him going in for this class of work, and hope to see more of his productions in the future. Mr. H. N. King exhibits six transparencies of interiors of Buckingham Palace, taken by permission of Her Majesty the Queen for publication; they are very fine examples of interiors.

"Yacht Racing," being a frame of racing yachts in full sail, by Messrs. West and Son, are wonderful specimens of this class of instantaneous photography, and are simply perfect, the cordage and everything being perfectly sharp. The difficulties must have been immense. The Society's first silver medal has been awarded to these.

Mr. J. H. Coath has three frames of portraiture, &c. Mr. Geo. Smith, of London, exhibits a frame of lantern transparencies by the Woodbury process, which have been awarded a second bronze medal; they are excellent in quality and good in tone. Mr. Geo. Hadley sends a frame of clever pictures which are very good.

Amateur Photography.—Mr. Geo. Bankart has been awarded a second bronze medal for his frame of landscapes, No. 833, which are very good, but would have been better if they had been a little warmer in tone. Rev. H. B. Hare again sends some very creditable work, No. 887, "Cows Drinking," being the best. Mr. E. Brightman has been awarded a first bronze medal for his production (No. 894), "The Village Smithy," which is capital. He has also many others of excellent merit. No. 910, "A Flash of Lightning," by Dr. Puddicombe, R. N., is very curious. No. 911, "A Nest of Birds," by Mr. A. G. Tagliaferro, although small, is exceedingly good. Mr. A. Pringle has been awarded a second silver medal for his architectural subjects—"Spanish Architecture"—which are very soft and delicate, and well up to the standard of that gentleman's work previously exhibited. He has also several other studies of very high order. Mr. J. G. Gibson contributes productions very varied in character, of very unequal merit, and very poor; an old vessel, "The Centenarian," is the best, but might have been improved had it been a little higher up in the plate. He also sends specimens of ferrotype work, quite out of place in an exhibition; these and his contributions of lantern slides, being very indifferent indeed.

Photo Appliances, &c.—Mr. George Smith, of London, exhibits a sciopticon lantern with several improvements, also Edwards' patent lantern slide changer which is very efficient for the purpose intended. A portable small camera, by the same exhibitor, is very ingenious, with several important improvements, which is very highly commended. Mr. J. H. Steward, of London, sends a very ingenious graduating diaphragm, and if adapted for use between the lenses, would be very valuable by way of preventing the losing of stops, or leaving them at home; they also send a very good form of lantern-slide changer (Rudge) which is very ingenious. A model photo camera, by Mr. Joseph Smith, is a very poor affair. The biophantoscope, by Mr. J. A. Rudge, is complicated, and in the opinion of the judges too elaborate to be of much use. Mr. Geo Hare, of London, sends his camera the same as he exhibited a year or two since, with several important improvements, being more compact and lighter, and is, in the opinion of the judges, the best and most simple camera, with every possible adjustment that is needed. It was awarded a first silver medal when last exhibited, which precludes it from again taking an award, but the judges very highly commend it, and they must not omit to mention the very simple finder that is attached to it, which is of the greatest utility for many objects. Sands and Hunter, of London, send several cameras, instantaneous shutters, &c., and are highly commended for excellence of workmanship. The most important feature in this department is the exhibit of Messrs. Eastman and Co, of their film roller slide, which bids fair to be a new era in photography. The workmanship is very fine and effective, and the judges have awarded them the first silver medal. By some means they have been able to get over a very great difficulty—viz., the texture of the paper; this they appear to have done perfectly, and when oiled it looks more like finely-ground glass than paper. The paper can be had any size, and is very suitable for enlarged negatives; the paper can also be used in ordinary dry-plate slides in small, light frames, which they also manufacture, which keeps the paper perfectly flat during exposure.

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SYMONDS' YAT AS A PHOTOGRAPHIC CENTRE.

BY T. CHARTERS WHITE.

"Symonds' Yat! Where is it?" I hear many enquire; and for the information of such inquirers let me say: "It is situated on the Wye, about midway between Ross and Monmouth, and easily accessible to dwellers in the great metropolis; being reached, *via* Gloucester, in five hours from the Paddington Terminus of the Great Western Railway."

If you ask the oldest inhabitant the reason of the name given to this place, he will probably tell you it takes its name from a gate once kept by a man named Symonds, gate being provincially corrupted into "Yat." This derivation may be doubted, but it is the general explanation given.

The valley at this part of the Wye runs nearly N.E. by S.W., and is formed by rocks whose altitude may be about 500 feet above the level of the river, and which rise in some places almost perpendicularly from its banks. They are covered for the most part by trees and undergrowth of various kinds, a bold bluff of limestone cliff occasionally projecting from amidst the verdure serving to add variety to the scene. The Wye has been described as the English Rhine; having seen the two rivers, I consider that, for condensed beauty, the Wye will bear off the palm. The Rhine, with its broad, flowing stream and its vine-clad slopes, is a noble river; but the Wye is characterised by a scenery of a different description—a scenery which appeals immediately to the eye of the lover of the picturesque. While the geologist, the botanist, and the entomologist will find abundant material for their favourite studies, ready to their hands and waiting to be gathered, the Yat is, for the photographer, a store-house of tempting bits of landscape scenery. The limestone of which the cottages are built lends itself favourably to photographic effect, whilst the irregular way in which they are dotted here and there amidst trees and rock, with a dash of the river thrown in, makes pretty pictures at every turn. The part of this locality specifically known as "the Yat" is a small flat piece of table-land at the highest point of the rocks about here, and is said to be 502 feet above the Ordnance sea level. The view, embracing as it does a panorama whose visual limit is the Wrekin in Shropshire, may be described as extensive, but it affords a good idea of the windings of the Wye, which may be seen pursuing its tortuous course for miles, sweeping round the base of the Yat in a great horse-shoe bend.

Crossing the Wye by the Symonds' Yat Railway Station the ferry-boat lands you beneath the great Doward rock, from whence a path by the river side leads into Monmouth (six miles). This path, for some considerable distance, is through a tunnel of hazel nut trees, which occasionally breaks, giving very pretty peeps of the river and the rocks on the opposite side. Several "shots" may be had down this path, the Dripping Well, the Seven Sisters' Rocks, and some very picturesque cottages near Leys House, and the seat of Mr. Bannerman, being well worthy of plates. If the enterprising photographer walks as far as Monmouth, the old Monnow Bridge, an antiquated gate of the city, will repay him for his trouble. Should he turn his steps eastward from the Yat, several pictures of great beauty may be found on the river's bank. Proceeding under Huntsham Hill, does his taste incline to archæology, a quarter of an hour's run by rail will land him at Kerne Bridge Station, from whence a ten minutes' walk will bring him to Goodrich Castle. The quaint old town of Ross is within half an hour's run of the Yat, where, on the old Market Hall, the church, and a view of the town from the river, a few plates may be exposed with advantage.

Thus the Yat forms a good centre from which to work with the camera; but to those who long after the excitement of such places as Scarborough or Margate, I emphatically say, stop away if they would not be killed by *ennui*; but to those who admire and love the quiet and satisfying rest to be found in the calmness of nature, in nature's own adornment, I say here is a garden of Eden: the air is laden with the perfume of wild flowers, and the only sounds which break on the ear are the ripple of the river as it flows over the stones, the songs of innumerable birds, and the constant hum of the insect world. There are no regular lodging-houses in this neighbourhood—these are abominations which, it may be hoped, are relegated to the far future—but a hospitable reception is sure to be accorded at Rocklea, where the obliging proprietors, Mr. and Mrs. Davis, will do all to accommodate those who avail themselves of this picturesquely situated home, even to the extent of finding a dark room in which to change or develop plates during the daytime, which is convenient in the midst of such photographic plenty; but, to be sure of this accommodation, it is necessary to write to Mr. Davis some time beforehand, as the house is not large, and, during the summer-time, is nearly always full.

There are one or two practical directions which may be useful in coming to this district with the camera: one is the absolute necessity for a short focus, wide-angle lens—for the rocks rise up in some places so abruptly from the bank of the river, that, without one, many "bits" of surpassing beauty have to remain untouched; while, for some of the views, nothing under a 20-inch focus would give an adequate idea of the extensive views to be taken. Again, the west bank of the river here can be taken at its best before noon, and the opposite side till daylight fades; but there are some parts which are well lighted throughout the day. I take leave of it for this year with regret that the brief vacation I allow myself must leave many points unvisited till a future to which I shall look with much longing anticipation.

TABLES OF SOME OF THE MORE COMMON PIGMENTS, WITH THE CHEMICAL SUBSTANCES FROM WHICH THEY ARE DERIVED, AND INDICATIONS OF THEIR PERMANENCY.

BY J. MILLER THOMPSON.

Table I.

	White.	
Cremnitz white	White lead	[$PbCO_3$, $Pb(OH)_2$].
Chinese white	Zinc oxide	ZnO.
Flake white	Basic nitrate of Bismuth	[$Bi(NO_3)_3$. $2Bi(OH)_3$].
Pearl white	Bismuth oxychloride	[$2(BiCl_3$. $Bi_2O_3)$. H_2O].
Constant white	Barium sulphate Barium tungstate	$BaSO_4$ $BaWO_4$
Tin white	Tin binoxide	SnO_2.
	Yellow.	
King's yellow	Arsenic sulphide	As_2S_3.
Cadmium yellow	Cadmium sulphide	CdS.
Platinum yellow	Platino-chloride of potassium	($PtCl_4$. $2KCl$).
Turner's yellow Mineral yellow	Lead oxychloride	($PbCl_2$. $7PbO$).
Turbith mineral	Basic mercury sulphate	($HgSO_4$. $2HgO$.).
Chrome yellow	Lead chromate	$PbCrO_4$.
Zinc chrome	Zinc chromate	$ZnCrO_4$
Lemon yellow	Barium chromate Strontium chromate	$BaCrO_4$. $SrCrO_4$.
Naples yellow	Oxides of lead and antimony	$PbO+Sb_2O_3$.
Yellow ochre	Ferric hydrate and clay	[$(2Fe_2O_3$. $3H_2O)$.+Clay].
Mosaic gold	Tin bisulphide	SnS_2.
	Red.	
Red lead	Lead oxides	[$3(PbO)$. PbO_2].
Vermilion	Mercuric sulphide	HgS.
Purple red	Basic mercury chromate	($HgCrO_4$-HgO.).
Iodine scarlet	Mercuric iodide	HgI_2.
Realgar	Arsenic sulphide	As_2S_2.
Red ochre Colcothar	Ferric oxide	Fe_2O_3
	Green.	
Chrome green	Chromic oxide	Cr_2O_3.
Cobalt or Rinmans' green	Oxides of cobalt and zinc	($CoO+ZnO$.).
Mountain green	Green malachite	[$(CuCO_3)$. $Cu(OH)_2$].
Scheele's green	Copper arsenite	$CuHAsO_3$.
Verdigris	Basic copper acetate	[$Cu(C_2H_3O_2)_2$. $CuO.6H_2O$].
Emerald green	Acetate and arsenite of copper	[$Cu(C_2H_3O_2)_2$. $CuHAsO_3$].
Terraverte	Clay coloured with iron and manganese	
	Blue.	
Ultramarine	Silicate of aluminium, and sodium with sodium sulphide	$Na_2Al_2Si_2O_8Na_2S_2$.
Mountain blue	Blue malachite	[$2(CuCo_3)$. $Cu(OH)_2$].
Smalt	Cobalt and potassium silicate	CoK_2SiO_4.
Antwerp blue Insoluble Prussian blue	Ferric ferrocyanide	Fe_4Fcy_3
Soluble Prussian blue	Potassio ferric ferrocyanide	$K_2Fe_2Fcy_2$.
Indigo		$2(C_8H_5N_3O_2)$.
	Brown.	
Manganese brown	Manganese dioxide	MnO_2.
Vandyke brown	Ferric oxide	
Burnt sienna Burnt umber	Clays coloured with oxides of iron and manganese	
	Orange.	
Orange chrome	Basic lead chromate	$PbCrO_4PbO$.
	Black.	
Black lead	Plumbago or graphite	Carbon+ash
Mineral black	Impure graphite	
Lamp black	Soot from resins or tar	
Diamond black	Impure lamp black	Artificial varieties of charcoal with greater or less impurities.
Spanish black	Charcoal from cork	
Ivory black	Charred bones	
Blue black	Charcoal from vine twigs Cocoa nut and peach stones	

Table II.—Pigments liable to Change under the Influence of Sulphuretted Hydrogen, Air, and Moisture.

White.—Cremnitz white—Flake white—Pearl white.

Yellow.—Turbith mineral—Chrome yellow—Mineral yellow—Naples yellow.

Red.—Red lead—Purple red—Iodine scarlet.

Green.—Verdigris—Scheele's green—Emerald green—Mountain green.

Blue.—Prussian blue—Antwerp blue.

Orange.—Orange chrome.

Table III.—Pigments little liable to Change under the Influence of Sulphuretted Hydrogen, Air, or Moisture.

White.—Zinc white—Constant white—Barium tungstate—Tin white.

Red.—Vermilion —Red ochre—Indian red—Madder lakes.

Yellow.—Yellow ochre—Barium chromate—Zinc chromate—Aureolin—Platinum yellow—Raw sienna.

Green.—Chrome greens—Cobalt greens.

Blue.—Ultramarine—Smalt—Thenard's blue.

Brown.—Vandyke browns—Raw umber—Burnt umber—Manganese brown—Sepia.
Black.—Ivory black—Lamp black—Indian ink—Graphite.
Orange.—Orange vermilion—Burnt sienna.

Table IV.—Pigments liable to Deterioration when in contact with White Lead.

Yellow.—Yellow orpiment—King's yellow—Indian yellow—Gamboge.
Red.—Iodine scarlet—Cochineal—Carmine.
Orange.—Golden antimony sulphide—Orange orpiment.
Green.—Sap green.

Table V.—Pigments which are little affected by Heat, and may be employed when the Material has to stand the Fire.

White.—Tin white—Barium white—Zinc white.
Red.—Red ochre—Venetian red—Indian red.
Yellow.—Naples yellow—Antimony yellow.
Green.—Chrome greens—Cobalt green.
Blue.—Smalt and Royal blue—Ultramarine.
Orange.—Burnt sienna—Burnt ochre.
Brown.—Burnt umber—Manganese brown.
Black.—Graphite—Mineral black.—*Cantor Lectures.*

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ON SOME AID RENDERED BY PHOTOGRAPHY TO GEOLOGY.

BY W. JEROME HARRISON, F.G.S.

Photography has rendered aid, in turn, to nearly all of the sciences; but I wish to note here just three cases which have lately come under my notice where it has been specially serviceable to geology.

In 1858 the question of the antiquity of man was brought prominently before the public by the discovery of flint implements—clearly fashioned by human hands—in certain gravel beds at St. Acheul, a suburb of the town of Amiens, in the north of France. These gravel-beds were deposited at some former period by the River Somme, but as the river now runs at a level *ninety feet below* these old gravels, it was admitted by all that the gravels were of very great antiquity. Besides the flint tools, these gravels contained many bones of animals, some of *extinct species*, such as the mammoth, cave-bear, &c. The French archæologists, M. Boucher de Perthes and Dr. Rigollot, had already collected hundreds of these flint implements from the gravel-beds when the question of their age was brought before the geological world. The leading men of science—both of England and France—were not at all prepared to accept the evidence afforded by the flint implements without strict investigation, and some of them, indeed, pooh-poohed the thing altogether. They insisted that the flints might have been made by the workmen engaged in the gravel-pits for the sake of the recompense they obtained when they found one (and certainly it was true that all the specimens hitherto discovered had been purchased from the men, or picked up on the floor of the pits). Others, more generous, believed in the authenticity of the specimens, but suggested they had been dropped down to the depth in the gravel-beds at which they were found, either by a settling of the strata, or through some crevice in the beds.

It was to settle this most interesting question that Mr. Prestwich (now Professor of Geology at Oxford) visited Amiens in the autumn of 1858. He superintended fresh excavations by the workmen, and shortly had the pleasure of uncovering with his own hands the end of a fine, well-shaped flint hatchet, lying at a depth of seventeen feet from the surface. This was convincing enough for Mr. Prestwich, but he wanted to equally convince others; so, fetching a photographer, several capital negatives were secured showing the tool still embedded in the strata, and showing also, what was equally important, that there were no signs of any vertical rents, breaks, or any disturbances whatever in the over-lying beds of sand and loam; which, indeed, contained many fresh-water shells, and had evidently never been disturbed since they were deposited, long ages ago, by the River Somme.

The photographs so secured were presented to the Royal Society, with the talented geologist's report, and carried conviction to many minds, so that many other inquirers visited St. Acheul, including Mr. James Wyatt, who, on his return to England, set to work and succeeded in finding precisely similar specimens in the gravels of the Ouse at Bedford.

The enormous period of time for which man has been an inhabitant of this earth is now clearly recognised, and no small share in the obtaining of this speedy recognition is due to Mr. Prestwich's photographs.

The second instance to which I refer was connected with the discovery by Dr. Rivière of a skeleton of one of the early men by whom the stone tools were fashioned and used, and who were undoubtedly ignorant of the use of metals. It is singular that the bones of these early races of mankind should be so scarce; their weapons we find in plenty, but of their bones hardly a trace. It was, therefore, a grand event when Dr. Rivière came across a complete skeleton of a Palæolithic (or early stone-age) man in a cave near Mentone in the South of France, in March 1872. He had been excavating in a shallow hollow in the rocks when he found the bones of a human foot, and this encouraged him to completely excavate the cavern, which proved to be of great extent, forty-five feet in length—running north and south, opening towards the south—and of great height. The skeleton lay at a depth of seventeen feet, and twenty-four feet from the entrance; surrounding it and above it were fifty rude flint flakes and scrapers, with many bones of animals, some of extinct species, but no trace of metal, pottery, or polished stone. The bones were those of a man five feet nine inches in height; the skull was of a red colour, and was covered by a chaplet of perforated shells and teeth of stags. There the skeleton lay, a grand sight for the geologist or the student of prehistoric man. But how to preserve a record of its exact disposition and appearance, a thing especially important, as the manner in which the body was laid out for interment—whether on the back, or side, outstretched, or with the knees drawn up—is one of the characteristics by which its probable antiquity may be determined. Fortunately the sun shone right down the cave, and it was an easy matter to secure an excellent photograph of the bones before they were disturbed.

Very many cases have occurred of the uncovering of skeletons and other objects in burial grounds, and even of the illustrious dead in our cathedrals, &c., where all trace of the objects faded away in a few minutes after exposure to the air; the bones crumbling to dust with a touch. If the forethought had been taken to have a camera at hand, other pictures might have been secured of great value to the scientist and the historian.

Lastly, I am sure no one will acknowledge more freely the aid which photography can render to geology than that excellent geologist Dr. Johnston-Lavis, F.G.S., who is employing the camera freely as an aid to his studies of the volcanic phenomena of Vesuvius; studies which have now extended over some considerable time, and which are encouraged and aided by the British Association.

All volcanic regions are subject to rapid changes of form and level, and a record of such change is of the highest importance in the study of volcanology. The cone of Vesuvius, we know, has undergone most wonderful changes in the past. The hill called Monte Somma, and the lower elevation of La Pedimentina, are relics of an old cone of far greater dimensions than the existing one; and a series of photographs showing the condition of the volcano at regular and frequent intervals since that mighty eruption in 79 A.D., which overwhelmed Pompeii, would indeed be interesting and important. But if it is not possible to now recall the past we can at least provide for the future.

And this is just what Dr. Lavis is doing by securing, almost daily, photographs of the crater, plain, and the interior and exterior of the cone of eruption. These change rapidly, sometimes within an hour or two, and the changes afford an important clue to the nature and action of the important, but as yet somewhat mysterious, forces which are at work beneath Southern Italy. Dr. Lavis's photographs will be reproduced in a journal which is published by the Naples section of the Italian Alpine Club.

In writing these few lines I have merely jotted down the first three instances which occurred to me of the aid which photography has been able to render to one science only, viz., geology. Did time and space permit, books might be written describing the assistance which this young art—not yet half a century old—has rendered in all branches of science and art. And yet nine out of ten people still think of photography as simply a mechanical method of taking portraits. Let it be the task of photographers—and more especially of amateurs—to show of what infinite applications, and those of the highest and most accurate nature, photography is capable.

M. DAVANNE AND M. LEON VIDAL AT THE INAUGURATION OF THE POITEVIN MEMORIAL.

M. Davanne, President of the Commission of Administration to the Photographic Society of France, was called upon to speak at the unveiling of the bust of Poitevin at Saint-Calais. He drew a comparison between the memories clustering round Admiral Chanzy, whose statue had just been raised at Mans, a neighbouring town, and those connected with Poitevin, essentially a man of peace and of great modesty. He continued :—As in the army and navy, so in science, there arise shining lights who seek for the right point to be struck. Some open an entirely new way leading towards the path of progress; Nicéphore Niépce was one of these. Others enlarge the way and render it practicable for us; such was Daguerre. And there are still others who connect this byepath, as it were, with great scientific, artistic, or industrial tracks tending to an infinite progress, giving fresh support to the peaceful conquests of intellect; of this last was our illustrious Alphonse Poitevin. Engineer at the central school, his life opened out to him what promised to be a tranquil career in his chosen profession; but from the first he was led away by the charms of photography as displayed in the processes of Nicéphore Niépce, Daguerre, and Talbot. He was soon struck with the thought that, as engraving and lithography copied in large numbers, and at low prices, works executed by hand, might not photography, capable of retaining an impression of anything reflected by light, be made to do more than produce slowly, and at great expense, prints of a fleeting nature. M. Davanne concluded by thanking M. Charles Gauthier, sculptor of the bust, and M. Forget, who designed and executed the plans of the pedestal, for coming forth so nobly, employing the entire resources at their command in the material realisation of their work. He then presented the monument to the Mayor and Corporation for the town of Saint Calais.

M. Léon Vidal, after speaking in glowing terms of the honour and riches a scientific man confers upon his country, foretold that the name of Poitevin, now unknown to many, would, a few years hence, takes its place with those of Nicéphore Niepce and Daguerre, and stand as a follower of Guttenberg, inventor of printing, and Senefelder, inventor of lithography, continuing their work.

He then referred to the numerous applications of photography, the principal processes of which are all due to Poitevin's research.

He next enlarged upon Poitevin's experiments with bichromated gelatine, and explained, in detail, the process of rendering it fit to be used as a lithographic stone. It is almost incredible that the image thus mechanically disposed on the gelatine and transferred to paper, should have all the delicacy and modelling of images chemically obtained by ordinary photography, and on this point, unless one is perfectly initiated in these processes, one often cannot distinguish a chemical image from a mechanical print.

M. Vidal then spoke of Poitevin's use of carbon as a permanent colouring matter, and the various processes by which prints were struck in indefinite numbers, as in a regular printing office, and how these researches are now practically bearing their fruit. Poitevin, time after time, sought to break the barrier between the arts of printing and photography, and owing to his researches are we almost entirely indebted for this alliance between the old and new processes. By studying the properties of bichromated gelatine, he investigated processes in permanent photography, which we call now carbon or fatty ink. His experiments with salts of iron are practically tested this day by large firms requiring tracings for outline and shaded subjects, and he furnished great facilities in the decoration of ceramics. Scientific circles appreciated his work and encouraged him; but the ideas of an inventor are often not fitted for wholesale manufacture, and during the latter part of his life he was saddened, disillusioned, and depressed, yet still diligently working on, sending communications to scientific societies, which still kept up the *prestige* of his name. To prove the importance of his work, I will cite some of the honours he gained. In 1862, after the London International Exhibition, he was nominated *chevalier* of the Legion of Honour; in 1865 he took the prize of 10,000 francs, offered by the Duke D'Albert de Luynes, for producing an image with carbon, and in 1878 every nation united in declaring him as the international contributor to all photographic progress. A gold medal was given him, and a suitable reward was asked for, but the state of finances did not permit of it. Dumas, one of his pupils, proposed him for the prize of 12,000 francs offered by the Marquis d'Argenteuil through the *Societe d'Encouragement*, and was so anxious about it that he said: "If he does not get it during my lifetime, I will put down in my will that it is my great wish that the prize be awarded him." Both lived to see the desire fulfilled. On his death there was a great wish felt to perpetuate his memory, and what was to have been a bas-relief on his tomb, is now this monument. Thus it comes to pass that, to Nicéphore Niepce, Daguerre, and Poitevin, photography owes its invention, and most of the finest methods of its application. Last year, Daguerre's memory was honoured at Cormeilles-en-Parisis, Niepce but a few weeks ago at Chalons-sur-Saône, and now today it is the turn of Alphonse Poitevin.

Notes.

The Photographic Exhibition—which opens to the public on Monday next, the 5th of October—may fairly be taken as the pulse of the photographic workers in this country, and we are informed that a notable feature will be the exceptional excellence of the work done by the newer generation of photographers.

One point likely to be illustrated by several good but small pictures is the power which gelatino-bromide gives of making figure studies in dim or partially-lighted interiors. In the old days of photography—that is to say, the days of wet collodion—photographs of such subjects had to be made by the patchwork method known as combination printing; and notwithstanding the circumstance that such productions may at the first glance excite a momentary impulse of admiration on account of their loud and theatrical character the impulse of admiration only too often gives way to a sensation of disgust when it is seen how parts of various photographs utterly and entirely inconsistent as to lighting have been brought together on one sheet. "Sheet" is about the only term one can apply to a combination of incompatible photographs; certainly neither "picture" nor "photograph" is a correct term.

Although many combinations of photographs—perhaps, indeed, the majority—are bad, incongruous, and inartistic, there are notable exceptions to the rule. Real pictures have been produced by combination, and much credit is due to those who have made them; but the instances are few and far between. Bad combination is generally most apparent in the lower part of the sheet, and shows itself notably by the contrast between the lighting of the parts printed in, and of the immediately adjacent objects. Sometimes the line of junction, or stippling done to cover it, is clearly obvious; but this is simply the result of bad manipulation.

Rock salt is superior to all other substances in its power of transmitting rays of low refrangibility. At the recent meeting of the American Association for the Advancement of Science, that able worker, F. Brashear, read a paper on a practical method of washing rock-salt surfaces for optical purposes.

With a lens made of rock salt it might be possible to photograph in the dark! Abney has succeeded in preparing plates which are sensitive to the rays lying beyond the red end of the spectrum—the dark heat rays—and with such plates used with a rock salt lens there should be a possibility of photographing bodies which possess a high temperature, although that temperature may be far below that needed to render them self-luminous. It is even possible that such a plan may some day be so perfected as to give us information about the "dark suns," that are believed to crowd the firmament—or rather heavenly bodies, which once were seen, but have now cooled down so as to be invisible.

Among the indirect consequences of the fall in the price of silver, may be the break up of the Latin monetary union. At the present moment that two-franc piece with which the tourist pays for his cab fare at Rome, Berne, Paris, or Brussels, may have originated in any one of some half-dozen nations. Should the Latin union not be renewed, the monetary cares of the tourist will be greatly increased.

Last week we commented on the unpleasant incident of which a photograph of Mr. Parnell was the innocent cause in Ireland. Within a few days a photograph of the Comte de Paris has led to "a scene" in one of the principal streets of the French capital. In the latter case, however, the author of the disturbance was far too excited at the sight of the offending portrait to go in and quietly buy it as a preliminary to wreaking his vengeance upon it. He adopted the more summary process of smashing the window in order to get at it, and, when ultimately arrested, was loudly expressing his determination to smash pretty well nigh everybody and everything.

Now it is not at all as a political demonstration we wish to notice this iconoclastic Parisian's proceeding. It is rather to point out what an evident risk is run by photographers and photograph sellers who in these excitable days exhibit portraits of men of light and leading in their windows and show-cases. Of course they would not object if, as in the case of Captain Foster and Mr. Parnell's carte in Ireland, the offending photographs were duly bought and paid for before being sacrificed to the political antagonism of their purchasers; but they cannot protest too strongly against the smashing of the plate-glass and their stock-in-trade by rowdy political partisans. For the chances are that if this kind of thing is not stopped, the undesirable process will be developed farther, and the photographers themselves probably included in the smashing.

Hitherto, in times of intense political excitement, it has been the newspaper office or the candidate's head-quarters whose windows, as a rule, have received the attentions of the mob; but now, unless all portraits but those of neutral celebrities are carefully removed from sight, it would seem that photographers' panes will be some of the first to suffer. We need scarcely say how very hard this is on the photographic artist; and how illogical it is to treat a man who takes a politician's likeness as though he thereby committed himself to taking his side also. But political mobs, sad to say, are illogical, and will be only too apt, judging from recent events, to treat such photographs as we have alluded to as though they were party flags or emblems. It seems highly ridiculous to think of such a thing; but it really appears to be possible that in Paris, on the day of the coming elections, the photographers' shops will have to be shut and barricaded!

An exhibition is to be held in Carlisle shortly under the auspices of the recently-formed Amateur Society of that place. The president of the Carlisle Amateur Photographic Society is the Mayor of Carlisle, and H. Y. Thompson, L.S.A., is the Secretary.

A large phototype of a silver mining property is issued with the prospectus of a stockbroker who invites speculators to invest. How the photograph bears on the richness or poorness of the mine it is difficult to imagine.

Brooks, the supposed murderer of Preller, at St. Louis, has good reason to hate photography. It will be remembered, as we stated some time ago, that his identification with a native of Stockport, Cheshire, was pretty well proved by photographs of two magic lanterns, which magic lanterns were in his possession. The proof is now completed by the reception by the Stockport police of photographs of Brooks' mother and sister, which were found on the person of the suspected man when arrested.

It is quite possible that the time may come when portrait photographers will be skilled physiologists as well as physiognomists. Wrinkles and the difference between those caused by mental emotions and those caused by age we alluded to some time ago in referring to a book on the subject. The moral obviously in this case is that the photographer who wishes to flatter should know scientifically how to proceed in retouching these wrinkles so that the sitter may appear in the best light, and yet not lose an atom of likeness. It now seems, according to a keen critic, that when a woman reaches the age of forty, a peculiar bend in the shoulders just below the nape of the neck uncompromisingly proclaims the fact unless the lady is always on her guard. Sarah Bernhardt, it is said, has just began to betray this sign of age. Photographers, therefore, must not forget, when ladies of forty sit to them, to look well after "the bend in the shoulders just below the nape of the neck."

If other lady models follow the example of Miss Dorothy Dene, and are photographed, what interest there is in Academy Exhibitions will stand a good chance of evaporating. To recognise in an Ariadne, an Andromeda, an Atalanta, the portraits of the Misses Smith, Jones, and Brown, would be a slight damper on the imagination. As it is, the meeting of the same face in the gallery in half-a-dozen different pictures is disagreeable; but it would be ten times worse if the public knew the faces of the models from photographs before they saw the pictures. We hope, therefore, that lady models, however charming they may be, will refrain from selling their faces to the photographer.

A girl standing at a cottage door, or elsewhere in the open air, shading her eyes from the sun, is a somewhat favourite pose with photographers who go in for making pictures. If any one has sent in a picture of this kind to the Pall Mall Exhibition, it is to be hoped he has been true to nature, and made his model hold her palm upwards. According to an American observer, a woman always shades her eyes in this manner, so that the back shall not be sunburnt. During the American Civil War, a woman in the army in male attire was discovered by this gesture.

We cannot say we are surprised at the complaint of the Washington photographers, that the pictures of the officials of the new Administration do not sell. The wonder is that these photographs should ever be enquired for; yet there seems formerly to have been a demand for them—not, indeed, by the residents of Washington, who soon became familiar with official greatness, but by visitors, and especially lady visitors. This year, it seems, there have been few lady visitors to Washington, and business, so far as sales go, is very quiet. If photographs of the members of a new Administration do ever meet with a sale in America, the interest in politics must be much keener than in England. What portraits of the present Ministry, save those of Lord Salisbury and Lord Randolph Churchill, does one ever see in the London shop windows?

It is clearly the duty of everybody to be photographed. No one knows when greatness may be thrust upon him or her, and if photographs were always at hand, editors of illustrated papers would be saved no end of trouble. A case in point. William Morris, the artist, poet, and socialistic leader, was much wanted this week—that is to say, his features were. The editor of the paper in need of Morris's portrait had no time to lose over the matter, and, jumping into a Hansom, he paid a round of visits to the various publishers of socialistic publications. Not one had either a photograph or print. A shopman at one of the establishments believed a portrait of Morris had once appeared in a periodical, but what periodical he could not remember. At another establishment the editor was told by an assistant that there was only one shop where a portrait of the distinguished socialist could be obtained, but who kept the shop, and where it was, the assistant was entirely unable to recollect. "Was it any use going to Morris for a photograph?" asked the editor at the head-quarters of the League. The officials did not think it was. Morris had a strong objection to sit for his portrait. The editor was in despair. At last it was suggested that he might be seen in the flesh that evening at the head-quarters. The hint was taken. Our artist made his appearance, interviewed the poet, who made not the slightest objection to being sketched, and away went the artist rejoicing.

A neat distinction between art and science was made the other day by Sidney Webb in the course of a discussion at a meeting of the Fabian Society. Every science has for its end the mere acquisition of knowledge, and consequently it has neither end nor aim; the investigator must simply follow where he is led. An art is, on the other hand, a scheme towards some definite end. Art and science are thus perfectly distinct, and can never lie in the same plane. We are not at all sure that the above words are those of Mr. Webb—who, by the bye, is Professor of Political Economy at the Working Men's College—but it is their sense. We fear Mr. Webb would be much scandalized at the mongrel term, art-science, as often applied to photography.

CLOUDS, AND HOW TO GET THEM.

BY BENJAMIN WYLES.

> "Things the angels weave for us daily, yet vary eternally."—*Ruskin.*

Very few subjects yield such poetic results in the camera as well-selected and well-photographed cloud effects; in most departments the photographer has to trust more or less to composition according to the best of his own knowledge, or at least he will be subject to the variations that may be caused by his aptitude, or want of it, in selecting his point of view. Here the composition is always being made for him by an infallible hand, and the most he has to do is to see what comes in his way, or to wait its forming. Some difficulties attend work of this sort, but experience will soon eliminate these, and make it not only a practicable, but a pleasurable pursuit. Certainly in my own case there are few greater pleasures than being out and about on a day when fine atmospheric effects are rapidly succeeding each other; and there are few classes of work, perhaps none, in which there would be so much of the satisfactory assurance of success that gives the feeling of mastery and enjoyment in the work.

The first necessity is not only a clear atmosphere, but an open range of space, a low horizon line, the seaside if possible, failing that, a flat country where the fewest possible big trees interfere. The obvious reason, of course, is mechanical, to see our subjects, but there is a secondary advantage in such situations not usually reckoned with; it is said the sky effects over broad expanses yielding evaporation are actually finer. David Crow sought such subjects on the sandy expanses of the Lancashire coast, and the fens of Lincoln and Cambridge are credited with specially fine sunset effects.

Given an open space, then, a few hints may not be amiss how best to photograph these fleeting "things of beauty" from one who has done it. Gelatino-bromide is so universally used and so convenient, that it must perforce be the medium, though it is undoubted that for this particular class of work wet collodion would yield equal results, and be far easier to manage in some respects; the very qualities of quickness and delicacy which constitute the charm of gelatine provide its difficulties for this work, and I may confess that the old love stood out longer in this department than in other things. The kind of plate is important; in the present craze for rapidity, it sounds almost heresy to say a word against it, and in favour of a slow plate, but I must indulge in the heresy—it is quality that is wanted; a plate with plenty of emulsion on it, capable of recording a wide range of tones, and this is usually found with plates of only moderate speed, such as would be recommended for landscape that would tend towards vigour and pluck, rather than to extreme speed and flatness.

The developer should contain a large amount of restrainer if pyro ammonia is used, and the smallest possible quantity of ammonia that will set the picture slowly developing. The details are sure to come; the difficulty is to prevent them coming *too much*, and getting hurried. Time is an important item; don't hurry. Hurry is the enemy of good development at any time; in this special work it is fatal. When the picture is well advanced, ammonia may be added more freely. Neither flatness nor fog will accrue once the early stages are passed; but the addition should be only for the final forcing of density when the picture is a long way on towards completion. But although pyro ammonia is almost universally used, I would strongly recommend the alkaline carbonates, especially ammonia carbonate. A comparison of its results with those from liquor ammonia, worked at its best, using the same plates, subjects, and exposures, unequivocally result in a verdict in favour of the carbonate. The picture comes up very gradually. Any amount of detail is obtainable—that is simply a question of time—but the quality is different, more variety of half-tone, greater range from light to shade, and a richer-looking picture altogether, apart from the mere question of colour. Its strength is that usually employed—25 grains of carbonate, and two of pyro to the ounce.

It is most important for success in this work to acquire some judgment as to what clouds will photograph satisfactorily; the form may be grand, the colour delightful, but it may be well to enjoy the sight of both, and leave the camera at rest. There must be contrast. The instrument will, therefore, mostly be printed directly on, or not far aside, from the sun. As a rule, it will be useless to attempt front lighted clouds, *i. e.*, such as you would get with the sun behind the camera; these give no relief, and it is all but impossible to score a success from them. In this position the colour will be pre-eminently beautiful for chaste, quiet delicacy as removed from the strong, showy effects near the sun, but for the special work of photography it is well nigh out of court. Again, strongly coloured clouds seldom photograph satisfactorily; grey clouds must be sought, the energy running into light and shade, rather than colour. It is generally said that certain months are specially favourable for this work; my experience does not endorse that; I have found fine effects at all seasons, I think. The weather is of course important, all important, but the right sort for this seems to come almost regardless of seasons, and for a good long time may not come at all.

Little need be said about the optical condition of two lenses; if there is any difference in their working as regards clearness and brilliancy, it will "tell out" in a very pronounced way in this work. Hence the old simple form is unsurpassed, though I have used both the rapid symmetrical and the rectilinear most successfully. In shutters, operators like to please themselves. I have used various forms, and generally return to the old love that exists in the shape of a home-made "rise and return" article that was figured some years since as Harrison's shutter; it is not very handsome, capable of little adjustment, but with the smaller stops gives just the exposure, and never shakes. The best work has certainly been done with it.

With the facilities for getting good cloud forms—the ease with which they may be printed-in, the very obvious evidence in themselves as to which will suit any special picture—flat, uninteresting skies, ought to be things no longer tolerated in our pictures.

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Patent Intelligence.

Applications for Letters Patent.

11,317. Harry Lucas, Little King Street, Birmingham, for "Improvements in photographic apparatus."—23rd Sept., 1885.

11,339. Fox Shew, 8, Argyll Street, Regent Street, London, W., for "Improvements in means for actuating the shutters of photographic cameras."—23rd Sept., 1885.

11,446. Orrin Luther Hulbert, 23, Southampton Buildings, Middlesex, for "Improvements in photographic sheets."—*Complete Specification.*—25th Sept., 1885.

11,386. Henry Park, 8, Quality Court, London, W.C., for "Improvements in the construction of photographic cameras."—24th Sept., 1885.

Patent Sealed.

13,156. James William Thomas Cadett, 84, Grove Lane, Camberwell, S.E., for "New or improved arrangements applicable to photographic shutters, whereby the duration of exposure can be varied."—Dated 3rd October, 1884.

Patents Granted in America.

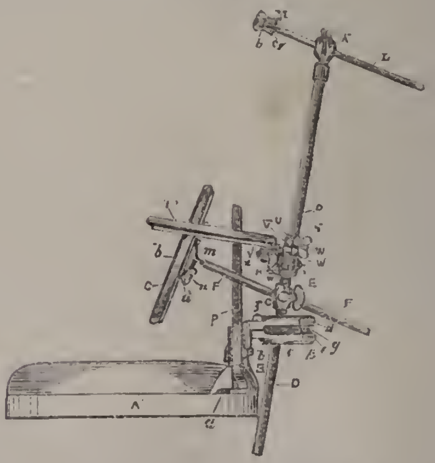
326,184. Otis C. White, Worcester, Mass. "Child's Photographer's Chair."—Filed April 13th, 1885. (No model.)

Claim.—1. The combination of the seat and back with the two independently-adjustable waist-clasps, as set forth.

2. A chair such as described, consisting of the back, the seat adjustable on said back, the waist-clasps also adjustable, and the head-rest adjustable, as set forth.

3. A photographer's child-supporting chair, consisting of the back having the pivot, the seat, the independent waist-clasps, and the head-rest, all adjustable on said back, as set forth.

326,185. Otis C. White, Worcester, Mass. "Dentist's or Photographer's Chair.—Filed April 20th, 1885. (No model.)



Claim.—1. The ball-clamp, C, substantially as described, composed of the two parts *d* and *c*, socketed to receive between them the ball, the screw-nut, and its sustaining-cap applied to one of such parts, and the handle provided with the screw to engage with the part *d*, and the said rest, all being essentially as set forth.

2. The combination of the head-rest clamp, having its jaw *b* provided with the slot *d'*, with the cylinder *c*, going through the said clamp and connected at its middle to the rod L by being screwed thereon, all being substantially as set forth.

THE PHOTO-CRAYON AS A MEANS OF REVIVIFYING BUSINESS.

BY J. TRAILL TAYLOR.[*]

When sitting thinking of a suitable subject on which to write a lecturette for the Convention of the Photographic Association of Canada, my eyes were resting upon a beautiful enlargement of a portrait which I have framed, in my room. Its appearance is precisely similar to that of a very finely finished crayon, its margin (it is a vignette) being finished in the free, sketchy style peculiar to crayon portraiture executed by a master. It is quite suited for being allotted a place on the parlour walls of the most critical connoisseur. This picture, I concluded, would make a good practical subject on which to engage the time of the members for a few minutes, because, first, of its quality and inherent attractiveness—it rivals the finest work executed in crayon; secondly, because of the great ease and low price at which it can be produced; and thirdly, as a consequence of these, because of a stimulus that may be imparted to a flagging trade by the introduction and vigorous pushing of these pseudo crayon enlargements. Why I am encouraged in selecting this topic is the fact that I some time ago tendered to a photographic friend, who was in low water, very much the same advice as I am now to offer you, the result being of the happiest nature. He is now in the possession of a good business, in which the ratio of profit is high, and he blesses the day when I urged him to bestow his attention upon photographs *à la* crayon.

The style of portrait which I now advocate was introduced by the late Oliver Sarony, of Scarborough, England. It created quite a sensation, and proved the means by which large sums were made by those who were permitted to practice it—for its use was hampered by several restrictions, by which it was confined to a few; but it had a fault, a most serious one, and one by which it was killed very soon after its first advent—the pictures faded, not only rapidly, but very badly. Hence the process fell into disuse.

But in the light of the cause of the fading, and the ease with which it may be avoided without sacrificing any good quality, the time has arrived when the photo-crayon may fittingly take its place among the every-day routine work of the gallery.

There is in the photo-crayon an optical effect involved which imparts a brightness and beauty that is quite unattainable in a collodion transfer, which latter, simple though it be in production, is still less so than the crayon, which is merely a collodion transparency made in a certain way, and backed by a sheet of tinted or white drawing paper of a somewhat coarse texture, pressed close to the glass, but not placed in adhesion to it.

Before making further comments on the process, I proceed to give full details concerning the making of the picture.

A glass plate, of any dimensions ranging between twelve inches and thirty inches long and of proportionate width, is made clean. The quality must be good in the sense of being free from air-bubbles, and it must be reasonably flat. Sprinkle it over with powdered talc, French chalk, or steatite—which commercially means one and the same thing—and then with smart friction rub it all off. Coat with collodion, and immerse in a silver bath. What is termed "good negative collodion" has rather too much body for producing the best results; hence it should be diluted with an equal bulk of a mixture of ether and alcohol, about equal parts of each, because, contrary to the production of a dense negative, we here require to make an image exceedingly thin. If the collodion is somewhat old, so much the better, because we require an image, the high lights of which must be bare glass. The sensitizing bath, composed of thirty grains of nitrate of silver to the ounce, and rendered slightly acid by nitric acid, is most advantageously used in a flat dish, especially when a large plate is employed. A silver or horn hook serves to raise up the plate when sensitized.

For exposing, means analogous to the magic lantern must be adopted. If one possesses a copying camera sufficiently large, so much the better; in that case, it must be tilted upwards so as to have the small negative projected against a background composed of a uniformly lighted sky. A sheet of white cardboard, upon which the sun's rays fall, also answers well; but this is by no means necessary, for an equally effective method consists in darkening a room, placing the negative in a small camera fitted with a carte portrait lens, which must be used without any diaphragm, and in front of the camera, at a suitable distance, an easel on which to place the plate during exposure. The focussing and adjustment are effected upon a plate of glass the size of the sensitive plate, covered with white paper. Any powerful light placed behind the negative will suffice for its illumination; but I have invariably succeeded best by burning a strip of magnesium ribbon held in a pair of pincers immediately behind the negative, with a piece of ground glass interposed. By moving the light during exposure, equality of illumination is ensured. A vignetting mask, formed of a large sheet of card having an oval aperture of, say, four by six inches, must be held in front of the plate during exposure, and it must be manipulated so as to impart a very soft edge to the vignette. It may here be said that it is indispensable the enlargement be vignetted.

It is in the development where failure is likely to occur, for there is such innate depravity in the photographer that he is at first almost certain to carry it too far. All ideas acquired by practice with negatives or transparencies for the stereoscope, or even the lantern, must be discarded, and a new education be commenced. A twelve-grain iron developer will answer well, but the resulting tone will be bad, necessitating toning by flushing the image with chloride of gold solution after fixing. The best iron developer I have employed is composed of 20 grains protosulphate of iron to the ounce of water, with enough citric acid to keep its action well checked; added to this are a few drops of a solution of gelatine in sulphuric or nitric acid. This gives an image of a purplish black tone, which is pleasing and quite permanent. The most delicate effects are obtained by pyrogallic acid, 3 grains to the ounce, with half its proportion of citric acid, and enough alcohol added to make it flow readily over the plate. Watch the appearing of the image very attentively, and be careful not to allow it to proceed beyond a thin and ghostly-looking stage, else it will be spoiled. Fix with hyposulphite. If subsequent toning is to be had recourse to, then will cyanide prove the best fixing agent, as it sometimes causes the lights to be clearer. It is essential to the success of the operation that these and the margin of the plate be clear glass.

When dried, the picture is examined by pressing a sheet of pure white paper hard against the film side, when it should present the appearance of a fine solar or platinotype. If satisfactory, varnish, and it is then ready for mounting. It is at this stage where the distinctive characteristic of the process asserts itself. For optical reasons, which it would be too tedious here to enter upon, when this image is pressed in mechanical contact with a surface of any material, such as drawing paper, the spectator, no matter whether he be artist or photographer, ceases to realize that the image is on the glass, but estimates it as being on the paper by which it is backed; hence all markings and drawings made upon such paper become in effect part and parcel of the image. Sarony's application of this principle lay in his adopting as a backing one of a series of backing papers of different tints, upon which had been printed, by lithography, a few sketchy, crayon-like lines, so as to surround and merge into the vignetting of the bust. When such crayon lines are produced by the hand on the special sheet of backing paper selected, care must be taken that the colour of the black lead pencil or crayon employed for this purpose assimilate to that of the enlargement. Anything defective in the photograph may be supplied in the backing paper by a few pencil touches, for, as previously observed, it is a peculiarity of the process that its photographic origin on the glass is not suspected, and that everything appears to be executed on the paper. This backing should by preference be toned drawing paper, although what I consider the finest photo-crayon I possess, is backed by a sheet of blotting paper of coarse texture, to which I imparted a very deep cream colour by immersion in water, to which I added a few drops of one of the aniline dyes. A very pale green, just bordering on the deep cream, is also a good colour for the backing paper. But the tints procurable are quite numerous, and selection must be left to the taste of each photographer.

This enlargement looks best when framed in a rather light yet elegant and ornate gold frame. The picture looks so beautiful that it would be a pity to detract from its merits by framing it unworthily. One great point to be observed is to have the backing paper pressed close up against the glass. If care be not taken to do so the picture will suffer in vigour and sharpness. But do not imagine that by pasting or cementing the backing paper to the plate that any improvement will accrue. Such proceeding will totally destroy the effect desired. The optical principle involved in this process demands that both photograph and backing be quite dry, and pressed closely against each other.

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[*] Lecturette before the Convention of the Photographic Association of Canada.

This is the class of picture which I claim could be made instrumental in giving an impulse to business were it reintroduced. It was unfortunate that a system of toning was adopted by the patentee, some sixteen or seventeen years ago, by which the pictures soon faded and changed tone, leaving the crayonized *enclairage* of one tone, and the photographic image of another. To bichloride of mercury, followed by sulphide of ammonium, was this solely owing. Gold, platinum, or palladium, are unchanging, hence their value as toning agents.

Such is the rapidity with which work may be done that within one hour after looking at the small negative from which the enlargement is to be made, the photo-crayon may be made, finished, framed, and sent home, and a handsome price received for it, the cost of which may be mainly estimated by that of the glass and frame, for all the chemicals that enter into the production are of little value to be estimated financially.

I submit a specimen which was made in 1869, and by examining it you will form an idea of the extent to which the development should be carried.

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G. W. WILSON AT HOME.

BY A. L. HENDERSON.*

"Is Mr Wilson at home?" I asked, as I entered the spacious offices in Swithin Street, Aberdeen. A reply in the affirmative was given, and in a few moments I was face to face with the great landscapist. Although several years had elapsed since we met, he looked as hale and hearty, and more youthful than I had ever seen him, and I have no doubt as full of energy. I mentioned that I would like to look over his works, and my only regret is that a shorthand writer was not present to note down all that passed between us.

Mr. Wilson's premises cover about half an acre; the front portion of the ground floor is used as offices, and the dimensions, at a rough guess, are about 80 by 25 feet. Here are to be seen rows of shelves on which are arranged thousands of blads of photographs. Several young ladies are sorting out orders, which are hourly arriving by post.

The upper floors of the building are used for finishing, and several females are busy mounting paper photographs on glass in optical contact (using gelatine as a mountant). They are then placed on canvas shelves to dry preparatory to being fixed in brass rims. These views are all vignetted, and this is done by using a sheet of lead as a mask, the centre of course being cut, and the edges bent outwards, which give more or less softness as desired.

In another room a ponderous hot rolling machine is worked by steam. The surface of the photographs are placed face downwards on the burnished plate, a thick piece of mill-board is put over it, a lever is touched, when away goes the plate under the roller, and returns, stopping to allow changing. I noticed one print hold somewhat to the plate, doubtless from being damp; a second passage through the roller sufficed to allow an easy removal without the slightest injury to the print. The steel plate is heated by an atmospheric movable burner, which the operator moves about under the plate at will.

The printing, toning, and fixing rooms are at a right angle with the front building; each of these has a glass covering top and front, and tramways run into them, so that in wet weather the carriages holding the printing frames can be expeditiously run out and in. At the back of the glass buildings are the changing and sensitizing rooms; in one of them I noted some half-dozen girls floating and drying albumenized paper, and Mr. Wilson informed me that in fine weather it took them all their time to keep up the supply. There can be no doubt that freshly-prepared paper conduces to permanency. Mr. Wilson does not fume; he tones with acetate and gold. The washing of the prints is done by placing them on a large circular frame about 8 feet in diameter, revolving horizontally; this wheel is covered nearly all over with fine cord, the prints are laid over it, the water is turned on, which beats down like rain all over the prints, and falls into a receptacle below.

The water in Aberdeen is very pure; solutions of silver may be made with it, without any precipitate forming. I believe that the permanency of Mr. Wilson's prints is also largely due to the purity of the water. I saw a large album full of views printed over ten years ago, and on one only did I notice the faintest indication of fading. Mr. Wilson is happy in having a talented daughter, who scans all the foreign journals, translating anything that is likely to be of service to her father. She, too, is an experimentalist. A print or two (gelatine reliefs for Stannotype) was shown me, and a question asked regarding them that puzzled me, and perhaps some of you may explain the peculiarity. Miss Wilson, in endeavouring to get greater depth by longer exposure, in the relief got a reversed image, and this impression is sharper and more brilliant than the non-reversed one. I place them before you for explanation.

Mr. Wilson is successfully competing with the German lithographers; he has now inaugurated a system of producing books of twelve views (Collotypes), sizes of plates about 5 by 3, neatly bound in scarlet cloth and gold lettered; the retail price is a shilling each. Mr. Wilson takes a very active part in all branches of photography. I noted him erasing a stain from the sky of a large negative taken from the top of Ben Nevis. I am told one might have to live up there for months before they could get so fine a result; the layers of mist and the clear tips of the mountains are truly grand. Mr. Wilson informed me that he has often sat beside his camera a whole day watching a tree to get it still. On the floor of one room were some dozen sets of apparatus placed there by the operators, who had just returned, after being away some weeks, having scarcely exposed a plate. On another floor Mr. Wilson, Junr., and several assistants, might be seen packing large tin boxes with sample books of photos, preparing for a long journey.

In answer to a question, if I might relate all I saw, Mr. Wilson remarked that he never had but one secret. I forget how he said it was let out, but it was this: he had seen Mr. Tunny, of Edinburgh (his initiator) taking glass positives and then converting them into negatives; he conceived that an instantaneous result might be obtained in the open air; he succeeded admirably. I had the pleasure of seeing many of these negatives; they are in a perfect state of preservation; the ripples on the water and the sharpness of the oars of a boatman testify to the rapidity.

I asked his opinion as to the comparative quality of wet *versus* dry plates. His views coincided with mine, that there is difficulty in getting detail and pluck in the foliage without over-exposing and flattening some portions of the picture. He is seriously thinking of returning to the wet process.

An elder son of Mr. Wilson conducts the portrait branch at a superbly-appointed studio in Crown Street, where are to be seen numerous groups of Royalty. Mr. Wilson's presence at Balmoral is very frequent.

If I may be allowed to express an opinion, although Mr. Wilson was many years in advance of his time, there are few, even now, who can equal his early results.

The Glasgow Photographers at Home.

From Aberdeen I made my way to that city where, as the proverb says, "It only snows when it does not rain." I found all the photographers fairly busy. I visited one of the oldest photographers, Mr. Urie; he is very enthusiastic over a machine for printing by development. The machine is certainly exceeding clever; a roll of alpha paper is arranged by clockwork to pass underneath a negative, a couple of ordinary gas-burners are placed about six inches from the plate, the clockwork is set in motion, and after a given number of seconds the gas burns itself down, while the changing takes place (all automatic). I carefully timed about two dozen prints, and saw them developed; the resulting prints were very equal. In answer to a question as to the comparative cost, I was informed that they could be produced fifty per cent. cheaper than silver printing. Of course I am somewhat sceptical on this point. I noticed in the strips containing thirteen prints about four that might be considered useless; there is no doubt of this. However, Mr. Urie is turning out large numbers of these prints. I saw some dozens of rolls of paper ready to be sawn in strips the depth of a C.D.V. This is done with a fret-saw; the machine is patented, but how it differs from the one I saw at Cincinatti last year I am unable to say.

I visited the new studios of Messrs. Turnbull and Sons, three in number; they are splendidly appointed. I was sorry to see such good work being done at such low prices. I learn that there are only three or four Glasgow photographers who are not doing club work.

My next visit was to the gelatine and ice works of Messrs. Verill, of Cathcart. I did not see anything new. The premises are very large; I daresay they cover more space than any I have seen. They turn out several tons of ice daily; yet, curiously, they do not use it in plate-making. Their water is drawn from a very deep well, and the temperature all the year round is 45° Fah.

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* Read before the London and Provincial Photographic Association.

I also looked into a couple of stock houses. At Mr. Mason's I saw (and ordered one) a very good studio camera stand. At McGhee and Bolton's I noticed a new washing machine for prints. A model of the same I place before you for inspection.

From Glasgow I returned to Edinburgh, where I had the pleasure of attending one of the Monday evenings at Mr. Matheson's (an enthusiastic amateur). I enjoyed it very much, meeting many old friends. I had the good fortune to attend a meeting of the Edinburgh Photographic Club. A good deal of time was taken up in discussing the alterations of one of the rules. Many novelties had to be carried over to the next meeting. I think the Club should meet weekly, and that they should enlarge the circle—in fact, make it open to all. Some of the members think it would ruin the Society. I am not of that opinion, as the societies in London have not degenerated in consequence of the clubs.

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NOTE ON PHOTOGRAPHIC WORK AT HOTELS.

BY F. PARTRIDGE.

I have been compelled, during the past two years, to do a very large amount of work in rooms such as I find at country hotels, with such conveniences as the hotel affords or I could carry in an ordinary grip-sack. The first thing that I put into it was two or three strips of black cotton cloth—silesia, or something of that sort. Each piece I made usually about six feet long by a yard wide. Those answered to darken windows, &c., by means of a few tacks, which I added to my kit. I could darken windows, I could shut out electric lights, could stop up transoms, and be independent of any outside light, though in some cases—one I remember in Baltimore particularly—I have had to take the blankets from the bed, the bedclothes and sheets, and make a dark-room in that way.

The next thing was a light, for I carried no candle and no ruby lantern. I had two or three pieces of ruby paper folded in such a way and put in my valise that when I was ready to make a lantern I could fold it up in a square and put a tin plate on the top, or else roll it up and set a tin plate on the top; and, then, as I came in at night, I bought a couple of candles at the grocery, and was prepared for my work. One advantage was, that the candles were not very hot, and the paper was lighter, and packed in a smaller space than I have ever seen a ruby lantern. In fact, they occupied about twice the space that that sheet of paper does.

When one is in the country, one often finds himself nonplused for lack of water. I have successfully washed plates with less than a pitcher full of water to pour on them. I have washed six plates in an evening by putting them into a wash-bowl, face down, two edges together, cob-house fashion; changed that water once or twice during the evening, and found the hypo eliminated sufficiently so that the plates have kept eighteen months; six plates in that way can be washed in one bowl of water after having got them clean by pouring water from the pitcher upon them. To those of us who have been in the habit of washing for hours in running water, that seems remarkable, perhaps, but the film being face down affords the very best opportunity for the dissolved hypo to fall directly from the plate.—*Anthony's Bulletin.*

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Correspondence.

PAPER NEGATIVES.

Sir,—In your leading editorial article of September 4th upon Paper Negatives, you allude to the difficulty sometimes experienced in obtaining sharp prints from paper negatives. Permit me to call your attention to the fact that this difficulty may be overcome by drying the negative upon a smooth flat surface, such as talced glass, or polished hard rubber. Negatives so prepared have a smooth glossy surface without cockles, and go into contact with the albumen paper without undue pressure.

The large prints shown by the Eastman Dry Plate and Film Company at the Inventions Exhibition were made from paper negatives prepared in this way; and no great difficulty has been experienced in making prints from such negatives as large as 20 by 40 inches.

Polished sheets of hard rubber or ebonite are better for the purpose than glass prepared with talc, for the reason that the negative is not liable to stick to the rubber, as it sometimes does to the glass in spite of all care that may be used.—Yours respectfully, George Eastman.

MR. BOTTONE'S PHOTO-MICROGRAPHS.

Dear Sir,—Since Mr. Walmsley has given the measurement of his dung-fly's foot, and of the field of his quarter-objective with the A ocular, all becomes quite clear in his statements.

My triplet, with the A ocular, has a field of $\frac{20}{1000}$ of an inch. (My micrometer is one of Stanley's, and is divided to 1,000ths.) Of course there *are* triplets and triplets. But I shall be happy to mail one to Mr. Walmsley or any other reader of the Photographic News for a Post Office Order for ten shillings, and will choose it myself, so that I shall be able to guarantee it to be equal in performance to the one with which I executed the foot under discussion.

The foot from which I took the photograph alluded to measures, from tip of long hair to end of second joint, exactly $\frac{20}{1000}$ of an inch; from the tip of one claw to the tip of the other, $\frac{14}{10000}$ of an inch. I fully agree with Mr. Walmsley as to the propriety of giving the exact magnification of any given representation; but he must bear in mind that I am not responsible for the minification to which Messrs. Meisenbach found it necessary to subject my correctly measured photographs in order to reduce them to the size of a Photographic News supplement.—

Stanley Road, Carshalton. S. Bottone.

THE ROYAL CORNWALL POLYTECHNIC EXHIBITION.

Dear Sir,—I am glad to notice that the Committee of the Royal Cornwall Polytechnic Society have temporarily abandoned Rule 7 in their "Regulations for Competition." It was a most objectionable rule, and has prevented many from competing after having taken a medal the previous year; and although the same exhibitor has again obtained the first silver medal, I trust the Committee will not let this act prevent them in permanently confirming the wise course they have taken this year. I am sure they will continue in obtaining a still larger number of exhibits and higher standard of work if they adopt this course, which no doubt will be highly gratifying to all photographers.—

4, *Richmond Terrace, Derby.* H. Jarvis.

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Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 24th inst., J. Barker in the chair.

A. **Haddon** gave an interesting account of a recent trip to Paris. There was no difficulty, he said, in taking gelatine plates by the route over which he passed—viz., Newhaven and Dieppe—but the officials were more strict at Newhaven on the return journey. Being informed of this, he explained the nature and contents of his packages to the inspector, who allowed them to pass unopened, the officials contenting themselves by closely scrutinising the remainder of his baggage. He advised continental tourists to deal fairly with the Custom House officials, and their plates would be passed through in safety. He then spoke of the necessity for special permits from the Hotel de Ville authorities when negatives of public buildings or gardens were desired; nevertheless, they secured two views in the Bois de Boulogne while waiting for a permit. Street views, taken from the roof of an omnibus, did not require a permit. He used a piece of cardboard turned up at each end as a view meter, one end carrying the sight, and the other a rectangular aperture large enough to include the subject.

The Hon. Sec. found no difficulty in taking plates through the Customs on the other side. There was more scrutiny observed when they returned to the Thames; an explanation of the contents, however, satisfied the officers.

The Chairman thought Mr. Haddon's extemporised view-meter excellent, and suggested his employing holes of different diameters to correspond with any lenses that might be carried.

A. L. Henderson said he had not brought any novelties or photographic discoveries away from the British Association's meeting at Aberdeen, but he had picked up a few ideas while in Scotland. He then proceeded to read an account of a visit to G. W. Wilson's establishment (page 636), after which he passed round a Wray lens, also a rectangular box containing lens, shutter, focussing screen, and four quarter-plate double dark slides arranged as a detective camera. Three movements were required to actuate this instrument when making an exposure—viz., to pull the shutter aside, to withdraw the shutter of dark slide, and to release cord. The slides were changed by opening a door at the back, the focussing screen folding inwards; the front comprised two folding doors; within these a lens and guillotine shutter was encased. The tension of a rubber band on the shutter was regulated by a knob on the exterior.

The Chairman, referring to a discussion on stereoscopic lenses at a previous meeting, understood that stereoscopic effect could not be obtained with circular lenses. He had, therefore, brought a number of examples as well as mounted prisms. A short discussion followed, in which it was pointed out that by mounting circular lenses so that the visual portions were not centres, they would practically become prisms.

W. E. Debenham desired further information regarding the preparation of the gelatine reliefs which had been exhibited, as he was not aware that bichromated gelatine was susceptible to a reversed action of light.

A. L. Henderson promised to obtain further details concerning the preparation of these reliefs. His impression was that they had been prepared by the late W. B. Woodbury.

It was announced that smoking concerts will take place on the third Thursdays of November, January, and March.

Amateur Photographic Association of Victoria.

The annual meeting of the above Association was held on the 20th July. The report and balance sheet were presented and adopted, and the following officers elected for the year 1885-86.

President—Dr. Browning.
Vice-Presidents—J. McEwan and E. C. Bell.
Secretary—J. H. Harvey. *Treasurer*—J. J. Fenton.
Librarian—E. A. Walker.
Custodian of Apparatus—E. Purton.
Committee—J. Levens, W. Himan, E. J. Hughes, J. Hoogklummer, and T. Williams.

The second annual exhibition was referred to at the meeting, and it was the general opinion of members that it was a great success. It was held on the 26th and 27th of June, at the Congregational Hall, Russel Street, Melbourne (the Royal Society's Hall, at which the ordinary meetings of the Association are held, having been considered scarcely convenient enough for the accommodation of the large number of exhibits and visitors which was expected). There was a large attendance of members and the general public on each night, and a small charge was made to the public for admission, the proceeds of which went a considerable way towards paying the expenses, which were rather heavy. The exhibits consisted of the general all-round work of the members of the Association, and a contribution from the Amateur Photographic Association of Wellington, New Zealand; these were supplemented by a few exhibits from some of the Melbourne professional photographers. A large amount of apparatus was shown by the photographic importing houses, and some was exhibited by members of the Association, the latter consisting in all cases of special pieces of apparatus invented, and in some instances also constructed, by the members.

In an adjoining room were shown at intervals, by means of the optical lanterns of the Association, a collection of transparencies selected from the work done by members during the year. Some of these were of a very high degree of excellence, and the "transparency show," in consequence, became very popular. A few transparencies of the moon, produced by members, were shown; the negatives from which they were printed were obtained at the Melbourne Observatory, and were produced by the late Mr. Turner (an amateur). The images of the moon on the negatives were about 3 inches diameter. Both negatives and transparencies were produced on wet plates.

Arrangements have been made for the proper representation of the Association at the forthcoming Indian and Colonial Exhibition, which is to be held in London early in 1886. There will, no doubt, be a good show of prints on the walls, and a special exhibit in the form of transparencies, illustrative of the scenery and progress of the Colony, will be sent; and the commissioners for the Victorian Court have arranged to have them exhibited of an evening. The subjects will include views taken in the cities and principal towns in the Colony.

North Staffordshire Amateur Photographic Association.

The usual fortnightly meeting was held on Wednesday, September 23rd, C. Alfieri in the chair.

After the minutes of the last meeting had been confirmed,

The Chairman, introducing the subject of the proposed exhibition, suggested that each member be requested by the Hon. Secretary to guarantee a sum of money, not to exceed the amount of his annual subscription, to form an emergency fund.

The proposition was carried, as was also a resolution that the last excursion of the season be made on Wednesday, Sept. 30th, to Shugborough Park, near Stafford, with the permission of the Earl of Lichfield.

L Kelsall showed some fine photographs of the interior of Lichfield Minster, taken by himself.

Mr. Hall exhibited a series of 15 by 12 views on the Severn, taken on a recent tour by himself.

After some interesting discussion on photographic optics, the meeting terminated.

Liverpool Amateur Photographic Association.

The usual monthly meeting was held on Thursday, September 24th, the President, J. H. Day, in the chair.

The minutes of the previous meeting having been read and confirmed,

The President paid an eloquent tribute to the services of the late Walter Bentley Woodbury to the art-science of photography.

Charles A. Tummins was elected a member of the Association.

The Secretary brought forward several matters of general interest. Referring, first, to the petition to the Railways, *re* reduced fares, &c., he stated that twenty-six societies had united in signing the petition, which had been forwarded to some of the principal Railway Companies, and would have been in the hands of all if the whole of the forms sent out had been signed; but many of the societies had only returned two or three forms with signatures, instead of lending their support to the whole.

The Secretary passed round a print made in an unusual manner by a member of the Birkenhead Association. This gentleman had broken a negative after obtaining a good print. In order to replace it, he placed in a printing-frame a piece of plain glass; on this he laid the print, then a gelatine plate, and after a suitable exposure to gaslight, a negative was developed, which gave prints of such excellence that nothing but a very careful scrutiny could suggest that it was not an original print. It was closely examined, and considered very good indeed. He next passed round two samples of pyro. The first was prepared as follows last October, being eleven months in solution, and still absolutely as clear and colourless as plain water:—Sulphite of soda four ounces, made up into twenty-seven and a half fluid ounces with boiling water, the solution carefully made neutral to litmus paper with citric acid, and when cool, one ounce pyrogallol added. The second preparation was sent by Marion and Co., and was carefully examined by all the members, consisting of solid pyro in cakes, which broke up into four-grain pieces. The Secretary stated that this form was a luxury for travelling purposes, and far more rapid in dissolving than the American form, while the cost was scarcely one half. The Secretary drew the attention of members to the plan of development in two separate solutions, and mentioned that a young photographer had called on him a few days before, and shown him some negatives, stating that he had for seven months been developing first in pyro alone, and then in ammonia and bromide alone, and that only on that day had he discovered that his plan was not the usual mode of procedure.

A question was then taken from the question-box, asking for the best mountant. Several substances were advocated; but starch plus a minute portion of carbolic acid, or for large prints starch plus a small quantity of gelatine, seemed to have the preference; it being pointed out that if the starch were allowed to cool, and then squeezed through very fine muslin, the process became exceedingly simple.

J. H. T. Ellerbeck was then called on to give an account of his recent trip to Norway. He read a series of extracts from letters sent home in the form of a diary, and mentioned many interesting facts, which were listened to with marked attention. The paper was illustrated by a very large collection of photographs, 12 by 10 and $8\frac{1}{2}$ by $6\frac{1}{2}$, which, although taken in many cases under circumstances of difficulty, were very fine, and brought before the members the wonderful features of Norway in the most conclusive manner.

Derby Photographic Society.

On Tuesday evening a special meeting was held at the County Hotel, Derby, for the purpose of presenting to Fred. W. Simpson, F.C.S. (who has been hon. secretary of the Society since its commencement), an album containing the photographs of the members of the Society. Among those present were the Rev. T. E. M. A. Bradbury (vicar of St. Chad's, Derby), Dr. Bloe, Messrs. Bennett, Bourdin, Cooper, Kaye, Keene, Lovejoy, Naylor, Scotton, and Sykes. The chair was taken by the Rev. T. E. Bradbury, and the minutes of the previous meeting were read and confirmed.

The Chairman, in introducing the business of the evening, said that a very pleasant duty fell to his lot. He had known Mr. Simpson ever since the formation of the Society, and had a profound respect for him, and was sure that the Society owed in a great measure its prosperity to his enthusiastic efforts. He was pleased, however, to know that Mr. Simpson was only leaving Derby to fill a more important position, and was sure he would take the good wishes of all present with him.

Mr. Keene (a vice-president) then thanked Mr. Simpson for his valuable services, and handed the album to him, assuring him that he would carry the good wishes of the Society with him.

In responding, Mr. Simpson said he felt he had many things to thank the Society for. In the first place, he thanked them for the handsome present which Mr. Keene, in the name of the Society, had just presented to him, and in the second place for allowing him the opportunity of meeting them once again before taking his departure from Derby; and lastly, for the uniform kindness and good will he had received from all during the time he had had the honour of being their secretary. He believed it was about eighteen months since a few gentlemen talked over the formation of this Society with him, and he was sure the success which had attended their proceedings had far exceeded their most sanguine expectations. He little thought when he occupied the post of hon. sec., that when the time came to pass his work into other hands, this Society would be one of the largest in the Midland Counties. He was pleased, however, that Mr. Kaye had been appointed his successor, for he knew he had the interests of the Society at heart. He was very grateful to Messrs. Keene, Kaye, and Scotton, for the trouble they had taken on his behalf, and to the Society generally for the handsome present he had just received. He wished the Society every prosperity for the future.

The Secretary read letters of apology from Colonel Hon R. H. de Montmorency, H. Arnold Bemrose, J. C. Merry, and others, and stated that several of the members had not yet sent in their photographs, but that he hoped to forward the completed set to Mr. Simpson very shortly.

The members present occupied the remainder of the evening in a social manner, W. H. Orme, organist at St. James' Church, presiding at the piano. T. Wood and T. Scotton favoured the company with several songs.

Birmingham Photographic Society.

A meeting was held on Thursday, September 24th, in the Technical School, Bridge Street, W. J. Harrison, F.G.S., in the chair.

The minutes of the last meeting having been read and adopted, and the usual business disposed of,

Mr. Harrison read his report of the Society's excursion to Haddon Hall on Monday, September 14th. Although the weather was not what it should have been for a day's out with the camera, those who had assembled at the station seemed determined to go, the rain ceasing almost coincidently with the arrival of the party at Knowsley. A few plates were exposed on the Peacock Inn, its picturesque exterior being too attractive to be resisted by the knights of the camera. The main road was now taken for Haddon. Crossing the bridge the Hall came into sight, and several pictures of its lofty walls and battlements, peering out from the encircling woods, were secured. Passing Mrs. Swaine's Cottage, with its curious box trees clipped in the shape of the Rutland crest, the steep ascent to the Hall was commenced. Haddon presents, from the exterior, an imposing aspect. It was erected during the reign of Henry VII. and Henry VIII. The great charm of Haddon lies in the fact that whilst it is kept in perfect repair, everything remains unaltered, and in examining its interior, we see it just as it appeared to the eyes of its inmates during the 16th and 17th centuries. Passing through the old oak door, we find ourselves in a spacious court yard; on the right hand is a door leading to the chapel, where the principal objects of attraction are the font, pulpit, and a stained glass window, whose date is known to be 1427. Several plates were exposed here, the exposure varying from five to ten minutes, with rapid plates and stops $\frac{f}{20}$ to $\frac{f}{30}$. The Banqueting Hall was next visited, but as this room is very dark (requiring exposure of half to one and even two hours) it was not attempted. Passing out at the farther door the garden was reached, where the famous steps leading up to a terrace walk protected by stone balustrades next engaged the attention of the photographer. At the end of this walk we see the low door through which, three centuries ago, Dorothy Vernon, the heiress of the place, eloped on a ball night with her lover, Sir John Manners, thus bringing the Haddon estates into the Rutland family. Several plates were here exposed. Returning through the garden, a long flight of steps was descended, and search made for the narrow stone foot-bridge across the Wye by which the happy couple crossed the stream. This bridge, with the woods and Hall behind, makes a very pretty picture, several members exposing plates. During the day 115 plates were exposed, sizes varying from $3\frac{1}{4} \times 4\frac{1}{2}$ to 10×8.

The Chairman next announced the exhibits on the table, the work of the members, many of which reflected great credit on their producers.

Mr. Foster was next called upon to give the paper of the evening, "Art in Photography." He said that his paper would be short, but after reading it he would give them examples on the black-board illustrating what he had said. In the course of his remarks he urged upon all to make a study of the art, and apply it to photography by studying the works of our great painters and photographers. A good plan, Mr. Foster said, was that on looking at a picture that either pleased or displeased us, to find out why it did so, and not be content with the fact that it pleased us or otherwise. Mr. Foster next showed on the black-board the way to divide a picture into the requisite number of parts, showing forth the points. He then proceeded to show some sketches on the board, pointing out what to put in and what to avoid. In conclusion, the lecturer said that he hoped at some future meeting to again have an opportunity of showing some more sketches on the board.

The Chairman then announced a donation of books to the library from Mr. Foster, for which a hearty vote of thanks was passed.

Talk in the Studio.

Photographic Pictures, by James Henderson, of Patna by Ayr.—Before us we have a very effective series of pictorial subjects from the camera of J. Henderson, and we may not be wrong in predicting that he will make a name for himself in that branch of photography, which is at once the most difficult, but, at the same time, the most attractive. The most dramatic of the series is "Caught Out," and shows a group of fishermen surprised by the game-keeper. The attitudes and expressions of the various members of the fishing group are telling in the extreme, while the same may be said of the game-keeper, who stands with dog close at his heels. In another picture, which might appropriately be called "Rest after Effort," the keeper is taking his ease on a grassy bank surrounded by his dogs. Fresh and sparkling is the "Scotch Good-night," a leave-taking at a gate; while "The Stiff Yarn," which shows a group of seven young people in a nook on the Doon, is a picture which many would prefer to the others as an exponent of facial expression; it is remotely founded on H. P. Robinson's "Merry Tale." We hope, before long, to present one of J. Henderson's pictures to our readers.

Hardmuth's Pencils for Retouching.—High-class pencils, such as are used by the artist or the retoucher, have, up to the present time, been usually made with the lead immovably set in the shank; in fact, quite on the old-fashioned lines. Messrs. L. and C. Hardmuth now send us a set of their special pencils, suited for retouching or other artistic work, in which pencils the leads are removable and renewable; the set of pencils being mounted in a convenient combination of box and rack. As regards hardness, they range from B B B B B B—an extra soft pencil for bold and broad strokes, to H H H H H H, which is furnished with an extremely hard lead, suited for the finest outlines. We handed these pencils over to an experienced *retoucheuse*, and she expressed a most favourable opinion of them.

President Newton on Amateur Photographers.—At the last annual dinner of the photographic section of the American Institute, the President said:—I look upon the amateur photographer as one under the influence of a pleasant contagion, which, as a general thing, runs its course, and begins to subside in about two years. Of course the time, to a certain extent, depends upon whether the patient has it in a mild or virulent form, and becomes incurable. Such instances, however, are not common. Among the many who have come within the range of my observation in the last twenty years, I can recall but one or two instances of this kind. Our worthy general superintendent, Charles Wager Hull, had it in its severest form, and was considered by those who diagnosed his case as incurable. He succeeded, however, in finding some nostrum (whether patented or not I am uninformed) which produced an hallucination, or peculiar mental condition, which relieved him to a great extent of the most aggravating forms of the complaint. Ordinarily, individuals are not subject to a second attack of an inflammatory fever. There are, however, exceptions to the general rule. Sometimes a person will have the small-pox a second time, usually in a mild form. With this amateur, from this exception to the general rule, seems to hold good, as I have observed occasional returns in a mild form, and of short duration. Our good friend (the general superintendent) furnishes a conspicuous example—a return of the complaint, but it did not assume an aggravated form, but was, as is usual, of a mild type. It was caused by carelessness or indiscretion on his part. Shortly after the introduction of the gelatine dry plate, he very rashly exposed himself by getting a package and confining himself in a small dark room with it incautiously open. In a short time his friends noticed the unmistakable return of the premonatory symptoms. Fortunately, however, it developed only to a mild form, a kind of varioloid, and he has so far recovered as to be able successfully to withstand the eloquent and persuasive efforts of the chairman of the committee to induce him to be present here to-day. I hope this will be a lesson to him, and that on all future occasions of this kind self-defence, if not the fever, will impel his presence.

J. Chapman Jones's Lecture Class at the Birkbeck Institution.—The first lecture of this course on photography will include the following:—Preliminary—Methods of Study—Light, the Active Agent—Light Produces Chemical Effects—Evils of "Rule-of-Thumb" Work—Advice to the Beginner—What is Necessary—How to Begin Intelligently and Usefully.

Electric Fans.—"What is this?" asked a broker, as he sauntered into a Wall Street banking house on Saturday, and fixed his enquiring gaze on a curious little machine, from which there came a subdued whirr and a current of air. Then he put out his hand to investigate. There was a subdued snap, and he drew it back with three fingers cut half off. While the clerks were binding up his wounds previous to starting him off for the family doctor, they explained that the thing which he saw was an electro-motor, while the part that he felt, but hadn't seen, was an eighteen inch fan, making 2,200 revolutions a minute. The broker went home with his curiosity satisfied, and the clerks decorated the machine with a huge placard, "Hands off!" There are now over fifty of these fans in use in the downtown district alone, the stock exchange and most of the leading banking houses having them. The rent for a machine is 15 dols. a summer, and they are run by the current which supplies the lamps at night, a fan and a lamp requiring the same amount of power, the cost of either being 11·5th cents per hour. The fans can also be bought outright. A large one will create a current of air that can be felt at a distance of fifty feet. They are made of two kinds of material, metal and fibre. The latter is not as durable, but it isn't so hard on the fingers of the inquisitive spectator. [The above is from the *New York Tribune*, and in reading it we cannot but be struck with the advantage that such an arrangement would offer to English plate makers if we had electricity laid on in our towns.]

Photographic Club.—The subject for discussion on Wednesday, October 7th, will be "View-Meters."

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To Correspondents.

*** We cannot undertake to return rejected communications.

Thomas Milnthorp.—This correspondent explains that he has taken a photograph of a Harvest Festival, and that some other person has also photographed the same scene. This other person imagines that he has thereby secured a copyright in the scene, and threatens our correspondent with pains and penalties if he sells his own photograph. Strange it is that persons should be so obtuse as to imagine that in registering a photograph they secure more than a copyright on that particular photograph. If he who first registered a photograph of a scene were to thereby secure the sole right of photographing that scene, we should soon have to pay a heavy price for the right to sell views of London. What a rush there would be for the first registration of St. Paul's Cathedral! Our correspondent should register his photograph if he has neither sold nor given away a copy. The previous sale of a copy invalidates registration, and gives every one the liberty to copy it, and to sell the copies.

J. V. B. (Holyhead).—We shall be very much pleased to have an article in which you describe your travels, and also to have a few photographs for reproduction.

J. W. Sykes.—Your last proposition seems to us to be the most advisable; but we recommend you to go in for a little more glass than you propose. Let the vertical light be about 8 feet long (height, as you propose, 4 feet), and the bars of the skylight of the length you propose (7 feet); but the light might extend a trifle farther towards the north and south than you suggest. Excess of light is always better than a deficiency in constructing a studio, as it is so easy to use curtains or screens.

F. Parson.—Thank you very much for taking the trouble; and should you get the information, we shall be glad of it.

R. Broadhead (Leeds).—The lens was made long before triplets were introduced, and the fixture in the middle is intended to take the diaphragms. Our advice is that you should not attempt to alter the lens.

F. Peakome.—The book is published by Messrs. Swan, Sonnenschein, and Co., London, and costs 2s. 6d. The above address will no doubt be sufficient, but we believe their publishing office is either in Paternoster Square or Paternoster Row.

W. N. Malby, J. P. Gibson, Jas. Crighton, F. Whaley, W. T. Goodhew, F. W. Broadhead, H. A. Room, and P. H. Emersom.—Received with thanks.

T. Evans.—We have not obtained the exact address, but at the time referred to he lived at Hull; we think in the Anlaby Road. Should we obtain the exact information you shall hear.

J. B. Currie.—Perhaps the details may stand over till the affiair is closed, and you can then write another letter.

Essex.—An article on the subject will be found in the present number of the News.

F. Stanley.—1. The colour is quite immaterial as regards the point at issue, the main point being to make sure that no hyposulphite is present. 2. You had much better varnish with a thick solution of shellac in methylated spirit; the tar will give trouble on account of the extreme slowness with which it dries. 3. We think that no harm is likely to result.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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THE PHOTOGRAPHIC EXHIBITION.

[First Notice.]

At the Exhibition Soirée held on Saturday last there was, as usual, a good attendance; but the crush somewhat interfered with the examination of the photographs. The following medals have been awarded. We take them in accordance with the sequence of the catalogue numbers.

H. Stevens, "Group of Orchids"; H. P. Robinson, "Dawn and Sunset"; T. M. Brownrigg, "Waterfall, Wharfedale"; W. Symonds, "Yacht-racing Scenes"; W. Muller, "Views in the Engadine"; S. Conway, "Views in the Southern Tyrol"; W. J. Byrne, "Home Photographs"; School of Military Engineering, "Tintern Abbey, and Raglan Castle" (No. 254); F. Beasley, Junr., "Views near Moritz"; J. Lafayette, portrait study, "Woman and Child"; W. Wainwright, "Austrian Tyrol"; W. J. Stillman, "Erectheum, with Mars Hill"; H. Colard, "Okoma"; W. Noble, "Views in the Engadine"; Annan and Swan (Photogravure), "A Fairy Raid," after Sir Noel Paton; The Autotype Company (Photogravure), "The Pet Lamb," from water-colour drawing by Mary Ely; J. Terras, "Figure Study;" W. N. Malby, "Strengthening the Understanding."

The plants photographed by Henry Stevens are certainly very fine, and the judges could hardly have passed over his "Group of Orchids and Ferns, Life-size," No. 47, without awarding it a medal, while his "Group of Rhododendrons in China Jar," No. 334, is perhaps equally good. The exhibitor, as a dealer in choice plants, has excellent opportunity of selecting fine specimens for photographing. Plants are naturally graceful and elegant, and cannot be galvanized into an awkward and stiff position like a sitter. Some persons invariably make a sitter feel awkward and ill at ease, and, judging from the figure studies which the same exhibitor sends—"Meditation," No. 46, and "A Rustic," No. 48—we should imagine that he possesses the power of galvanizing sitters into uneasiness in a very marked degree. It is difficult to imagine anything more inartistic and waxwork-figure-like than these studies.

H. P. Robinson sends three exhibits, the largest of which, "Dawn and Sunset" (No. 74), takes a medal. The general effect of this is very striking, and it was much admired by visitors to the *Soirée* on Saturday last. It is a combination, and represents a woman seated near a window, and upon whose lap is an infant, while the grandfather sits near the fire in the aimless, musing attitude of extreme age. "The Valentine" (No. 73), and "Who Could Have Thought It?" (No. 75), are companion pictures; the young woman who is shown in the first as having read the missive, is depicted in the second just at the time when she realises who is the sender. "Hope Deferred" (No. 36) is the picture we like best; the attitude of the dog who is waiting for a snack, and the expression of the lad who, while eating his lunch, holds up a piece in a tantalising way, being admirable.

T. M. Brownrigg, whose magnificent views in Yorkshire (No. 92) take a medal, exhibits other frames which do him equal credit.

In yachting photography we have pictures of really exceptional excellence in the medal exhibit of W. Symonds (No. 128), the central picture of the frame showing a tugging match; but all have a bright and lively aspect, which makes them exceptional among yachting photographs. W. Muller's frame (No. 161) of views in the Engadine are soft, yet bold and fully gradated, this frame taking the medal; but his other frames are so good that, in the absence of No. 161, he would doubtless have had the same award for one of them.

We need say nothing in praise of No. 182, the medalled exhibit of Seymour Conway—views in the Southern Tyrol; but his exhibits are not confined to these. The frame of home photographs (No. 224) by W. J. Byrne, does not please us. We have here the female form twisted into all manner of awkward and eccentric attitudes, and lighted in fantastic ways. This kind of thing—when the retoucher's work is done—goes abroad as high photographic art, stamped with the approval of the Photographic Society. Ingenious, not artistic, expresses our view of the varieties of position shown in frame No. 224.

The School of Military Engineering deserves very great credit for its large and splendid views of Tintern Abbey and Raglan Castle (No. 254). Alpine views again—and excellent views into the bargain—are those shown by F. Beasley, junr.; and it is his frame No. 258 that takes the medal; all his frames are excellent, but this is the best.

No. 320, "Mrs. Scroope Bernard and Child," by J. Lafayette, is a very striking example of the *show-case style* in photography. In these cases one never knows how much is due to photography, and how much to retouching; and the judges should act with much caution.

Grand in the extreme is W. J. Stillman's medalled exhibit (No. 339), "Erectheum, from the Parthenon Temple of Nike Apteros, Acropolis, and Thesium, with Mars Hill." Here we have legitimate photography at its best. W. Wainwright, Junr., displays the beauties of the Austrian Tyrol; his pictures are bright and good. The medal he takes is well deserved.

The interior study by H. Colard, "Okoma" (No. 354), was much and deservedly admired by those present at the soirée; it is a production of very exceptional merit. "Views in the Engadine" (No. 368), by William Noble, is a frame containing four large and excellent subjects, and his medal is well bestowed.

Two examples of photo-engraving take awards, and both indicate progress in this important direction. The Fairy-Raid, after Sir Noel Paton, exhibited by Annan and Swan, is understood to be produced by the etching method of Klic, while the plate of the exhibit of the Autotype Company is supposed to be made by an electrotyping process based upon that of Col. Waterhouse.

The tongue of a blow fly (No. 510), by M. T. Swift. has received an award. We hoped we had seen the last of this ever-recurring subject among photo-microscopists, and cannot trace in the exhibit any particular merit which should justify the judges in awarding it a medal.

J. Terras takes a richly-deserved medal, as he has produced some real pictures by photography. He illustrates the power of the gelatino-bromide plate to do justice to the dark and deep shades of the indoor subject. He has three magnificent studies which recall the Dutch style of painting, the first of these being the one taking the medal. They are Nos. 526,

> "I sit on my creepie,
> I spin at my wheel,
> And think on the laddie
> That lo'ed me sae weel";

No. 527, "Reading the News"; and No. 528, "Thinking it Over."

We now come to the picture which we cannot help regarding as *the picture* of the Exhibition, the charming little study (No. 530) by W. N. Malby, which forms our supplement. Although it is in reality a combination of two photographs, the union is so perfect, both as to joining and as to the unity of lighting, that many would take it for a photograph taken all at one exposure. In order to test this matter we—on the occasion of the *Soirée*—took the opinion of several of the best judges, and in each case the verdict was, "Taken at one exposure." Regarding this picture we need say no more, as a special article is devoted to W. Malby's picture. Other works by Malby in the Exhibition are meritorious, but by comparison with his medal picture they suffer.

We may sum up the whole exhibition by saying that it is a good one, and although we find but few exhibits of the jumping horse or leaping man type—exhibits merely intended to illustrate the speed of gelatino-bromide plates—we find everywhere evidence of the solid advantages which the photographer can realise by the use of the modern dry-plate.

Foremost among these evidences may be mentioned the number of photographs taken in rooms and places which are too dark for collodion work; the pictures of Terras, 526, 527, and 528, being good illustrations. Again may be mentioned the home portraits of Byrne; although, as we before mentioned, they have their faults, they indicate a power in the hands of the photographer.

OUR SUPPLEMENT.

Strengthening the Understanding : By W. N. Malby.

This picture has not only received the award of a medal at the Exhibition of the Photographic Society, but was warmly admired by the visitors to the *Soirée* on Saturday. The original picture is small, and from this circumstance, and the fact that it was not placed in a very prominent position, it is quite possible that many visitors to the Exhibition may have overlooked it altogether.

We need say nothing in praise of a picture which a large proportion of those present on Saturday last regarded as the gem of the collection, and which can so well speak for itself, but our readers will be interested in reading the following notes by the artist who made the picture.

"My model for strengthening the understanding happened to be passing my studio door, and, looking very dirty, it struck me it was possible to make a picture of him if I could get him to sit. I managed to make his acquaintance, and soon found out his profession was a bootmaker, and his great weakness was politics. After a lot of trouble, I managed to get him into the studio; but directly I ventured to suggest to him to sit for a photo was the sign for his making for the door. Beer soon made that right, and to get an empty packing case, an old box, some string, and cardboard, was the work of two or three minutes.

"The greatest difficulty of the lot was to make him more untidy than he was; and when I asked him to take off his coat he jumped up and said, 'No; my friends will not know me like that.'

"I got the expression by making him excited over the latest speeches (political), and at the last moment asked him if he had heard of the defeat of the Government, and the dissolution of Parliament, upon which he strained his neck, and said, 'Government defeated! where?'—and then I got him. The next job was to build a shoemaker's shop; which I did in my printing room, and then printed in the picture."

TRIMMING PRINTS.

We do not intend at this present to refer to common defects in trimming, such as want of straightness in the lines or of right-angularity of the corners, but to a far more serious defect which we have lately noticed in cases where we should by no means have expected to find it.

We have lately seen several sets of prints in all respects remarkably good in themselves, but utterly ruined by the manner in which they have been trimmed, the edges of the paper not having been trimmed parallel with what we may call the vertical axis of the print. In several cases the defect was exceedingly noticeable. We have in our mind at this moment the case of an interior evidently printed from a negative excellent in every way, in the taking of which the back of the camera had been scrupulously kept vertical; the print was, however, trimmed in such a way that between a vertical line of the picture and the edge of the paper there was convergence almost to the amount of $\frac{3}{8}$ inch in 8 inches. This is a flagrant case, one in which the photographer had evidently, simply in thoughtlessness, trimmed his print parallel with the edge as marked out by the edge of the negative from which it was printed.

It is a very simple rule that where a picture represents vertical lines in the subject, and these are brought out as parallel lines in the print, this latter must have its sides trimmed parallel with these lines, and of course its top and bottom at right angles to them.

It is a rule often laid down by photographic authorities that vertical lines in the subject must be represented by absolutely parallel lines in a photograph. It is true that, certain conditions being fulfilled, this is necessary to make the perspective correct – that is to say, to enable the picture to produce an image of the precise same form on the retina of the eye of an observer as the object does. It may at once be said, however, that these conditions are of a somewhat complicated nature, and are most unlikely to be observed on any single occasion by an ordinary observer. They are, that the picture be hung in a vertical plane; that the distance between the picture and the eye of the observer be equal to the focal length of the lens with which the picture was taken; and that, in fact, the eye of the observer be placed in relation to the picture as the camera was to the subject.

As we have said, these conditions are never likely to be fulfilled by the ordinary observer of a picture—or, indeed, by any observer except as a matter of experiment—and for this reason it becomes merely a question of whether, as pictures are usually looked at, the most pleasing result is produced when vertical lines are shown quite parallel, or slightly convergent. We must admit that we ourselves consider that a *slight* amount of convergence towards the top of the picture is not only allowable, but is advantageous, especially in the case of very high pictures. Indeed the ordinary method of hanging pictures, sloping with their upper edges forward, absolutely requires, if correct perspective is to be obtained, that the lines converge a little.

Whether the reader agrees with us in this matter or not, he must agree that many photographs in which there is a slight amount of convergence of vertical lines have found acceptance with the public. What we wish here to point out is the precautions which should be observed in trimming such prints. A moment's reflection will show that it will not do to trim the sides of the print parallel with one of the vertical lines near either edge, as may be done when such lines are represented parallel. The result of such trimming will be to make the object appear to be falling to one side. Indeed, it is only with a central vertical line that the sides of the print can be made parallel. In the case of there being no such line, we should, did we wish to be mathematically correct, proceed to get the direction of trimming in the following manner by construction. Taking a spare print, we should erect a perpendicular from any vertical line represented in it, and a second perpendicular from any other vertical line, so placing the second perpendicular that it would intersect the first in the print. The line got by bisection of the obtuse angle formed by the intersection of two perpendiculars would be one with which the sides of the prints are to be cut parallel.

In practice it is generally quite easy to divide the convergence by eye, the only difficulty arising when the vertical lines are all on one side of the picture.

Another fault that we have noticed in trimming is seen in the case of seascapes, when the bottom of the print has not been trimmed parallel with the sea horizons. It may be taken as an absolute rule that where the sea horizon is visible, the bottom and top of the print should be cut parallel with it, and the sides, of course, at right angles to it. It will be found that this will never be incompatible with the rules given for vertical lines where both these and a sea horizon are visible on the same print.

On the other hand, it is to be observed that any horizontal line in a landscape, except the horizon itself, cannot be taken as a basis for the direction of trimming. It is only in the few cases where such horizontal line is at precisely same height as the lens, or when it runs at right angles with the axis of the lens, or when both conditions are fulfilled, that the line should appear horizontal in the picture.

We have seen many a picture in which a horizontal line nearly, but not quite, fulfilled one or other or both of the conditions mentioned, and had evidently been used as a guide for trimming the print, with the result that the vertical lines were all caused to appear to lean to one side.

WHO SHOULD HAVE THE HONOUR?

BY H. P. ROBINSON.

When Sheridan's son told his father that he had been down a coal-mine for the sake of being able to say he had performed such an exploit, his father, with a morality that may be easily appreciated in our own times, replied that he could as easily have *said* he had been down without actually descending. It seems to be an equally simple-minded proceeding now-a-days for a photographer to take his own photographs. There was a time when an amateur felt that the least that could be expected of him was to select the subjects and make the exposures, but "we have changed all that," and would-be-thought-photographers can now get everything done for them from beginning to end. It is, I believe, true, or at any rate "well found," that a firm of photographers at Niagara supply exposed but undeveloped plates of the Falls, so that all that is necessary to become a photographer is to buy one of these plates, send it first to a developer, then to a printer, afterwards to a mounter and framer, and, finally, contribute it to an exhibition, and take a medal with it. It is inconvenient that several identical prints may be sent in with the names of different producers on them, for I hear that the enterprising American photographers are doing such a roaring trade, that they have ceased to expose their plates on nature, and take them from a transparency; but this is a risk that has been run for years by those who buy sky negatives and use them as their own.

It seems almost absurd to ask the question, in reference to the taking of a successful photograph, "Who should have the honour?" but it is now a well-known and much-to-be-regretted fact that medals are sometimes awarded to men who had nothing to do with the production of the picture to which the awards were made. I know of one case a year or two ago, in which the taker of the medal first saw the picture to which the honour was awarded in the Exhibition itself. It may be legally honest for an employer to claim the credit for work for which he has paid, but it is artistically a crime for one man to put himself forward as the producer of work which was due to the genius—or, to put it more mildly, the persevering talent—of another. If this was followed out to its logical conclusion, the winning of medals would be a mere matter of money. The one who could afford to employ the best talent would have the advantage over all others. Sometimes the best-intentioned jurors are defeated by the very persons they try to help. Some years ago a jury of the Photographic Society of Great Britain endeavoured to do justice, in awarding a medal to the School of Military Engineering, by adding the remark that the medal was intended for the actual producer of the picture, and not to the general, unpersonal "School." The officer under whose charge the School was then conducted, replied that it would be contrary to etiquette to mention the name of the individual photographer, and the Council of the Society rather weakly gave way, and allowed the medal to go to the School; and the same thing has occurred over and over again down to the present Exhibition. In the art of war, the General usually has the credit of a victory, and the same principle seems sometimes to be understood in lesser arts, such as photography, perhaps because a medal may be as difficult to divide as Birdofredum Sawin supposed Glory to be, when he said the glory never got down to the ranks.

> "An' s'pose we hed, I wonder how you're going to contrive its
> Division so's to give a piece to twenty thousand privits."

It was afterwards ingeniously argued that the function of the jury was to determine which *picture* merited recognition, not which photographer. This was not a bad retort, as far as it went, if the picture was a sentient thing, which could accept a medal when offered to it; but common-sense would surely suggest that it is the producer of a success who should be decorated. That this is so, is evident. Medals are usually stated to be awarded to Mr. ——, for his picture No. —, and the theory is, however erroneous the assumption may be, that the exhibitor is also the producer.

In only one instance do I remember a master modestly declining to take the credit for pictures produced by his assistants, and we have to go to America for our example. At the last American Convention a medal was awarded to Mr. Ryder for a noble display of photographs; but with a frankness that, as things go, did him more honour than any medal could, he declined to accept credit for work done entirely by his assistants.

Can anything be done to remedy the evil? It would be impossible for jurors to enquire into the truth. When a man, otherwise unconvicted of falsehood, sends a picture to an exhibition with his name on it, the managers of the exhibition are bound to believe that it is his own production, and treat it accordingly. I am afraid redress must be left in the hands of those who are least able to help themselves—the employed. In the case of firms there may be some difficulty. It must be acknowledged that to exhibit means, more or less, to advertise, and it is certainly more profitable to advertise the firm than the individual members of it. I knew of one firm that got over the difficulty by taking as nearly as possible an equal hand in every picture made to exhibit under the name of the firm, and if either of them got a particularly bright inspiration that could not be shared by his partner, the result was always exhibited in the name of the individual: the medals for other productions were divided.

Notwithstanding what I have said above, I see no objection to a photographer accepting assistance in the production of his picture. The materials, tools, and the mechanical parts of production should be kept distinct from conception, and are only rational aids to results. This view of the matter was very ably put some years ago by an anonymous writer in the News, whose remarks I paraphrase. Both painters and sculptors have assistants; in some instances it is well-known that these assistants have acquired such ability as almost to carry out the whole work of their masters from the sketch which illustrates the conception. Again, for the sculptor who has made his model in clay, a great part of the work is carried out by other hands than the artist's, but under his guidance. For all that, on beholding the finished picture or statue, it is evident that both painter and sculptor are the Alpha and Omega in the production of these works. So also with photography as an art. To conceive and to carry out the production of the negative of his picture is, with the photographer, to produce and be the author of the work. It is no more necessary for him to have prepared his plates or mixed his developer, than for the painter to strain his canvas or grind his colours. To sum up: if a man wants safely and honourably to put his name on any photograph and call it his own, the subject and arrangement should be of his own conception. What he does by the hand of another should be under his own superintendence and guidance, and the delicate and important parts, such as exposing and developing, which require matured judgment, should be done by himself.

RESEARCHES ON THE CHEMICAL ACTION OF LIGHT.

BY PROFESSOR DR. J. M. EDER.

1.—Behaviour to light of ferricyanide of potassium, and mixtures of the same with other substances. 2.—Relative light sensitiveness of ferri-cyan, nitro-prussic, and other iron compounds. 3.—Various copper compounds. 4.—Indigo sulphate of soda. 5.—Molybdic acid. 6. Decomposition of chlorine and bromine water, and of tincture of iodine in the light, and the influence of organic substances upon this process. 7.—Decomposition of alcoholic solution of chromate in the light. 8.—Decomposition of iodide of mercury by light.

1.—Behaviour to Light of Ferricyanide of Potassium, and of Mixtures of the Same.

It is well known that an aqueous solution of ferricyanide of potassium becomes decomposed in the light. with the formation of a blue precipitate, and of ferrocyanide of potassium. Upon the duration of this reaction, and the quantity of the decomposition products, however, nothing has appeared. For the study of these points, I placed solutions of various strengths in closed flasks from the 28th July to the 2nd November, 1884, where they received the action of the sun and daylight, and in the immediate neighbourhood of the same another sample of the same solution protected from light. The solution becomes at first dark brown, afterwards blue.

After a time, a precipitate of Prussian blue was formed, in addition to ferrocyanide of potassium and free hydrocyanic acid. The Prussian blue was present as the so-called soluble Prussian blue; when collected upon a filter and washed, the filtrate began to be coloured as soon as the greater part of the soluble salts had been removed. For the quantitative estimation of the precipitate, I washed towards the end of the operation with a very dilute solution of perchloride of iron, and finally with alcohol. The precipitate was then dried at 100° C., and weighed.

The ferrocyanide of potassium in the filtrate, which gave neutral reaction, was estimated by precipitation with acetate of lead, and treatment of the precipitate with permanganate of potash.*

The formation of hydrocyanic acid in the ferricyanide solution exposed to light makes itself evident by the smell. Old lighted solutions, by warming to 60° C., develop much hydrocyanic acid; fresh solutions, on the other hand, yield very little. Similarly, the first, by distillation with bicarbonate of soda, give an easily recognisable amount of hydrocyanic acid in the distillate, but the latter an exceedingly small quantity.

The quantities of decomposition products from 150 ccm. of solution was estimated in solutions of various concentrations, as follows:—

An eight per cent. solution of ferricyanide of potassium separated—: 0·041 grammes of Berlin blue, and 0·703 grammes of ferrocyanide of potassium.

A four per cent. solution of ferricyanide of potassium separated 0·017 grammes of Berlin blue, and 0·432 grammes of ferrocyanide of potassium.

A one per cent. solution of ferricyanide of potassium separated 0·023 grammes of Berlin blue, and 0·322 grammes of ferrocyanide of potassium.

From this it appears that for each part by weight of Berlin blue, there is formed from 7 to 25 parts of ferrocyanide of potassium (besides hydrocyanic acid). A one per cent. solution is relatively more quickly decomposed than an eight per cent. solution.

Mixtures of solution of ferricyanide of potassium with sugar or oxalic salts are decomposed in the light more quickly. A solution (150 c.cm.) which contained:

Eight per cent. of ferricyanide of potassium, and eight per cent. of sugar, gave 0·092 grammes of Berlin blue, and 1·032 grammes of ferrocyanide of potassium.

One per cent. of ferricyanide of potassium, and $\frac{1}{2}$ per cent. of oxalate of ammonium, gave ·9 grammes of Berlin blue, and 0·64 grammes of ferrocyanide of potassium.

Eight per cent. of ferricyanide of potassium, and four per cent. of oxalate of ammonium, gave ·9 grammes of Berlin blue, and 0·528 grammes of ferrocyanide of potassium.

These mixtures, then, are decomposed quicker than pure ferricyanide of potassium. That the one per cent. solution gave on analysis a greater amount of ferrocyanide may be due to an inexactitude in estimation.

Ferricyanide of potassium and citrate of potash behave similarly to the mixture with oxalate.

A solution of ferricyanide of potassium, added to acetate of lead, gives in the light a bluish-white precipitate of ferrocyanide of lead, which can be extracted by means of hyposulphite of soda, as well as Prussian blue.

Ferricyanide of potassium, and sulphate of uranium, is more sensitive, then, than the foregoing mixture; it gives a reddish brown precipitate, which contains much ferrocyanide of uranium.

Ferricyanide of potassium and bichloride of mercury mixed are much more sensitive to light than either alone. Chloride of mercury, Prussian green, and hydrocyanic acid are formed.

2.—Relative Sensitiveness to Light of Ferricyan, Nitroprusside, and other Iron Compounds.

Dissolved ferricyanide of potassium is less sensitive to light than the ammonium salt. Both are, in the absence of light, very permanent. Solution of hydroferricyanogen becomes blue even in darkness, quicker however in the light.

Pure ferricyanide of iron behaves with light like a mixture of ferricyanide of potassium and iron-alum. The last named decomposes in darkness with the formation of

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* Communicated to the Imperial Academy of Vienna.

* The ferrocyanide of lead was first dissolved in caustic potash, and then acidified with hydrochloric acid.

Berlin blue and hydrocyanic acid; in the light, the process is much more rapid.

Ferricyanide of potassium with perchloride of iron (equivalent proportions) is also very unstable in darkness. At first, Prussian blue is formed. subsequently (after three months' exposure to light) Prussian green; this precipitate yields, after decomposition with potash, ferrocyanide as well as ferricyanide of potassium. Excess of perchloride of iron forms Prussian green at the beginning. In the light the action is about three times quicker than in darkness. With excess of ferricyanide of potassium, blue is first formed, then green. Hydrocyanic acid is produced at the same time (even in darkness).

Dissolved nitroprusside of sodium, the sensitiveness to light of which has been long known. is about twenty times more sensitive than ferricyanide of potassium. Berlin blue and hydrocyanic acid are formed in the light, and the solution acquires a strong acid reaction.

Nitroprusside of sodium with perchloride of iron is about twenty times more sensitive to light than the first alone, and approaches the sensitiveness of ferri-oxalate.

The following table gives the relative quantitative decomposition of the various substances in 40 ccm. of solution at 3 per cent. after four days' exposure to light:—

1. Iron-ammonia alum + oxalic acid gives 0·028 grammes of iron oxide (present as oxalate).

2. Iron-ammonia alum + citric acid gives 0·015 grammes of iron oxide (present as citrate).

3. The double peroxalate of iron and potassium gives 0·022 grammes of iron-oxide (present as oxalate).

4. Ferric oxalate gives 0·036 grammes of iron-oxide (present as oxalate).

5. Nitroprusside of soda gives 0·002 grammes of Prussian blue.

6. Nitroprusside of soda and perchloride of iron give 0·039 gramme of Prussian blue.

7. Ferricyanide of potassium and iron-alum* give 0·004 gramme of Berlin blue.

8. Ferricyanide of potassium and perchloride of iron yield in the light 0·039 gramme of Berlin blue.

9. Ferricyanide of potassium and chloride of iron (in darkness) give 0·022 gramme of Berlin blue. Difference = 0·017 gramme.

10. Iron-ammonia alum and sugar }
11. " " alcohol } no reduction.
12. " " urea }

Iron-alum with oxalic or citric acid decomposes more slowly than ferrioxalate. It is, however, worthy of remark, that perchloride of iron with oxalic acid decomposes more rapidly in the light than ferric sulphate (in the form of the ammonium double salt). With oxalic acid in this case, therefore, the relative photo-chemical decomposition of the chlorides exceeds that of the oxides. Perchloride of iron with alcohol decomposes quickly in the sun, with the formation of chloride of iron; persulphate of iron with alcohol is permanent in the light.

(*To be continued.*)

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CAUSE AND PREVENTION OF FRILLING IN DRY PLATES.

BY P. F. REINSCH.

It is a recognized fact that even with the best gelatine dry plates, and with all the care that may be employed, frilling and blistering will sometimes show themselves after fixing during the washing. The cause of this defect in the gelatine film has often been discussed, and without, however, sufficient ground being given, or a satisfactory remedy being supplied. In the course of experiments I have succeeded in discovering the cause of frilling. A fixed plate was washed with water from the cistern which had been filled with ordinary spring water having a temperature of about 16° Cent., the temperature of the dark-room being about 21·5° Cent. Soon small frillings formed at the edge of the plate, which, during continued washing, increased until the film was covered. A second plate of the same size was then washed in the same dark-room with a stream of water the temperature of which was identical with that of the room, viz., 21·5° Cent. On this plate, one of the same make, no trace of frilling was discoverable.

This experiment shows that even so slight a difference of temperature as 3·8° Centigrade is sufficient to cause frilling.

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ARTISTIC FEELING IN PHOTOGRAPHY.

BY A. H. WALL.

Part VI.—On the Treatment of Skies and Clouds

As I take pen in hand to deal with this section of my subject, I recall, with a smile, one of the earliest crusades against the inartistic in photography with which I happened to be connected. It began, I think, in 1859 or '60, at the South London Photographic Society—at that time in *its* beginning—and was projected against the then common practice of substituting for skies and clouds, bare, blank, flat, masses of opaque white paper. By thus leaving nothing at all where air and light should play their most important and prominent parts, it was actually believed by whole hosts of operators that a landscape photograph was wonderfully improved! All kinds of ingenious dodges were introduced to "stop out skies" in the negative, so that the pure and perfect blankness of the paper should not be destroyed. For my poor part, I made a vigorous onslaught, and luckily, not without some effect, inasmuch as most of the more active, tasteful, and prominent members of the "societies," backed by the journals, seconded the effort, which at last so prevailed that "white *skies*," as they were comically called, instead of being the rule, became the exception, and are now, I suppose, quite unknown.

Then came the days of "printed-in skies," with clouds made on the printing with—Heaven bless the mark!—cotton-wool. To some extent this was improvement. The over-powering mass of staring white did not throw all the tones of the landscape utterly out of keeping, robbing the high-lights of their luminousness, and, by contrast, making the heavier cast-shadows look unnaturally black and heavy; but they were no more like air and light than the white paper "skies" were. You saw at a glance that they were artificial. They were, indeed, glaringly so, being altogether due to the operator, and entirely unconnected with what the lens gave. How could there be anything in common with a pulled-out piece of cotton-wool laid on a flat-toned surface, and that exquisitely wonderful and beautiful region of ever-varying depths, surfaces, forms, and effects—the sky?

The light and shade of clouds are wonderfully subtle and expressive in their gradations, and always full of pregnant meanings. They accumulate in endless diversity of expressive forms, a vast universe of changeful beauty, alike glorious in the grandeur of their larger masses, and in the tender delicacy of their most diminished forms. They have, of course, their aërial and linear perspective; their outlines and their surface variations, marked by high-lights, half-tones, and reflected lights, all indicating the chief governing influences of the landscape, such as the source and kind of illumination, the atmospheric conditions which rule in the picture's more prominent and powerful effects, and with which, I need hardly say, they should always be in natural harmony. How could all this have been obtained with cotton-wool and a "printed-in sky"? Yet it was once a very common belief that they could be so obtained, and I remember some good folk were almost angry—indeed, some were quite—with those who said they couldn't.

Blunders of the same kind are not, however, confined to photographers. Not a few artists have perpetrated them, and, indeed, some of these blunderers were not only clever, but even great artists. Thus, in Turner's "Shipwreck," as Ruskin first pointed out, the stormy waves are without foam, and the air above them has no spray in it. "None of the white touches in these seas," he said, "have in the least the construction or softness of foam"; and he added, although this work displayed "infinitely more power of figure-painting than ever landscape painter showed before," yet "in such a sea as this of the shipwreck, the figures, even in the nearest boat, would have been visible only in dim fragments through the mist of spray."

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* This mixture suffered so little decomposition during the time specified in darkness, that no precipitate that could be weighed was formed.

He says, too: "There is a worse fault in this picture than the want of spray. Nobody is *wet*. Every figure in the boat is as dry as if they all were travelling by waggon through the inland counties. There is no sense, in the first place, of their clothes clinging to their bodies; and, in the second place, no surface is reflective."

Some few months since, by-the-bye, I was on the South Coast—at Bognor—where I purchased from the studio of a local photographer, whose shop faces the sea, one of the most wonderful photographs of stormy waves taken from the shore that I ever saw. The foam forms were especially curious—torn and rent, and cast upward to a great height by violent action in the most singular way. The air, thick with spray, was realised by the lens with the utmost perfection and accuracy; while the rush and leap of the furious water, its fierce dash, its sudden rushing back, as if to gain fresh impetus for another spring, the wild shock of its conflict, furious waves struggling one with another in the fiercest intensity of their rage, heaving and sinking, writhing and tossing in a bewildering mass, held me spell-bound before the window in which I first saw it. In a smaller photograph of the scene the effect was that of over-crowding, too much in too little. In the exhibited enlargement it was simply magnificent, as I could not help telling the pleasant young lady from whom I purchased my copy, which I called exultingly a wonderful lesson in seascape. Some splendid examples of skies and clouds are also to be seen in Mr. Donkin's large Alpine photographs.

But to go back, and yet remain with Turner. Do you remember his "Rain, Steam, and Speed" in the National collection? What would that picture be without its sky and its clouds? You can hardly imagine one part without the other, so perfect is their union. The sky is nearly everything; all the beauty and expression in that wonderful painting seem concentrated in it. Take again his "Line Fishing off Hastings," and see how essentially the landscape is part of the sky, and the sky of the landscape; how completely in unison are the water and the sky, the motions of the clouds, and those of the waves, both telling in different ways precisely the same story. "Calais Pier," which Ruskin says was the picture which first bore "the sign manual" of his "colossal power," is a fine illustration of harmony between stormy water, sky, and cloud. "We have here," said the great art critic, "the richest, wildest, and most difficult composition," with "exquisite appreciation of form and effect in sea and sky." Although, as he also, with a sharp touch of satire, wrote, "It is very squally and windy, but the fishing boats are going to sea, and the packet is coming in in her usual way, and the flat fish are a topic of principal interest on the pier. Nobody is frightened, and there is no danger."

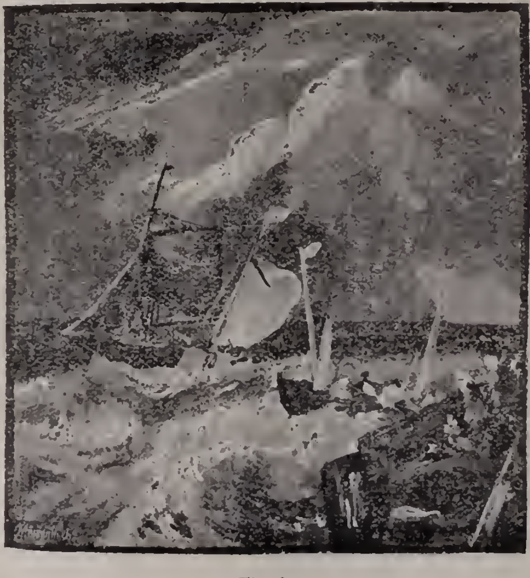


Fig. 1.

I have made (fig. 1) a black and white sketch of the general effect of this picture roughly put in, and altogether without the wonderful detail and softness of the original, but sufficient, perhaps, to lend some force to my remarks as to that unity of effect which I am trying to impress upon the attention of photographic art students as a vital necessity in all good landscape art. One point which I have chiefly in view is that of a focus of light and dark which the sky gives it, and the water aids, and the way in which breadth is secured by the light sail of the fishing

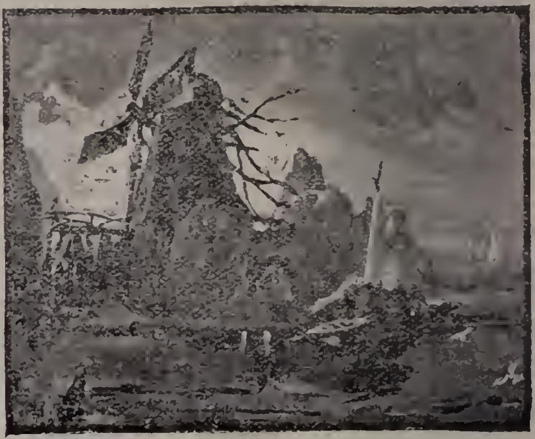


Fig. 2.

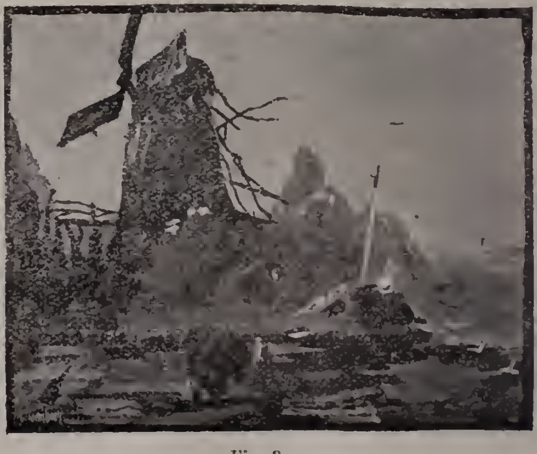


Fig. 3.

boat, which carries the eye from the waves upward to the most intense light—that in the sky.

The part contrast plays in at once intensifying the brilliancy of light, and increasing depth of shade, will be further seen in fig 2, which is from an etching by the Rev. E. P. Owen, and will serve also to show how a weird, wild, romantically picturesque effect may be obtained by combination of sky and cloud. Take away the sky belonging to this picture, as I have done in fig 3, and see how different is the result. The powerful sentiment and feeling of the picture at once vanish.

The remaining sketch, fig. 4, is from another etching by the same artist, again illustrative, but in a different way, of thus focussing the effect by contrast. Here, the dark tower and battlements of the ancient bridge at Shrewsbury, called the Welsh Bridge, comes into direct contrast with the strongest light in the lightest part of the picture—the sky—and thereby adds greatly to the aërial and luminous effect of the entire picture. Here, again, it will be seen how the composition, natural truths, and picturesque effects are all served by sky and cloud.

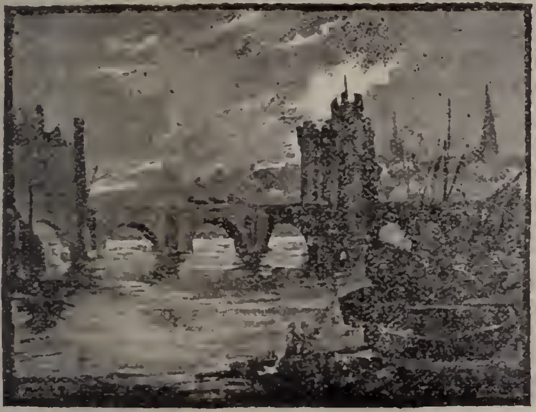


Fig. 4.

I shall resume this subject in my next paper.

(*To be continued*).

PANORAMIC VIEWS.

A panorama, in popular phraseology, is a picture of a decidedly oblong form, embracing a very wide angular extent of subject. The perspective in a panorama differs from that known as plane perspective. Every portion of the view that is to be depicted in panoramic perspective by a lens must pass axially through the lens. In ordinary photographic operations in which the perspective is plane, only the centre of the view fulfils this condition, all the rest being depicted obliquely. Hence, in order to photograph with panoramic correctness, the camera should be mounted on a pivot and the lens directed in succession to every part—on a horizontal plane- of the view that is to be taken, provision being made to shut out from the sight of the lens all of the sensitive plate, except a narrow strip exposed behind a slit, the plate being made to pass with a steady motion behind it, while the camera is being rotated on the stand.

This is one of two forms of panoramic camera, the other being one in which the lens is an absolutely spherical globe formed of a glass shell, the interior being filled with water. With such a lens it is evident that every ray that is transmitted will be axial, as all are transmitted under like conditions. But in such a case the plate on which the negative is to be produced would have to be bent in a cylindrical form, the radius of its curvature being equal to the focus of the lens.

Both of these cameras at one period were manufactured, but owing to the difficulty and consequent expense incurred in their production they have long ago since ceased to be made.

Owing to the perfection with which wide angle lenses are now constructed, the necessity, or more correctly the extreme desirableness, which at one time existed for having panoramic lenses have passed away, because of the facility with which a wide extent of subject may be included on a plate by taxing the lens to its utmost capabilities.

But still there are innumerable subjects in which the lateral range is so great as quite to transcend the powers of any lens. Among such subjects may be mentioned a long range of mountains, lake scenery, and the like. Anything that has extension in any considerable degree will set at defiance the powers of an ordinary photographic lens and camera to get it produced.

But by taking several photographs in succession, rotating the camera on its stand a certain distance between each, a series of consecutive views will be obtained, which, if placed end to end, will afford a fairly good panoramic representation of any scene, however extended it might be. But even the succession of negatives were printed on one sheet of paper, and every care taken to superimpose them at the junction common to any two, and were such skill adopted in the printing as to have them identical in tone and vigour, yet would not the resulting photograph be a true panorama, in the perspective sense of the term, but one possessing a combination of plane and panoramic perspective. However, if care be taken in the selection of the subject, such conglomeration will scarcely be noticed even if looked for. But when a building, or series of buildings, forms the subject, then is the result most painful to an educated eye.

As to the best way by which to join the ends of a succession of views, we would here strongly reiterate what we have formerly said when writing on this—abstain from making any attempt to join them. Such attempt is certain to produce dissatisfaction. Much better is it to mount them a small distance apart. Such a trifling separation as the twentieth of an inch will quite well effect the purpose of not disturbing the continuity of the examination of the outlines and details of the scenery on both sides of the separation, while it effectually prevents little points of non-agreement in the drawing and the transition of the perspective being noticed. Slight differences in tone, too, remain unobserved. Such immunity would not be obtained if the prints were trimmed and mounted, or printed on a sheet so as to make a continuous whole of the series.

The reintroduction of the roller slide upon which to wind a long band of flexible sensitive material for negatives suggests its value as a means by which to produce panoramic views.

It will, without doubt, greatly facilitate the production of panoramas in combination perspective, which may either be composed of elementary pictures slightly separated from each other, as just described, or joined together without the chance of anyone discovering the junction.

We have already described the *modus operandi*, but prefer doing so again more fully. Having discovered the optical centre of the lens that is to be employed (and as it is imperative that the lens possess freedom from curvilinear distortion, this centre will be about midway between the two lenses forming the combination), let the pivot upon which the camera is to be rotated be precisely under this centre. A strip of sheet brass screwed to the bottom of the camera and projecting forward, and having a hole in its outer end, will form a suitable appliance for effecting the rotation. The top of the stand must carry a little table on which the camera is placed, and the pivot referred to must be fixed in this table. In determining to what extent to rotate the camera after having made the first exposure, see that a small portion of each view taken is duplicated in that which follows, and let that part which is subsequently to form the junction be precisely as far from the right-hand end of the one plate as from the left hand end of the other. When the whole of the views have been impressed, develop them without severing the paper. When quite finished and dried, let them be divided, and having carefully superposed the end of one upon its corresponding one, and got the details common to both to agree (a retouching desk, having a strong glass bed-plate, being the best means for effecting this adjustment), sever the two from top to bottom with a very sharp and thin-edged knife, and when the end pieces or clippings are removed, and the negatives placed edge to edge, the subject will be absolutely continuous even to every detail.

If this has been skilfully done, the print that is taken from the two negatives, previously joined by strips of paper at the top and bottom, will not show any indication of a junction. The only way by which the true origin of this panoramic negative can be discovered is by the mixed perspective; for, as we have said, while the picture as a whole is panoramic, it is formed of a series of photographs projected in plain perspective.—*Photographic Times.*

Notes.

The excellence of the general arrangements in connection with the Exhibition and the opening *soirée* are in great measure due to the energy and judgment of the assistant secretary, E. Cocking.

Among the inventions in photography rejected by an unappreciative Hanging Committee, was that of an original genius who surrounds a small photograph with a wide expanse of silk, pleated after the manner of the front of a pianoforte.

"Would you believe it? But I assure you that these things took me no less than two hours to arrange." "Such things require the tender care of one who almost loves them as children." "Ah! you would think that this kind of thing is done off-hand, but it is not so." "I always like to have good frames; by-the-bye, each of them cost me no less than three pounds."

The above sentences, or others scarcely differing from them, were heard in the Pall Mall gathering on Saturday rather a hundred times than once; but it is gratifying to note that the same individual was the offending party in each case. Not only during the evening, but at the afternoon press view, was the above subject-matter recited in a loud voice by an exhibitor while standing before his own frames.

In future it is to be hoped that the council will take steps to prevent any persons being present at the press views but those who are entitled to be present, as it is by no means fair that those who have to do hard work during the afternoon should be hindered and annoyed by a loud-voiced person who has the bad taste to puff his own wares on such an occasion.

The offender, it may be mentioned, is quite a novice at photography, or he would not have thought so much of two hours' work. "How long did it take you to arrange yours?" we asked of a well-known maker of pictures by photography. "It is difficult to say," was the reply; "but two months would be far nearer the mark than two days."

He was staring at a pink telegraph form lying on a partitioned desk in a City Post Office. The words, "Photograph, metamorphosis, camera, Gladstone, Desdichado," fascinated him. In the midst of his reverie up came a stranger, snatched up the paper, and exclaimed—"Well to be sure, if that isn't a piece of impudence!" "What do you mean?" he returned, fiercely. "Why,' said the stranger, "I just turned my back for a moment, and you come up and read my telegram. Luckily it's in cypher." And the stranger darted away, refusing to listen to his explanation that he was a photographer, and that, nobody being at the desk, the word "photograph" caught his eye, and he naturally stopped to look at it. He went away muttering that the compilers of a telegraphic code had no business to use the word photograph.

Algin tissue or seaweed paper should be useful to photographers. In Watson Smith's report on the Chemical Industries, as represented by exhibits in the Inventions Exhibition, the following remarks are made regarding algic cellulose:—"This substance bleaches easily, and under pressure becomes very hard, when it can be turned and polished with facility. It makes also a good paper, tough and transparent, but with no fibre. Alone or mixed with algin and linseed oil or shellac, it may be used as a non-conductor of electricity where a cheap material is required."

A really transparent paper is just what photographers are looking for at the present time, and we recommend them to try the seaweed paper as a support for the gelatino-bromide film.

"If," writes a correspondent, "as you stated last week, it will be possible with a lens of rock salt to photograph in the dark, it is clear a new terror will await the burglar. For pater familias, aroused by a house-breaker, will fire his revolver with one hand, whilst with the other he aims his instantaneous camera at the noise; and even if he misses his disturber, with the former weapon will secure a 'pistolgraph' of him for the information of the police. But, of course," he added, "much depends on the further triumphs of Abney, whose marked success in the past certainly makes one chary of 'Abneygatting, even his most startling propositions."

Lord Rayleigh has been discussing "the accuracy of focus necessary for securing sensibly perfect definition," a matter which we have repeatedly treated of in the News. He points out that mathematical research and practical tests both point out that a displacement of one-hundredth of an inch is often recognizable. Lord Rayleigh's observations had been made principally with the telescope, and of course lenses of long focus, but it is clear that they are equally applicable to our cameras.

Prof. Hartley makes a very interesting report on his investigation by photography of the ultra-violet spark spectra of metals. The study of a great number of negatives shows the strength of the solution of the metallic salt under examination to have an important effect on the number of lines visible : the more dilute the solution, the fewer are the lines. It is quite possible to make a quantitative analysis in this way, since the same strength of solution always gives the same number of lines. So delicate is the test that it reveals the presence of one part of magnesium in ten thousand millions by the presence of the two characteristic lines of that metal.

Evidences of the presence of the "silly season" continue to reach us by well nigh every post. One of our correspondents, who is, at any rate, brief, asks us to note that photographers are rarely influenced by those considerations of social rank which too often appeal to what is flunkeyistic in man. For instance, he adds, "look at the case of two individuals, so far apart in a social sense, as the justice of the peace and the loafer brought before him for some petty crime. But is the photographer influenced by the existence of that social gulf? Certainly not; for do we not always read that "the prisoner was 'taken' before the magistrate?"

The Committee of the British Association appointed to consider the standard of white light report that "the standard candle as defined by Act of Parliament is not in any sense a standard." The spermaceti of which it is composed is not a definite chemical compound, and is, moreover, mixed with other substances. They state that the pentane standard of Mr. Vernon Harcourt is the best standard of white light they know of at present, but recommend further experiments before coming to a final decision,

At length England is to be relieved from the disgrace of having no telescope of the first class in any of the National Observatories. An order for a 28-inch refractor for Greenwich Observatory has been placed in the hands of Howard Grubb, of Dublin, and we may be sure that the skill which has recently been applied to the construction of magnificent instruments for foreign governments has not been diminished by the experience gained. We trust that part of the work to be executed by the new telescope will be in connection with the photographing of the heavens, although a reflector such as that of A. A. Common is perhaps better fitted for that class of work

Those who may wish to inspect the most recent products from the establishment of Braun, of Dornach, whose work at the National Gallery has recently excited so much comment, will find a fine set of his photographs in the Art Library at the South Kensington Museum. We recently spent an hour in turning over the copies of the paintings in the Royal Galleries at Dresden, and they certainly seemed superior in beauty, truth, and spirit to any engravings of the same pictures with which we are acquainted.

"An adhesive mount as used in America." This is sent on by a correspondent, who says:—"The print is placed on it direct from the washing, pressed, and allowed to dry. It is then burnished with considerable heat, and finally hard pressed."

The card appeared to us to have been coated with a strong mucilage of gum tragacanth. By coating cards with this material we succeeded in preparing an adhesive mount, which answered admirably when used in accordance with the note of our correspondent.

In using adhesive mounts prepared with mucilage of tragacanth, it must be remembered that by mounting the prints wet, the distortion which arises from unequal stretching of the paper is perpetuated while at its extreme. It might be better to allow the prints to dry, and to quickly moisten the back of each with a sponge just before placing it on the adhesive mount.

Patent Intelligence.

Applications for Letters Patent.

11,729. George Wilson Morgan, 5, Crimon Place, Aberdeen, Scotland, for "Changing and Holding Photographic Scenery Backgrounds, called the 'Simplex Photographic Background Frame.'"—2nd October, 1885.

11,777. Leon Warnerke, Silverhowe, Champion Hill, London, S.E., for "Adhesive Carrier."—3rd October, 1885.

Patents Sealed.

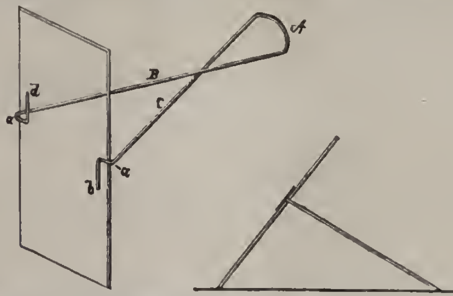
13,318. James Thomson, 21, High Park Street, Liverpool, for "Improvements in Photographic Cameras."—Dated 8th of October, 1884.

13,596. Alfred Julius Boult, 323, High Holborn, Middlesex, for "Gelatine Plates, Films, or Tissues for Use in Photography and Process of Manufacturing and Using the same."—Communicated by George Eastman and William Hall Walker, United States.—Dated 14th October, 1884.

3581. Alfred Peter Sharp, 17, Great Brunswick Street, Dublin, for "A Photographic Dark Slide for Negatives on Paper."—Dated 20th March, 1885.

Patents Granted in America.

326,921. Sterne Russell, Waterbury, Conn., assignor to the Scovill Manufacturing Company, same place, "Photographic Plate-holder." Filed April 20th, 1885. (No model).



Claim.—1. The herein-described holder for photograph-plates, made from wire, bent to form the bow A, the legs extending therefrom and crossing each other, the legs near their ends turned inward to form a grasping-angle, *a*, and the extreme ends turned into a position parallel to each other, and in a plane at substantially right angles to the plane of the legs, substantially as described.

2. The herein-described holder for photograph-plates, made from wire, bent to form the bow A, the legs extending therefrom and crossing each other, the legs near their ends turned inward to form a grasping-angle, *a*, and the extreme end *b* of one leg turned into a plane at right angles to the plane of the two legs in one direction, the end *d* of the other leg turned into a plane parallel with the leg *b* but in the opposite direction, substantially as described.

TROUBLES AND PITFALLS IN OUT-DOOR PHOTOGRAPHY.

BY EDWARD DUNMORE.*

Of the many troubles and accidents that befall photographers when on the war-path, I think we may safely say the weather is the most important of all pertaining to out-door photography. It not only determines whether a negative shall be bright or dull, artistic or commonplace, but whether our plates and apparatus shall remain intact, or come to grief. Verily, the elements have much to answer for. I think it may be set down as an indisputable fact that only in the best weather can the best photographs of ordinary landscape work be obtained. The *bête noir* of all negative making is wind. It will not only destroy foliage effects, and cause the camera to vibrate, but, in an unguarded moment, will upset the whole apparatus, blow an easily-fitting cap off the lens, play objectionable pranks with the focussing cloth, letting the light get to the plate—in fact, play the very dickens with the turn-out in its entirety. I speak feelingly, having suffered considerably by wind during the past early summer. When two exposures have to be made on one plate, and the subject is water and trees, absolute quiescence is necessary for success, if only for a few seconds. One exposure may have been satisfactorily accomplished—the wind rises, the watery mirror is a mirror no longer, the branches of the trees sway to and fro, the foreground foliage wavers and trembles, and there is nothing for it but to wait patiently till things are quiet again; by that time, perhaps, the light has gone, clouds have come up, and if the second half of the plate is exposed, it is difficult to judge the time so that it will develop up with the first exposed portion, and make a negative equal in density and detail.

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* Read before the South London Photographic Society,

There is an old saying that if you are accidentally hit on the face, it is sure to be in your eye. Now, if there are a few clouds floating about on a fairly clear sky, and you particularly require bright sunshine, they will, in the most perverse manner, float over the sun longest way on, getting larger as they float, till your eyes ache, and patience fails in waiting for the troublesome vapours to disperse. During the time there is not a sign of wind, no rustling of leaves or waving of grass; everything is beautifully still, which, with a touch of sunlight, would produce a perfect effect. At last the sun is gradually unveiled; at the same time there is gentle swaying of branches and rustling of leaves, and you are informed, in the plainest possible manner, you have waited only for disappointment. This vexatious condition of things is particularly prevalent by a river side, or on elevated positions, where the gentle breezes are prone to disport themselves. Now, this particularly interesting process of waiting for the clouds to roll by has been tolerably frequent during the past summer. It is all very poetical to talk of gentle zephyrs, and to enjoy refreshing breezes, or to be braced up by a healthy wind; but it's not the photographer who will chant its praises.

The insidious mischief of wind is something wonderful in photographic picture making. It is almost impossible to keep a strict watch all round on the delicately-poised foliage in a leafy view; and it will often happen that some portion that, in the photograph, looks conspicuous, has moved, quite spoiling the result, when you had fondly flattered yourself every leaf was beautifully still. Then again, dust, on a windy day on some soils, is an abominable nuisance. It will find its way into the camera and on to the plates, making specks on the negative, no matter what precautions may be taken.

Wind, directly or indirectly, causes more trouble than almost any other atmospheric condition. One is lured on by a bright sky to make exposures that only end in failures; whereas, with a good honest fog, no attempt at work is made, as you are perfectly well assured beforehand what would be the result if you did.

Another trouble, which rests with the photographer, and may be called his personal equation, is "flurry" or excitement, which is a special failing with beginners, and from which old hands are not always exempt. It has undoubtedly something to do with many imperfect results, whether the imputation will be admitted or not. We will suppose the photographer has been waiting hour after hour for a certain effect—an effect that can last but a very short time. It arrives at last, but somewhat unexpectedly all the same, and unless the operator is of a very stolid and unimpressionable disposition, the chances are that from some oversight or other, the negative is defective; exposure calculated for a wrong sized stop, the shutter drawn with the cap off the lens, or some mischance or other that in an ordinary way would not be likely to occur, and for which the performer is the first to dub himself an ass. Reason and deliberation are terribly discounted by flurry. Unfortunately, some errors are not found out until too late to remedy them; that is, when the plates are being developed. A plate may remain curiously clear under the action of the developer.

Possibly the special view that caused so much anxiety—a little extra alkali is added, but with no apparent effect, till it gradually dawns upon you the plate has, by some inexplicable reason, not been exposed. Soon you are sure of it, and, with a puzzled feeling, begin to develop the next plate, on which, after a sort of hesitancy, the image rushes up like a thunderstorm, and you become aware of the mortifying fact you have made two exposures on one plate—*sic transit gloria*, &c.

Yet another development; another blunder! What is it? There is an indescribable appearance about the negative of an unsatisfactory kind; we will see how it looks when it's fixed. The magnifier is brought to bear, but the queer look is only increased. Is there a hole in the camera bellows? No. Is it in the front or flange screw out? No. We examine the lens put away just as last used. The murder is out; the revolving diaphragm, which works too easily, has been shifted, and part of two apertures has been used to make the image instead of one; hence the trouble. Again, when working with plates of several degrees of rapidity, they are prone to get mixed, and errors of exposure happen in consequence. This is especially the case when many negatives have to be taken, and development is delayed for a day or two, plates of different degrees of sensitiveness being used on the same day. If there then exists the slightest doubt about which is which, the more it's considered the more foggy one gets, and it is then a mere chance that the development is right for the plate under treatment.

Another trouble that sometimes occurs, and that is the plate is a trifle too small for the holder. The dark-slide may get an extra shake, so that when the shutter is drawn the plate falls forward towards the camera sufficiently to prevent the return of the shutter, the spring between the plates is sufficient to prevent it being shaken back into its proper place, spoiling it, as a matter of course. Warping, too, of the thin veneer shutter now in vogue is a source of trouble. By rubbing the surface of the film in the process of opening and closing the slide wherever the friction takes place there will be lines on the negatives; although the film may be not perceptibly scratched, still the friction will produce lines that show by increased density on developing the negatives.

Pulling up the wrong or outside shutter of a double dark-slide will sometimes happen. Owing to the method in which the shutter is generally manipulated, it is entirely a matter of feeling. The apparatus being enveloped in the focussing-cloth, the tabs of the two shutters being close together, it is very easy to pull up the wrong one, unless great care is exercised. A performance of this sort is, however, not likely to occur often to the same photographer unless he is exceptionally careless—the annoyance of spoiling a plate, or probably a negative, being a powerful incentive to caution.

With regard to troubles with drop-shutters, if made of ebonite and used in very hot weather, the material may get soft and bent, so that the shutter will stick in its descent, or not drop at all, and so spoil the plate; but take them all in all, drop-shutters are as free from faults as any part of a photographic outfit, and are usually reliable. Defects may happen in a pneumatic release, or an elastic band get broken; but with these exceptions there is very little chance of them getting out of order.

I think now I have exhausted the list of difficulties that occur to me as likely to happen on a landscape tour; such matters of carelessness as losing the stops of the lens, or leaving the plate-box open, or similar negligences, are scarcely worth referring to; but I have at the same time refrained from suggesting any remedies, the remedy being in many cases obvious. The simple enumeration of the troubles may perhaps bear fruit by inciting some of our inventive members to introduce little useful modifications in our apparatus that will tend to prevent even accidental mistakes. There is one thing, however, that is, and always has been, an unmitigated nuisance, and that is the focussing-cloth, and he will be a benefactor to photographers who will invent an efficient substitute for it—one that will embrace all the useful qualities, and relieve us from the ever-recurring smothering we have for so many years resignedly put up with.

ABSTRACT OF WM. LANG'S INAUGURAL ADDRESS.

The art we practise has had for me a peculiar fascination "e'en from my boyish days." The delight that accompanied the production of the first picture obtained by means of the home-made cigar-box camera and the sixpenny meniscus lens is still present to my mind.

In the second half of the 16th century the Italian philosopher, Porta, discovers the camera-obscura, but not till the first half of the nineteenth do the men arise (Niepce and Daguerre) who show mankind how to secure the fleeting images of Porta's instrument. Referring to the camera's delineations, Arago, in his masterly report presented to the Chamber of Deputies, on the occasion of life pensions being granted to Daguerre and Niepce by the French Government, spoke as follows:—"No person, however, has ever witnessed the neatness of outline, precision of form, the truth of colouring, and the sweet gradations of tint, without regretting that an imagery so exquisite and so faithful to nature could not be made to fix itself permanently on the tablet of the machine. Who has not put up his aspiration that some means might be discovered by which to give reality to shadows so exquisitely lovely? Yet, in the estimation of all, such a wish seemed destined to take its place among other dreams of beautiful things—among the glorious but impracticable conceptions in which men of science and ardent temperament have sometimes indulged."

Although neither a Chaucer nor a Shakespeare can be said to have foreshadowed the wonders of the photographic art, still a very remarkable forecast seems to have been made by a French writer, Charles Francois Tiphaigne de la Roche, in a book published in 1760, and which bears the grotesque title of Giphantie (which, by the way, is an anagram of Tiphaigne). This author relates how he was caught up in a hurricane and deposited in the abode of the genii, who showed him the mysteries of nature. "You know," said one of these genii to Tiphaigne, "that rays of light reflected from different bodies make a picture, and paint the bodies upon all polished surfaces; on the retina of the eye, for instance, on water, on glass. The elementary spirits have studied to fix the transient images; they have composed a most subtle matter very viscous and proper to harden and dry, by the help of which a picture is made in the twinkle of an eye. They do over with this matter a piece of canvas, and hold it before the objects they have a mind to paint. The first effect of the canvas is that of a mirror; there are seen upon it all the bodies far and near whose images the light can transmit. But what the glass cannot do, the canvas, by means of the viscous matter, retains the images. The mirror shows the objects exactly, but keeps none. Our canvases show them with the same exactness, and retain them all. The impression of the images is made the first instant they are received on the canvas, which is immediately carried away into some dark place. An hour after the subtle matter dries, and you have a picture, so much the more valuable as it cannot be imitated by art nor destroyed by time."

So ran the day dream of this fantastic writer, Tiphaigne; but nearly all, if not more, of the wonderful properties ascribed to these canvases coated by the elementary spirits have had their fulfilment in the instantaneous dry plate of these later years. Tiphaigne's viscous matter most aptly describes, by anticipation, the gelatine emulsion, so familiar to us all that there is little need to enumerate the wonderful susceptibility of the modern photographic plate. Given the light, no object in nature moves so rapidly but that its image can be secured. The flying bird, the passing steamer, the rushing train, and the surging crowd, have each in their turn been depicted. The busy streets of our own and other towns are now no longer represented as unfrequented, and devoid of life, veritable cities of the dead, as they were before the advent of the gelatine plate. Formerly, street views had to be taken early in the morning, before the stream of life had commenced to flow. Sometimes, perhaps, the solitary figure of a policeman leaning against a lamp post relieved the dullness of the scene; but his pose only served to bring out the fact that the policeman's lot is not a happy one.

Photography may be said to be the offspring of the two sciences, optics and chemistry. The study of the former has resulted in the production of that marvellous instrument of precision, the photographic lens, while it is the province of the latter to explain the varied reactions that are involved in the production of a photographic picture. It may not be out of place here, I think, to urge on the younger members of this Association the necessity of their making themselves acquainted, as far as they possibly can, with the elementary facts of chemical science, either by attending a course of lectures, or getting a good text-book, and working at it to the best of their ability. A knowledge of the lens, affecting the various operations which the photographer is daily called upon to perform, would, I take it, lend an additional interest to his ordinary routine work; nay, more, it might lead him on to the perfecting of a particular process, or better still, the working out of a new one. Much as may have been done in the past in the way of photographic achievement, there are still many worlds to conquer, so that no photographic investigator need sit down like the Greek king of old, and lament that there is nothing more for him to do.

Consider, for a moment, the fact that light acts not only on the silver salts, but also on certain compounds of uranium, iron, chromium, &c., and you will see that the field of research is a wide one. The old fable of the treasure hid in the field holds good in photography as in many other things, but it is only by working continuously that any treasure will be made manifest.

Another point that I would like to touch upon, which I think is worthy of consideration, more especially by those who have joined the photographic ranks these last few years, is, that the history of our art-science should be carefully studied. Were this more attended to we should not have so many old processes put forward as novel, or old forms of apparatus introduced as something entirely original. How many of those practising photography at the present day could give, if called upon, an account of some of the old processes—say the amphitype, the chrysotype, the energiatype, or the chromotype?—and yet each and all of them are still not without interest. The French seem to have been studying lately their historical records, and to some purpose. In a comparatively recent period, public statues have been erected to Daguerre, Niépce, and Poitevin. When shall we see similar tributes paid to the memories of their contemporaries—to Herschell, Fox-Talbot, and Ponton?

We have been hearing a good deal lately about film negatives, and the opportunity is afforded us to-night of seeing what can be produced on the film prepared by the Eastman Co. I do not know whether this class of negative will offer the same advantages to the professional that it will undoubtedly do to the amateur. History is again repeating itself—these films, after all, are but improved editions of the early Talbotype. I would be afraid of the paper support ultimately asserting itself, and leading to a fading of the image; this, of course, time can alone determine. Glass is an inert substance that cannot easily be replaced or imitated. We have also received the films which Warnerke has brought out. The special merit—or, rather, one of the special merits—of the films produced by this inventor, is that both sides of the support are coated with emulsion, and the image is produced on both sides of the transparent medium. Woodbury seems to have been engaged, before his death, in the working out of a transparent film, but with what success I am unable to say. I think, however, from what we know of this inventor's genius and perseverance, that, had he been spared, complete success would have crowned his efforts.

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THE LATENT IMAGE, ETC.

BY G. D. MACDOUGALD, F.I.C.*

What is the difference between an exposed and unexposed photographic plate? Is the colour the same? Yes. Is the weight the same? Yes. Is the solubility of the silver salts the same? Yes.

One might imagine if these three things are identical, there could not be much difference in the nature of two substances, and yet there is a very decided difference between an exposed and unexposed plate, as every beginner in photography discovers when he tries to take two pictures on one plate.

We, as practical photographers, have perhaps long ceased to give even a passing thought to the latent photographic image. There have been in the year past so many engrossing discoveries and inventions, that this wonderful fact—the sensitiveness to light possessed by certain materials—seems overshadowed and partially eclipsed.

I remember that at one time I considered the subject one scarcely to be comprehended. My photographic preceptor informed me that the hidden image consisted of sub-iodide of silver. We now work much more with bromide of silver than in the days of collodion. The common explanation applied to the present day would be that when light from a lens is flashed on a bromide of silver plate, a sub-bromide of silver is formed to a greater or less extent according to the intensity of the light.

Is this a true explanation of what takes place?

We shall see that while it contains the germs of truth, it is not (to use a legal phrase) the whole truth.

If light be allowed to act with great intensity and for a protracted period on bromide of silver under certain conditions, the silver appears in the metallic state, but this does not in the slightest degree prove anything as to the formation of a sub-bromide during short exposure and in a comparatively feeble light. In a very feeble light and with short exposure such as we have in the camera, is silver separated even in minute quantity? I think not. If it were, ordinary investigation would detect it.

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* Substance of lecturette delivered before Dundee and East of Scotland Photographic Society.

Is it true, then, that it is reduced to a sub-bromide? I think this is untenable. There is not such a thing as two chemical substances having exactly the same outward properties, and no difference has yet been shown to exist in the properties of the parts of the plate acted on by light, as compared with the other portions. The colour is the same. When placed in a material such as ammonia or hyposulphite of soda, the exposed and unexposed portions of the film are dissolved off with equal rapidity. In short, we must believe that in the film there are two chemical substances of distinctly different composition—a normal bromide and a sub-bromide—having identical colours and solubility, before we can accept the theory. It is hard to do this if a better theory is at hand. But, it may be argued, it is not necessary to believe that the whole of the portion acted on by light is reduced to a sub-bromide. If only the most minute portion is so reduced, the rest of the action is carried on catalytically. In some such way it may seem possible to bolster up a theory which is at best weak and clumsy.

There is another, and to my mind an infinitely superior theory, which we may designate the dynamic theory, and this we may consider for a few minutes.

As we all know, chemical substances are made up of very small particles or atoms. These particles or atoms are in a continual state of motion—of vibration—and are subject to the influence of the various forms of force, amongst which is light. When placed under suitable conditions, many chemical substances, including silver salts, are altered or changed by the action of light; in ordinary phraseology, they are "sensitive." Besides the silver salts, one of the most common instances of sensitiveness is to be found in the case of certain calcium salts, which become luminous on exposure to light. I have here a plate coated with a sensitive substance. A small experiment with it may help me to explain matters.

[The lecturer here exposed a plate covered with Balmain's luminous paint, below a negative, to the action of magnesium light, and exhibited the luminous picture on the room being darkened.]

Now here is a case of the action of light which may help to explain the disturbance due to light on a photographic plate.

In the first place, let us ask ourselves the question: Is the material of which this paint is composed destroyed or decomposed by the action of light? No. It remains exactly as it was, chemically considered. Then what is the change, and in what way does this paint bottle up light?

To enable me to answer this question satisfactorily, I will carry out another experiment.

Here is a pendulum timed to make a complete forward and backward oscillation in exactly three seconds of time. The weight is a very heavy one, of lead, weighing many pounds. What I am going to do is to send little puffs of air from my mouth against the heavy weight, at definite intervals of time, as measured by the small chronometer which I hold in my hand. I shall, to begin with, deliver puffs against the weight, for a minute, at intervals of one second. I shall then change the interval to puffs one in three seconds.

[The lecturer then began the experiment. After the lapse of one minute of puffs at intervals of one second, the pendulum was quite stationary and unaffected. After the lapse of the second one minute (puffs at one in three seconds) the pendulum was vibrating freely.]

What we have learned is that this pendulum will have nothing to do with any points of air coming at other intervals than one in three seconds, an interval of time which corresponds to its own time of vibration.

The energy in these puffs it takes up and accumulates, and it is easy to see, were a minute pair of bellows connected with this swinging weight, air puffs might be obtained from the stored energy. Now, for this pendulum, substitute the vibrating atoms of a sensitive body, and for the puffs of air substitute the beats of the light waves, and we have a complete explanation of the phenomenon known as sensitiveness to light.

The motion of the atoms of sensitive substances is altered by the beats of the light waves.—Instead of a pendulum beating one and a half seconds, and beats of one every three seconds, we come to deal with beats of light of many millions of millions per second. We have noticed, while looking at the luminous plate, that the light given out is not of the same colour as the light with which the plate was excited. Those light waves in the mixed light whose periodicity corresponds to the times of vibration of the atoms, are absorbed. When the plate is placed in the dark, these atoms give out the particular light which they have absorbed, and that light only.

Now the action on a photographic plate is something quite similar to these we have been considering, only our eyes are not suited to observe the effects of light on the silver salts. There are many sounds in nature that we cannot hear, and there are lights we cannot see.

After exposure in the camera, the places on the plate that have had most light have the atomic motion most developed. The light puffs on the vibrating atoms have been strongest there, and consequently they have gathered up more energy than the rest of the plate, and are oscillating between greater extremes.

This, then, is of what the photographic latent image consists: a greater or less motion of the atoms of the sensitive substance, those portions having had the greatest amount of light having the greatest motion.

It must be remembered, however, if light is allowed to act for a long time on a silver salt, an actual decomposition takes place —a "printing out" action. This may be seen to perfection when ordinary printing paper is exposed for a long time under a negative. Of these actions we are not treating at present, but of the more mysterious action in the camera when exposures, through small openings, are of a few seconds only at longest.

It is not a true decomposition which is effected, but the atoms of the sensitive substance are thrown into a state of vibration, which renders them easier of decomposition by outside agency.

And now a word about the action of the developer.

It matters not whether we are operating with sulphate of iron on a collodion plate, or with oxalate of iron, or alkaline pyrogallic on a bromide plate; the action is the same. These bodies have an intense affinity for oxygen. The common soda pyrogallic developer of the photographer is used in scientific laboratories for the absorption of oxygen in gas analysis.

What happens during development is this.

In those parts of the plate where the atoms are oscillating between the greatest extremes—that is, the portion most acted on by light where, therefore, the bromine and silver have the least hold on each other, an action begins which consists in the developer seizing the bromine and leaving the silver in the film to form the image. It is deposited in the film, not in proportion to the actual amount of light which reaches the plate, but exactly in proportion to the amount of light of a given rate of heat. The red light beats are too long; they do not move the atoms. The blue and violet have about the right length, and it is just in proportion to the movement caused by these rays that the image is formed, apparently untrue to natural tints and lights as we have them in nature.

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CHOOSING A SUBJECT.

BY RANDALL SPAULDING.

Beginners in amateur photography are now so numerous in all our communities as to warrant a word of advice even on a very simple matter.

The first picture to be made is of course the family group. The tyro, who has been in quite too much haste to read Robinson and other authorities, succeeds in displaying through the fogs and stains of his first negative some original and decidedly unique posing. The members of the family themselves become quite interested in the novel results, and will bear the strain of repeated trials until the first box of plates is exhausted.

The second subject to be attacked will be the amateur's residence, including the front yard with its trees and flowers. In this the amateur finds a much easier task, provided his camera carries a swing-back and a rectilinear lens. Without these accompaniments he will be doomed to disappointment. The writer was invited two or three days ago to criticise a picture in the making of which the amateur had used a very cheap lens and had neglected to use his swing-back.

The rather tall chimney was in imminent danger of falling upon the roof, a situation at first startling, then extremely ludicrous; I scarcely know myself how this remarkable result could have been brought about. But most amateurs are wise in paying early attention to landscaping; and it is on this point chiefly that I wish to speak.

The beginner is, not unfrequently, too ambitious in his first attempts. He tries to reproduce the most extensive areas; seeks the highest points that afford a view of the whole neighbourhood and town. I have been often urged to make an exposure from a particular point that affords a view of nearly the whole town. I have avoided doing so, and no doubt wisely. By following such suggestions the amateur "strains his lens" and produces a picture in which even the middle distance is weak and muddy. He has yet to learn the limitations of his lens, and the fact that no lens now in existence approaches the human eye in power and perfection.

Quality, and not quantity, is the chief desideratum in picture making.

An exceptional atmospheric condition warrants an occasional attempt at what I may call an epic view; but humbler subjects are generally more satisfactory, and hence more artistic. A hill-side, a shaded street, a rocky glen, a woodland path, a pond with mirrored trees—these and other choice bits of natural scenery are altogether suitable subjects for the camera.

Again, in choosing a subject, the amateur must choose for himself. He is alone most competent, for he soon learns to see things as they will appear upon his ground glass; that is, as when cut off from circumjacent objects. We are often surprised at the beauty of a photograph that discovers to us a scene that we have looked upon a thousand times. The reason is clear: the eye is no longer distracted by objects that lie outside the field of view. A most valuable function of the lens is that of selection and exclusion.

Again, many scenes that interest the eye do not readily lend themselves to the camera. At the suggestion of some ladies, whose artistic judgment would be in general accounted good, I recently walked a considerable distance to take a view from a certain bridge. I did not make the intended exposure. To the eye the view possessed some interest, but in a photograph it would have been flat and dreary enough.

A river coursing through a level marsh with little background, and a rather vacant foreground, would never make a picture. Objects that to the eye served to vary the scene, and lend it a certain degree of interest, lay wholly outside the field of view. It was plain to me, however, that the interest in this view lay chiefly in its power to stimulate the imagination. We sometimes forget how much this faculty has to do with our enjoyment of natural scenery. But the imagination finds far less excitement in a photograph than in the presence of nature herself. To this fact, perhaps, are due many of the amateur's mistakes in choosing a subject.

I will add, in closing, a single suggestion. A picture should possess human interest; that is, possess some phase of human life. These suggestions, however, in the depicting of natural scenery, should never be obtrusive. What is more suggestive and more charming in many a scene than a felled tree, a broken fence, or a well-worn foot-path?

In short, the "choice of a subject" involves the training and development of artistic feeling. In this development, indeed, the amateur finds his chief reward.—*Photographic Times.*

COSTUMES AT AUCTION.

A WILY PHOTOGRAPHER.

The sale of a costumer's effects at auction a few days since, at a big Mercer Street salesroom, called out an extraordinary crowd of people. The demand for masquerade costumes seemed to have been very light to the costumer himself, but it was certainly strong at the auction. There was one little man on a camp stool in the front row who bought extensively of costumes of every conceivable kind. He was small, dapper, bow-legged, and rather neat, with the exception of the lavish use of oil on his dark locks. On the very crown of his head was a small bald spot, which looked like the surface of an egg floating in ink.

"Down my way," he said, cheerfully, "the factory girls consider life hollow and insincere if they don't have their pictures taken once a year at least in costume. For three years I have been photographing them, with the aid of a pair of blue spangled tights, flushings, and a Turkish fez with little bells around the crown, but I haven't any theatrical footgear, and so the girls have to be taken in their own shoes. The factory and shop girls are not very far up in the matter of shoes, you know, and my show windows attracted a good deal of attention from scoffers and rivals. It does sorter spoil the illusion of a picture to see a plump and pretty girl, with a billowy bust and snowy arms, standing up in a queen-of-the-ballet suit of clothes on a foundation composed of a pair of Grand Street button gaiters busted out at the little toe and run down by the heels. It sorter spoils the illusion, you know. That sort of thing will be all settled now, though. And I've got the trade of the whole Bowery as soon as my stock becomes known."

He picked up a pair of pink silk slippers of a decidedly diminutive pattern as he spoke, and weighed them carefully in his hands.

"They look a bit small, don't they?" he said.

"Rather."

"Well, I'll bet you every woman that comes in my shop will be able to wear them long enough to stand in front of the camera and be photographed. The only trouble is," he added, thrusting his fingers inside of the slippers and against the silk, "they won't last long."—*Photographic Times.*

Correspondence.

MR. BOTTONE'S PHOTO-MICROGRAPHS.

Dear Sir,—Will you permit me to rectify an error which, though trifling in itself, might lead to useless correspondence if left uncorrected?

Either I, or your printer, inadvertently, after having specified that the micrometer used by me was ruled to *thousandths* of an inch, have given the dimensions of this famous dung fly's foot, from claw-tip to claw-tip, as being $\frac{15}{16000}$. It should have been $\frac{15}{1000}$.

Stanley Road, Carshalton. S. Bottone.

AN ATTEMPT TO PHOTOGRAPH THE SOLAR CORONA WITHOUT AN ECLIPSE.

[*Copy of letter to the Editor of* Science.]

Sir,—Mr. W. H. Pickering, having courteously sent me a copy of *Science* (August) containing a letter entitled "An Attempt to Photograph the Solar Corona without an Eclipse," may I ask you to insert the few lines which follow in the next number of your journal? Passing by all those points which are covered directly or indirectly by my reply to Mr. Pickering's first letter (*Science*, April 3), I find only two matters which I consider it necessary to notice.

1. Mr. Pickering says:—"The inferiority of the best gelatine plates to the human eye in this respect (small differences of light) is very readily shown by an attempt to photograph distant mountains." He then goes on to say, "Another illustration of the same thing is the impossibility of photographing the moon in the daytime when the sun is high above the horizon. Although the moon may be perfectly distinct to the eye, the negative shows no trace of it."

To your scientific readers the reasons will readily suggest themselves why, in the case of the moon in the daytime at some angular distance from the sun, the eye has an advantage over the plate, while in the case of the corona the plate has a great advantage over the eye. Apart from any such considerations, as a matter of fact, there is no difficulty in photographing the moon at noonday. Yesterday I took, with the apparatus used on the corona, four negatives on bromide plates (Edwards's) between 11.30 a.m. and noon in full sunshine. On all the plates the moon is very distinct and well defined. The moon at noonday, unless too near the sun, is an easier object to photograph than the corona. It is obvious, therefore, that photographic methods which are not delicate enough for the moon must utterly fail if applied to an object still more difficult, as the corona undoubtedly is at ordinary elevations. If Mr. Pickering's statement of the "impossibility" of photographing the moon under the conditions already named rests upon his own experiments, some light may come upon a point which has occasioned me surprise, namely, that Mr. Pickering does not appear to get upon his plates the defects of his own apparatus; for example, those of the position of his shutter and those of his spectacle lens, In some experiments I made with a shutter similarly placed, very strong diffraction effects appeared on the plates—effects stronger than any photographic action which could be supposed to be due to the corona.

2. With respect to Mr. Pickering's experiments, I would point out that the conclusion to which they lead him—namely, "It therefore seems that even in the clearest weather the reflected light of the atmosphere is 300 times too strong to obtain the faintest visible image of the true coronal rays"—appears to me to be irreconcilable with the direct observations of Prof. Langley, and others, of the planets Mercury and Venus as black discs before they reach the sun. Prof. Young says: "Of course, this implies behind the planet a background (of corona) of *sensible* brightness in comparison with the illumination of an atmosphere" (*The Sun*, p. 229).

I trust that Mr. Pickering will not think me wanting in courtesy if I should prefer not to take notice of any further communications he may make on this subject. The Bakerian Lecture, read recently before the Royal Society, in which I have discussed some of these points more fully, will be in print in a few weeks. The photographic method is now being tried at the Cape of Good Hope, under the scientific conditions I have pointed out as essential, by Mr. Ray Woods, under the able superintendence of Dr. Gill, F.R.S. WILLIAM HUGGINS.

Upper Tulse Hill, London, S.W., October 2nd, 1885.

Proceedings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE first ordinary meeting after the recess was held on Thursday last, October 1st, at the house of the Society of Arts, John Street, Adelphi, W.C., W. ACKLAND, President, in the chair.

The minutes of the June meeting having been read and confirmed, a short paper was read by the CHAIRMAN, explanatory of his new scale of equivalents.

F. A. BRIDGE thought many photographers would recognise the practical value of an adjustable scale, such as the one which had been passed round by the Chairman. He objected very much to distracting calculations, and he knew other photographers that were not fond of them.

E. DUNMORE then read a paper on "The Troubles and Pitfalls of Outdoor Photography" (see page 649).

The CHAIRMAN expressed the pleasure Mr. Dunmore's recital on "Pitfalls" had given him. He was once in company with an amateur who pulled out the wrong shutter five times, and upon arriving home to develop found he had two subjects on some of his plates, and not any on others. He had experienced every one of the annoyances mentioned by Mr. Dunmore.

In the discussion which followed, J. A. HARRISON advocated the use of a metallic drop, either of brass or zinc, which he considered would not materially increase the weight of such a shutter, while there was less chance of warpage than with ebonite or wood.

E. CLIFTON suggested the employment of three-ply wood in the construction of drop shutters. He meant the grain of three separate pieces of wood, to be in transverse directions when glued up, as originally suggested by W. B. Woodbury for the purposes of dark slides. His own drop shutter was made of mahogany, and the springs were composed of the ordinary silk-covered rubber, known as elastic, which did not perish so quickly as red rubber. A convenient plan of adjusting the tension, he said, was to secure the rubber by means of drawing-pins, so that it was merely necessary to alter the position of the pins to tighten or loosen the springs. He thought Mr. Dunmore should have mentioned leaving lenses, diaphragms, &c., behind.

J. A. HARRISON and others bore testimony to the value of covered rubber for light springs.

F. A. BRIDGE said his out-door kit was carried in cases which were provided with receptacles for everything he was likely to require; a final cursory examination of the cases before starting invariably suggested whether anything had been omitted or not. The main difficulty in out-door photography was the tripod, and if anyone could suggest an improvement in this direction, he should be thankful.

E. DUNMORE replied that the most firm tripod he had ever seen was now on exhibition at Pall Mall; this, he thought, was due to the strutts being much lower than it is customary to place them. Another form also exhibited, which folded into three, was very firm. He wished the focussing-cloth difficulty was as near solution.

Several prints made from paper negatives by the Eastman Dry Plate and Film Co. were handed round for inspection

It was pointed out by E. DUNMORE that gelatine negatives on glass were exceedingly liable to become damaged in printing by the appearance of numerous red spots, and ordinary varnishing offered very little protection. From this circumstance, negatives from which a number of prints had to be made often received two or more coats of thick collodion as well as varnish, which treatment proved effectual. For this reason he desired to know how the Eastman Film Company proposed removing silver spots which would be very likely to appear when the gelatine had no protection whatever.

A. C. BALDWIN, on behalf of the Eastman Company, said that spots caused by damp albumen paper could be removed with dilute potassium cyanide. As it was the intention of his firm to give a demonstration at the next meeting, he thought it would be better to give notice of the question, and reply then. Notice was then given as follows:—"Can spots be prevented in paper negatives?"

W. M. AYRES remarked that L. Warnerke overcame the difficulty by squeegeeing the negative on a talced and collodionized glass plate, and when stripped, the film of collodion was found to exercise a sufficiently protective influence.

A few desultory remarks ensued, having reference to rendering the films translucent, although it was stated that very hot castor oil rendered paper negatives very hard, and that it had no influence upon a gelatine film which would render it unsuitable for printing; yet those who had experimented with vaseline gave the latter the preference.

W. M. AYRES exhibited hoods he had made that day for shielding lenses from extraneous rays of light. Two forms were shown; one was cylindrical, and turned in the lathe to fit tightly on the lens mount; the series of flanges for his set of lenses were made to fit one over another, in order to build up a sort of tunnel when necessary. The other form resembled a pyramid, and carried an exposing flap, which was hinged to a pinion terminating with a milled head; bay wood mahogany was the material employed.

The advantage of judiciously shading a lens during exposure was generally admitted. More than one speaker regarded the plan as necessary to brilliancy of image.

The CHAIRMAN having requested the nomination of three members to form a sub-committee for selecting the Society's Presentation Print, the following gentlemen were proposed and elected:—E. Clifton, A. Cowan, and H. Trueman Wood. The subjects for artistic competition during the ensuing month are "Cloud Effects," "An Interior," "A Street View," and a figure study, "I See You."

The usual Annual Technical Meeting of the Society will take place on Thursday, November 5th, when, among other things of photographic interest, the Eastman Dry Plate and Film Company will demonstrate the making of paper negatives.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on Thursday last, the 3rd inst.; A. COWAN occupied the chair.

A. HADDON exhibited a series of views taken by him in Paris during his recent visit there.

J. B. B. WELLINGTON also exhibited a series of platinotype prints taken the previous week at Earlswood.

The CHAIRMAN passed round a frame of chloride transparencies, made from an exceedingly dense negative handed to him by a noted amateur. The exposures given were 2, 8, 15, 30, and 60 minutes in daylight; no difference could be detected in the details of the transparencies. A wide range of tone, however, was the result. They were developed with ferrous oxalate in each case. Commencing with the usual proportions of saturated solution, half diluted with water, the normal developer restrained with 1 grain of bromide was used for the next plate, and the developer further restrained for each exposure with 20, 40, and 60 grains of bromide respectively.

The CHAIRMAN said it might be inferred from this experiment that there was no such thing as over-exposure. He had repeated the experiment with three bromide plates, which he passed round;

two had received a normal exposure, which was increased eight times with the other plate, and showed but little difference to the others. The Chairman advocated using, when in doubt as to exposure, a pilot developer strongly restrained. One of the plates had been left in a strong restrained solution; no image appearing, the developer was thrown off, the plate washed, and a normal developer used. The strength of the restrainer had no effect upon the latent image.

W. K. Burton said even if a plate was immersed previously in a bromide solution alone, it would have no effect on the latent image or prevent the ordinary development.

A question arising as to the keeping qualities of gelatine films,

W. E. Debenham said he had with him a packet of unwashed chloride plates, which he handed to the Chairman. They had been put by for about two years, and were all more or less marked and stained; the top plate of the parcel, which was face upwards, being especially marked. They had been packed with pieces of yellow paper between, not quite covering the whole of the plates, the markings in addition taking the shape of the paper. This, Mr. Debenham was of opinion, might be caused either by a chemical action, or deterioration by contact.

A. L. Henderson had packed a parcel of plates some ten or twelve weeks since. They were placed back to back, with a narrow strip of tinfoil separating the films at the edges. These plates showed no sign whatever of the pressure of the tinfoil. He was of opinion that either lead or tinfoil might be used in packing plates without any fear of marking.

W. H. Harrison said that once the late C. F. Varley, Charles Blackburn (of Manchester), and himself, tried to photograph the alleged flames from magnets described in the books of Baron Von Reichenbach, but could obtain no evidence of the existence of the asserted emanations, although the experiments extended over a few months, and most powerful magnets, as well as weak ones, were employed. Glycerine plates by Blanchard's process were used. At $\frac{1}{8}$ inch above the poles, with one hour's exposure in total darkness, images of the poles appeared on the plates after development; but dummy wooden poles gave the same result, the effect being due to somewhat checked evaporation. Hence, when a plate was not bone dry, slightly checked evaporation from its surface—due to paper or other solids near it—might produce a developable image.

A question from the box was read.

"Does amber, shellac, or copal resist water most in a varnished film?"

The Chairman thought copal, but it was so sparingly soluble.

A. Haddon said if camphor was added to the alcohol, and the copal powdered, it would more readily dissolve.

J. Barker preferred button lac; he had coated wooden dishes with copal varnish, but it peeled off in a fortnight.

Several other members were in favour of shellac.

A. L. Henderson preferred collodion and varnish in the proportion of 1 part of collodion to 2 parts of varnish, thinned with ether; it dried slighly matt, but he considered it a very fine varnish.

Glasgow Photographic Association.

The opening meeting of the session was held in the Philosophical Society's Rooms, 207, Bath Street, on Thursday evening, 1st of October, the President (Wm. Lang, jun.) in the chair. There was a good attendance of members. After the preliminary business of reading the minutes, &c., had been gone through, the President delivered his inaugural address (see page 650).

Mr. Dodd (Vice-president), in proposing a vote of thanks to the President, spoke of the deserved tribute that had been paid by him to the late W. B. Woodbury, and urged upon all present to be more enthusiastic in trying to further the interests of the Society.

Mr. Urie, in seconding the vote of thanks, hoped the excellent and interesting address would have the effect of giving a stimulus to the Association, and that we might have many such papers during the session.

Mr. Parker congratulated the Society on the change they had made in securing such suitable rooms for the meetings.

Specimens of Warnerke's double-coated tissue and the Eastman film negatives were shown and greatly admired.

Mr. Armstrong showed and described the Eastman Roller Slide, and also a very ingenious and simple printing frame known as Durnford's patent.

A discussion on these exhibits took place, after which votes of thanks were given to Messrs. Warnerke and the Eastman Film Company, for so kindly sending specimens of their manufactures, and to Mr. Armstrong for bringing the apparatus and so fully and clearly explaining it.

The Chairman passed round a silver print to show the picture he intended to have done by Stannotype process as a presentation print to the Society.

A book of the architecture of "Old Glasgow," illustrated by the photo-gravure engraving process, and sent by Messrs. Annan, lay on the table along with some early specimens of the Talbot-type process, and at the close of the meeting the members had an opportunity of examining them.

Dundee and East of Scotland Photographic Association.

The first meeting for the session was held in Lamb's Hotel, on Thursday, 1st October, D. Ireland, Vice-president, in the chair.

The Chairman referred to the various advances made in photography during the past year, drawing special attention to the Eastman process of film photography, recently introduced. Mention was also made of the International Exhibition to be held in Dundee in February, under the auspices of this Society; and the speaker said that, judging from the amount of support promised, it was sure to be a great success; he hoped the members of the Association would be well represented.

G. D. Macdougald F.I.C., then gave a most interesting lecture on "The Latent Image, in an Unexposed and Undeveloped State. Of what does it Consist?" (see page 651) which he illustrated by experiments, and which was listened to with great attention.

A negative on the Eastman paper was handed round and examined with much interest, and a print from it was also shown. It was thought the results thus obtained were in no way inferior to those got by the use of glass plates.

A sample of the compressed pyrogallic acid introduced by Marion and Co. was laid on the table, and thought to be a great improvement upon the old form.

Sheffield Photographic Society.

The annual meeting of the Sheffield Photographic Society was held October 6th, in the Freemasons' Hall, Surrey Street. After the usual supper, to which a number of members sat down, the business of the meeting was commenced, W. B. Hatfield presiding.

Mr. Yeomans, the treasurer, presented his accounts, which showed a balance in favour of the Society, which is in a very flourishing condition, the members numbering over 60. The following officers were re-elected:—

President—W. B. Hatfield.
Vice-Presidents—Dr. T. H. Morton and T. Firth.
Treasurer—Mr. Yeomans. *Secretary*—J. Taylor.
Committee—Messrs. Bacon, Turner, Platts, and Pearce.

Dr. Morton proposed "That an exhibition of members' work and a conversazione should be held at an early date." This was carried unanimously.

The President then distributed the prizes to those who had been successful in the competitions during the year. In the specimens of work some excellent prints were shown by Mr. Pearce, Dr. Morton, Mr. Taylor, and others.

The following new members were enrolled:—Walter Tysak, W. E. Nicholson, Bradley Nowell, and J. S. Nowell.

The monthly meeting was afterwards held, and the prize for village scenes was awarded to J. Taylor.

Talk in the Studio.

Royal Cornwall Polytechnic Society's Exhibition, 1885.—In the Judges' report which appeared last week the following was omitted:—Amateur Section. "Frame No. 898 of instantaneous pictures, by Mr. C. Preston, of Birmingham, are little gems in their way, being soft and delicate, and show careful manipulation and artistic taste."

The Antwerp Exhibition.—The following French firms have received awards:—*Diploma*—Braun, Nadar. *Gold Medals*—Chalot, Fleury-Hermangis, Petit, Quinzac, Saint-Senoch. *Silver Medals*—Attout-Taifer et Clayton, Audouin, Gilles frères, Hautecœur, Pirou, Schaeffner, Vanderborch. *Bronze Medals*—Colons et Cie., Deroulède et Terpereau, Gallot, Craft, Lecadre, Martin, Manckenstein, Tombelle, Vandembert, Vavasseur.

Asbestos Membranes for Filtering, by Breyer.—This invention relates to the manufacture of thin layers of asbestos felt, suitable for filtering purposes. Only those asbestos fibres are suitable which, when ground, give a woolly product, and not a powdery one. After reduction to this state, by a mill or edge-runner, the product is chopped so fine that the fibres do not exceed 0·2 inch in length. It is then mixed with crystalline carbonate of lime, or magnesia, the granules of which do not exceed 0·2 inch in size, and ground with water so as to effect a further reduction. The semi-fluid resulting is then treated with an acid to remove the carbonates. After washing, to remove the excess of acid, the emulsion is ready to be filtered. This is best carried on by depositing successively even layers upon a woven fabric stretched on a frame. When a felt of sufficient thickness has been obtained, the fabric to which it adheres is dried in a kiln, and the whole is then ready for use.—*Journal of Chemical Industry.*

Activity of Antiseptics. By Ratimoff.—Seventeen antiseptics were tested on septic and putrefactive bacteria, and on microbes. Determinations were made on the quantity of each antiseptic required to kill or sterilise, and of the quantities which were insufficient to kill or sterilise. From the results of these investigations, the antiseptics are arranged in the following order of activity :—(1) Mercuric chloride, (2) silver nitrate, (3) iodine, (4) thymol, (5) copper sulphate, (6) salicylic acid, (7) zinc chloride, (8) phenol, (9) quinol, (10) kairine, (11) resorcinal, (12) chloral hydrate, (13) boric acid, (14) alcohol, (15) oil of gaultheria, (16) bitter almond oil, (17) eucalyptus oil.

Paper on "Art," by Walter Crane.—On this day week (Friday, the 16th instant), Walter Crane will read a paper on "Art," before the Fabian Society. The meeting will take place at the Westminster Town Hall, and the chair will be taken at 8 p.m.

A Photograph of a Curious Machine.—A Bavarian correspondent sends us two photographs representing a tricycle or velocipede, the invention of Sylvester Krnka, the inventor of the Russian army arms. It is a most curious and wonderful contrivance, and is shown in two forms, the first a tricycle—front-steerer—the front wheel of which is double, and provided with a cog-wheel in the centre, driven by means of a chain by a pulley fixed on a platform above, and turned by the hands, the steering being done with the feet, which rest on little platforms each side the wheel. In the other pattern the machine is a five-wheeler, and takes the form of a light basket carriage, in which two children are shown seated, while the driver—a youth—sits in front to work the machine. Elaborate lamps and other paraphernalia are shown, and our correspondent informs us that the frame is made of solid iron bars. The whole arrangement is crude, rough, and unmechanical, yet we are told that for the past year the inventor has driven his machine through the streets of Prague, and thinks no end of the invention, as, perhaps, it is only natural to suppose he should.—*The Cyclist.*

A Giant Refractor.—Grubb, of Dublin, has just received a contract from the Admiralty to erect what will be the largest refracting telescope in the world, a 28-inch diameter instrument, for the Royal Observatory at Greenwich.

Abstract of J. Chapman Jones' Lecture at the Birkbeck Institution, October 7th.—Photography an art universally patronized, though a knowledge of its principles is generally crude, even in scientific circles. Its active agent is light, which must be under the perfect control of the operator, hence the use of dark chambers and dark rooms that admit light only when and how it is required. The light initiates a change in the sensitive surface which is perfected by chemical means ; therefore we have to study the nature of light and how to control it, as well as the chemistry of the changes it effects or makes possible. An operator who works by "rule of thumb," however otherwise intelligent, is a blind man, and often blindly led. The very beginner must have reliable apparatus ; it requires the skill of the experienced to work under disadvantages. In this matter the novice must be content to accept the advice of others. He absolutely needs no dark room, as he can wait till evening, and use any available apartment after the simplest precautions as to drawing blinds, &c. Little dark holes in which one can neither sit, stand, turn, nor breathe, are detrimental to the photographer as well as to his work.

Photographic Club.—The subject for discussion on Wednesday, October 14th, will be "Camera Stands." On the second Wednesday in January, 1886, an exhibition of photographs by the members will be held.

To Correspondents.

*** We cannot undertake to return rejected communications.

E. S. D.—1. Attach rings to the curtains, and let them run on smooth wires. 2. A distance of 18 inches, and an area equal to one-sixth of the whole. 3. Fume it with ammonia before printing upon it.

D. R. (Glasgow.)—You cannot secure any collection as a whole by arranging with the authorities ; but there is no reason why you should not come to some understanding with individual exhibitors.

F. W. Findlon.—1. It is not necessary for a copyright photograph to bear on its face an intimation that it is copyright ; but in issuing a copyright picture, it is advisable to notify the circumstance that it is copyright. 2. You are at liberty to copy any non-copyright photograph, and to sell copies ; but it is an unsafe thing to sell copies of any photograph unless you know it to be non-copyright, or you have the permission of the owner.

Collotype.—Your question was overlooked last week. Collotypes, and also reversed negatives suited for the work, are made for the trade by the Autotype Company.

D. E. Goddard.—Thank you for sending it to us. You will find the required information in the "Notes."

E. T. Posse.—It has been repeatedly treated of in the News. See p. 628 of our volume for 1884.

Fred. W. S. (Brixton).—Your letter has been sent on to the gentleman you name.

A Subscriber.—A length of 30 feet, and a width of 9 or 10, will be ample. About one-third of the length.

Artist.—1. The form can be had post free from our publishers for twopence, and the cost of registering is one-and-sixpence. 2. We do not know, but would suggest that you should apply to Marion, 22, Soho Square.

J. V. Drake.—Mix the colour with white of egg, apply in the usual way, and coagulate by touching the place with methylated spirit.

Lex.—When the plate is well washed, immerse it in a dish containing a few ounces of strong methylated alcohol. Rock the dish for a few minutes, so that the spirit flows over and over the film, after which pour off the spirit and renew. Finally, rinse in a similar way with sulphuric ether. It will now dry very rapidly in the air.

One Taken In.—It is quite clear that the lens is nothing more than a forgery, and you had better discard it, and get something upon which you can rely. There are at the present time many spurious lenses in the second-hand market, and the maker you refer to is perhaps more honoured by imitation than anyone else.

Photographs Registered.

G. Mold (Banbury)—1 Photo. each of Northern Star Express passing Banbury, "Reindeer" Inn Yard (Banbury), Village Well (Wroxton) ; 2 Photos. of Interior of St. Mary's Church, Banbury.

J. Glass (Londonderry)—2 Photos. of "Irish Athletic Team."

R. Keene (Derby)—Photo. of Mr. J. L. Mayger.

M. Boak (Gt. Driffield)—Photo. of Cow and Calf.

F. W. Broadhead (Leicester)—1 Photo. each of Elizabeth Saloon and Regent's Gallery (Belvoir Castle),

Turner and Drinkwater (Hull)—Photo. of Lord Charles Beresford ; Photo. of Lords Charles and Marcus Beresford.

The Photographic News.

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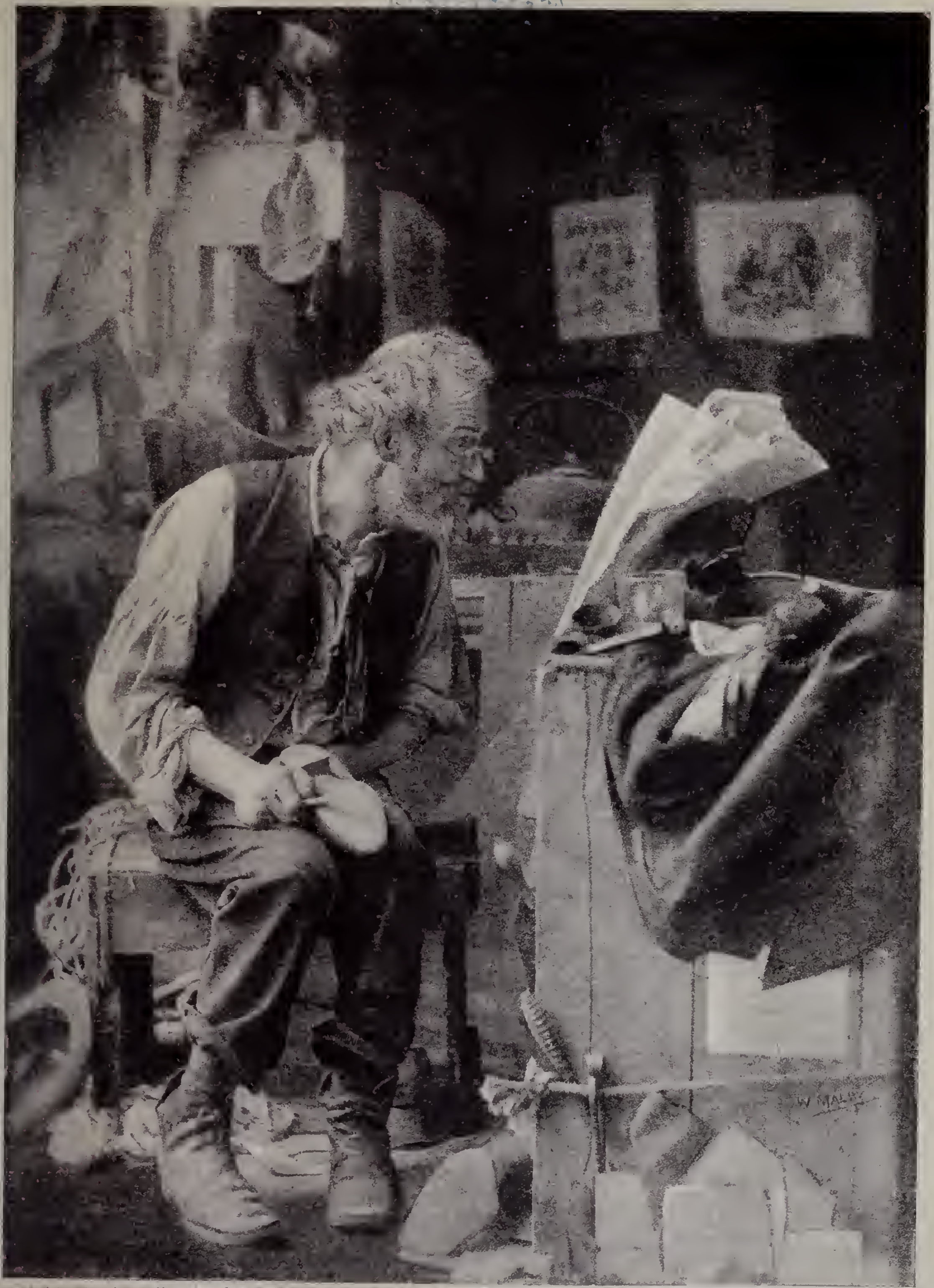
SUPPLEMENT TO "THE PHOTOGRAPHIC NEWS" 9TH OCTOBER, 1885.



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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1415.—*October* 16, 1885.

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THE PHOTOGRAPHIC EXHIBITION.

[Second Notice.]

Since our last notice two more medals have been awarded: one to L. Warnerke, for paper as substitute for glass (negative taken on the patent double-coated sensitive negative tissue), exhibit No. 783; and R. Schuster, for specimens of photo-engraving, exhibit No. 800. In both these cases the awards are undoubtedly well deserved. No. 1, "Temptation," by F. Hollyer, is a reproduction, and, therefore, of secondary interest; and the same remark applies to his other exhibits, Nos. 29, 115, 491. No. 2, by K. B. Murray, "Woman at Cottage Door," is a little hard—the result, perhaps, of under-exposure—but the general effect is good. The same exhibitor has other exhibits, the best of which is a charming picture of "The Mill at Pont Avon" (No. 205).

R. Slingsby always sends fine examples of the photographer's art, and on this occasion he is well represented. Of his eight exhibits (Nos. 3, 4, 5, 31, 32, 33, 283, 471), the one which many will consider most pleasing is a pretty study of child-life called, "Will it Float?" (No. 5). It represents the launch of a toy ship. J. Chester Jervis shows to best advantage in his wonderfully realistic "Market Scene at Nice" (No. 360); but his other exhibits (Nos. 6, 7, 8, and 436) are all meritorious, especially his "Nice Boy" (No. 8). T. B. Maguire shows a large portrait of "Mr. Shaw" (No. 9); also (No. 667) a portrait on opal, "A Jersey Lily."

"Tennyson" (No. 10), by H. H. H. Cameron, is a good and expressive portrait, and the same may be said of No. 11, "A Portrait of Dr. Jackson." H. H. H. Cameron has numerous other exhibits, most of which are good, but his "Boy's Head, after Murillo" (No. 80), is decidedly a failure. The photographer has been ambitious, and overleaped himself.

A series of ten out-door pictures by J. P. Gibson is worthy of much admiration, technically good and artistic. That which strikes us as best is No. 12, "An Old Mill." Other works by the same exhibitor (No. 83, 628) are also good.

B. Wilkinson, Junior, shows good work, Nos. 22-25, and 193. The best of his pictures is his "Broom Maker" No. 23.

We already know that express trains can be photographed, and G. Mold's "Express Trains" Nos. 26, 370, and 350, will excite but little interest. His other exhibits are meritorious.

F. W. Edwards sends five exhibits, Nos. 27, 38, 68, 123, and 124; the photographs of Tinworth Panel are very noteworthy.

"'Twixt Cup and Lip" (No. 37), and "Why Don't You Speak for Yourself, John" (No. 53) are by Ralph W. Robinson. This latter is a scene from Miles Standish, and we congratulate the exhibitor on his success in a difficult line of work. Both R. W. Robinson's pictures show good promise for the future.

B. J. Edwards's exhibits—no less than twelve frames, many of them sea pictures; perhaps the best for effect is "Coming Home" (No. 41).

Three pictures of "London from the Adelphi," by W. K. Burton, are exceptional in their excellence. They show a trace of that peculiar faint haze which we look upon as so characteristic of our capital city, and this softens the distance in a very charming manner. Of the three, that which pleases us most is No. 41, showing the dome of St. Paul's and Cannon Street Station—each admirably softened. To a painter this photograph should be a valuable study.

ON A MEANS OF PREVENTING HARDNESS IN GELATINE PLATES DURING DEVELOPMENT.

The above is the title of a communication by Herr Eujen Himly to the *Photographische Mittheilungen* of October.

The writer points out the fact, which is unfortunately undeniable, that there is a tendency at times to hardness in negatives taken on gelatine plates; that the high-lights become too dense before all the details in the shadows have been brought out; and that this deplorable state of affairs is liable to occur in landscape work, in portraiture, and also in the case of copying coloured pictures.

Here let us say that in the communication referred to there appears to be some confusion, or at least not sufficient distinction, between two entirely different things. One is the hardness or flatness which may occur in a negative from the inability of the film to register more than a certain length of gradation of white light; the other is the incapacity of ordinary films to register the colour towards the red end of the spectrum.

A plate may be an excellent one in the matter of registering a long gradation of white light, possibly showing a difference of density between squares 1 and 2 of the sensitometer when a long enough exposure has been given to bring out figure 25, or giving good modelling in the high-lights of a portrait subject, whilst at the same time the details in the shadows of a black dress are well rendered. Although it may seem paradoxical, it is nevertheless the case that any light reflected from a black substance is white light. A plate may, we say, show all these qualities, and yet be quite insensitive to any less refrangible rays of the spectrum than the green. It will in such a case be almost the worst plate possible for copying a brilliantly painted picture in which there are blues, and also reds and yellows. On the other hand, a plate which is sensitive to the red and yellow rays, and which on that account is excellent for copying—say a chromo-lithograph—may be a poor plate for general work, not registering efficiently great extremes of white light.

If we are to believe Herr Himly, the addition which he makes to his developer causes it to bring out a greater range of detail both as regards white light and the less refrangible rays. That is to say, in the case of an ordinary subject it enables more shadow detail to be brought out, without over-exposing the lights than would otherwise be possible; whilst in the copying of pictures it allows the yellows and reds to be better rendered without the blues being over-exposed, than with the common developers, and this whether ordinary gelatino-bromide or orthochromatic plates be used.

Two different "additions" Herr Himly has discovered by experiment; one suitable for ferrous-oxalate, the other for the alkaline developer. When used with the ferrous-oxalate, not only are the above-mentioned very desirable results produced, but, moreover, an old developer—not more than four days old—is resuscitated, and shows none of its usual tendency to give hard pictures. Other minor advantages the addition has, which we have not space here to enumerate. Herr Himly's experiments in its application to wet plates are not yet quite complete, but he hopes to work wonders in this direction as well as in others. Not on Herr Himly alone rests the evidence of the advantages to be gained by the use of the "addition." Herr Haberlandt corroborates all that Herr Himly has said of it.

The above is, put as briefly as possible, a description of the advantages to be gained by the use of Herr Himly's "addition," and after reading it, we concluded that that gentleman had surely made a very valuable addition to photographic knowledge, and we glanced somewhat eagerly forward to see what the substance or mixture, always so far talked of merely as "addition," might consist of. Well, we discovered that the writer had entitled the substance "Excelsior," and that it could be got, suitable either for ferrous-oxalate or alkaline developer, from a certain commercial house; but that no farther description was given of it!

This useful information we found to be followed by a warning not to use the "Excelsior" for a developer other than such as it was labelled as suitable for, else failures would be certain.

We do not give the name of the firm who sell the "Excelsior" (at a price mentioned in the article referred to!); nor should we have mentioned the matter at all, but to point a moral to photographers—especially experimental photographers. Surely the effect of adding various chemical substances to the usual developer has not been sufficiently investigated. We go on from one year's end to another adding, as restrainer, bromide of ammonium or of potassium to our developer, scarcely considering that these are only two of probably hundreds of substances which will act in a manner somewhat similar to these, but many of which may show good qualities not exhibited by the two soluble bromides which were selected at first more or less by chance. All know to how great an extent the addition of sulphite of soda to the alkaline developer, as first recommended by Mr. Herbert Berkeley, modifies the colour of the image obtained; yet most would probably, before the thing was tried, have described sulphite of soda as an inert substance not likely to influence a developer one way or another. Possibly, experiments carried out on the lines here indicated may result in the discovery of some substance which, used as an addition to the usual developer, may result in effects the same as those attributed to "Excelsior."

◆

VARNISHING GELATINE NEGATIVES.

If a gelatine negative is worth preserving, it should certainly be varnished, for, although it may be used without, the additional trouble is more than repaid by the extra security. It is not an unreasonable carefulness that leads one to varnish even before taking a proof, removing the varnish, if it is required, to get at the film for intensification or other treatment; but such a refinement of precaution could not be advocated in an unqualified way. The printer in platinum must varnish his negatives, for his chief enemy is dampness, and he cannot be sure of brilliant prints unless he takes every precaution to keep his paper absolutely dry until the moment of development.

Varnishing, however, is not always so easy as one is apt to think it ought to be; the varnish, perhaps, will not flow on the gelatine surface, and a bare spot or an uneven layer is the result of attempts to improve matters by tipping the plate about, or pouring on a little more varnish. Then follows the disgust that puts the operator out of temper, and leads him, in subsequent cooler moments, to argue with himself that perhaps, after all, varnishing is not so important as some consider it to be, and that soaking for half an hour, instead of for five minutes, in the alum bath will be an easy compromise. But good work will not follow because difficulties are evaded—they must be met and surmounted. There are no reasons whatever why every gelatine negative should not be evenly and perfectly varnished if the difficulties of the operation are admitted, and the necessary precautions taken.

It is useless to varnish an unwashed negative; and sluicing it with a little water, or with a great deal of water in a short time, will never remove the soluble salts from the film. Our own habit, which we do not believe can be shortened without disadvantage, is approximately to rinse the plate on removal from the fixing bath, soak it for half an hour in water that is changed every five minutes, then for half an hour in a saturated alum solution (whether it was alumed before fixing or not), wash it again for half an hour, changing the water every five minutes, and then, while it is under a stream of water from a tap, to rub it gently but with increasing pressure with cotton-wool. The film gets appreciably firmer during the rubbing as if the liquid were squeezed out of it, and a final good rinse under the tap, to remove any little particles of the cotton that may be about, completes the washing. The plate is then stood as nearly perpendicularly as possible, that dust may not settle on it, at least until it is surface dry.

When the film is thoroughly dry and hard to all appearances, it is ready to proceed with. A quantity of varnish that is about twice as great as what is expected to be necessary is then filtered into a dry, clean glass of convenient size, and covered over with a larger glass, like a glass shade, so that no dust may fall upon it. The negative is warmed by holding it in front of a fire until it is so hot that one can only just bear to touch the glass side, and it is therefore far too hot for the varnish. This heating ensures the thorough drying of the film.

When the plate has cooled down to the temperature best suited for the varnish to be used, it is taken by a corner that is more or less blank—as the sky in a landscape—dusted with a wide, soft brush, and varnish from the filtered sample is poured upon the film almost centrally, while the operator watches carefully to see whether it spreads with equal ease in every direction. If it does so, the pool is added to till it covers about two-thirds of the surface, run into each corner, &c., as usual; but if the varnish spreads with difficulty or unevenly, the pool should be made to nearly cover the plate before the pouring on is discontinued, and by that means the varnishing may eventually be satisfactorily done, although a little of the liquid is spilt or runs over the back of the plate. The negative is then drained as usual and heated; but before and during the heating as may be necessary, the accumulation of varnish along the two lower edges should be removed by a cloth drawn tightly over the finger; otherwise this varnish spreads back over the film and leaves an irregular thickening, with a well defined margin perhaps a quarter of an inch or more from the edge of the glass. After having done about half-a-dozen negatives, the varnish should be re-filtered and more added, or a freshly filtered quantity should be taken.

Having gone through a batch of negatives in this way, it will prove on examination that perhaps one or two in every ten are imperfectly or badly varnished. These are taken one at a time and put in a flat dish containing enough methylated spirit to cover the film, and after soaking for a minute or so, carefully rubbed with cotton-wool to facilitate the solution of the varnish. The plate is drained from this bath and treated similarly in another, then drained and laid flat on its back to dry, which it does in about two minutes. If stood on one edge, the alcohol will leave marks about the lower part. If when dry there are patches where the varnish is not completely removed, a gentle rubbing with cotton-wool wet with alcohol, without re-immersion in the bath, will probably prove efficacious. The re-varnishing of a plate so treated is always an easy matter.

For filtering varnish, dry filter paper must be used, and it is convenient to cut the stem of the funnel entirely off, leaving only the conical part, so that it may easily be well cleaned. The funnel and the glass used should be thoroughly cleaned from all dried varnish by a rag moistened with methylated spirit before they are put away. In the same manner any varnish is removed from the backs of the negatives.

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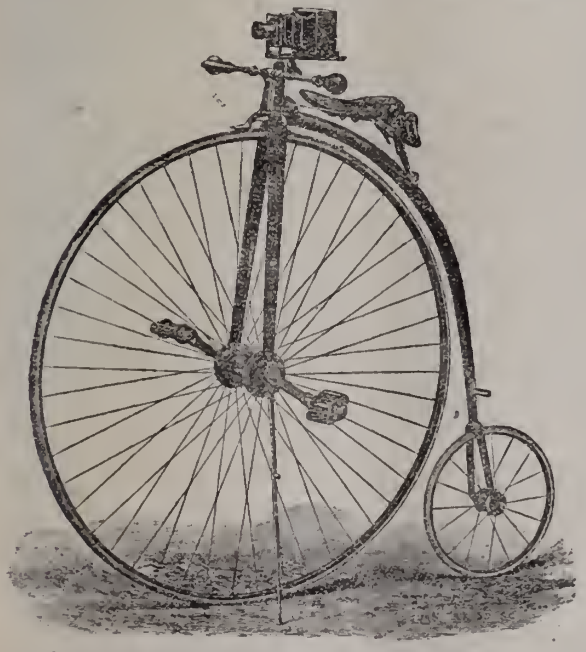
PHOTOGRAPHY FOR WHEELMEN.

During these delightful Fall days we know of no greater pleasure than a spin along the country roads on a bicycle. The bracing air, the easy exercise given to all parts of the human frame, the delight of the eye with the surrounding scenery, give new life to a man, which is not to be obtained with the same facility in any other known manner. To add further zest to these rides on the wheel, the art of photography with the modern dry plates lends a peculiar aid. As the rider spins along, his eye catches some little bit of scenery, some quiet nook with bubbling water, or some exquisite vista stretching in the distance, that he would gladly fix in some more permanent form than upon the tablets of his memory. To make such a record possible, the manufacturers of photographic materials have devised very portable forms of apparatus. Our publishers are manufacturing an outfit of this character that leaves nothing to be desired as to completeness, lightness, and (last, but not least), moderate price. We give a cut of their neat little bicycle camera, adjusted ready to take a picture from the back of the wheel steed.



By means of a very good single achromatic lens, a picture 3¼ by 4¼ inches can be taken, and from having seen the work of these lenses, we believe they leave nothing to be desired as to their good quality.

As will be seen by the cut, the camera is attached to the handle-bar of the bicycle by an universal joint, which allows of taking pictures in any direction without turning the machine. Another neat device is a kind of monopod (if we may coin a word), which is adjusted against the hub of the wheel by means of a Y-top, and has adjustable extension to reach to the ground. This sliding brass foot telescopes and shuts up into a length of only about sixteen inches, making a very effective means of turning the bicycle into a rigid camera stand. The camera, lens, and plate-holder are fitted into a sole-leather carrying case with a shoulder-strap, and the whole weighs only two pounds. With such a slight increase in his impedimenta, the bicyclist can add greatly to the pleasure of his journeyings, by capturing many pretty scenes that will serve as souvenirs of his rambles.—*Anthony's Bulletin.*

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NOTES ON THE GELATINE EMULSION PROCESS.

BY DR. J. M. EDER.

1.—Phenylhydrazinsulphonic Acid as a Developer.

I recently published a communication upon the property which I had discovered in phenylhydrazin of acting as a photographic developer.

I have continued my experiments, and found that phenylhydrazinsulphonic acid, when employed in an alkaline solution, possesses the same developing properties upon bromide and chloride of silver. In many points this compound appears to excel the hydrochlorate of phenylhydrazin, because chlorine salts act as restrainers.

2.—General Reduction of Intensity in Too Powerfully Developed Plates.

I have tried almost all reducers, and have only been satisfied with the per-oxalate of iron and potash, recommended by Belitski. This salt, however, does not keep well, and is not everywhere to be met with in commerce. On this account I have employed the following mixture of perchloride of iron and oxalate of potash.

A.—1 part of perchloride of iron in 8 parts of water.

B.—2 parts of neutral oxalate of potash dissolved in 8 parts of water.

Immediately before use, mix equal parts of A and B. A light green solution is formed, which in darkness keeps for several days; in the light, one day suffices to decompose it.

Of this mixture a little is added to a fresh strong solution of hyposulphite of soda; in difficult cases, to each part of fixing solution from a quarter to a half part of iron mixture may be used.

The picture is rapidly and evenly reduced in this bath. The plate is washed before the desired degree of reduction is quite reached, as the process of reduction goes on during the washing.

This reducer works satisfactorily upon plates that have been much over-developed, either with iron or pyro, and may even be used upon plates that have been dried. It is, however, to be recommended that it be used before drying, as its action is then more under control.

3.—Reduction of Over-Dense Portions of a Plate.

It often happens, in photographing interiors, &c., that certain portions of the negative come too intense, whilst other parts possess the proper amount of intensity, and must not be reduced. In this case reduction should not be accomplished by chemical means, or the use of baths, but by rubbing with a piece of linen moistened by strong alcohol. This method was first communicated to me by Herr Lenhard, in Vienna. I saw many good results thus obtained, and succeeded perfectly myself with the method, which I can, therefore, thoroughly recommend.

A piece of fine linen is dipped in alcohol, and rubbed with considerable pressure on the too-intense portions of the dried plate until they are sufficiently clear. The linen becomes black, and the intense portions thinner, without loss of detail.

Small places can be cleared with a little stick of pliant wood that has been dipped in alcohol. I saw at the atelier of Herr Burger difficult retouching accomplished in this manner.

4.—Citrate of Iron Developer for Warm Brown Tones upon Chloride of Silver Gelatine Films.

A very favourite developer for transparencies upon chloride of silver gelatine plates, and also suitable for paper, is the citrate of iron.

It is prepared by mixing an acid solution of citrate of ammonia with sulphate of iron.

I have now simplified the preparation of the ammonia citrate solution, and my formula is as follows:—

700 cub. cents. of distilled water are poured upon 150 grammes of citric acid, and 160 cub. cents. of ammonia (sp. gr. 0·910) are added, and stirred. In a short time the citric acid dissolves in the solution, which, at the same time, rises in temperature. The solution is then tested with litmus paper to see whether it is neutral or slightly alkaline; if strongly acid, more ammonia is added; if strongly alkaline, a few crystals of citric acid are thrown in.

When the solution shows a neutral or slightly alkaline reaction, 100 grammes more of crystals of citric acid are added, and, when dissolved, the whole is filtered.

To develop chloride of silver pictures, take—

15 volumes of ammonium citrate solution.
5 ,, sulphate of iron solution (1 : 3).
1 ,, chloride of sodium solution (1 : 30).

This developer can, as is known, be used repeatedly.

5.—Acid Chloride of Silver Gelatine Emulsion.

Chloride of silver separates in a flocculent precipitate more readily than bromide, and therefore it is well to add a good quantity of gelatine to the solution of chloride of sodium, as well as to that of nitrate of silver. This proceeding has already been described, and after many experiments I have settled upon the following formula.

Three solutions are prepared in flasks.

A.—Chlor. of sod. (or 13 gram. chlor. of amm)	14	gram.[*]
Gelatine...	25	,,
Water	200	c.c.
B.—Nitrate of silver	30	gram.
Water	50	c.c.
C.—Gelatine	25	gram.
Water	250	c.c.

The gelatine is dissolved in flasks, A and C, by immersing them in warm water; the gelatine solution C is then poured into the silver solution B, and shaken, then (by yellow light) the chloride solution A is added. The temperature may be at from 40° to 50° Cent. The emulsion is left standing for a few minutes until the froth disappears, when it is poured out to set; afterwards it is divided, and washed as usual.

Chloride of silver is mostly employed without further ripening, because then it gives clear reddish-brown images.

The emulsion in thin films appears by transmitted light reddish-yellow, and very transparent. Nevertheless, it gives powerful pictures.

After cooking for half an-hour, or digesting for a longer time at 40 per cent., the colour of the emulsion becomes grey by transmitted light, and the sensitiveness is increased from two to four times. The transparencies or paper pictures obtained with such an emulsion have a colder and more neutral tone than is given by the uncooked.

The addition of one drop of hydrochloric acid to the emulsion keeps the pictures clear. Citric acid, from 10 to 20 grammes to the foregoing quantity, produced light-coloured (yellowish or reddish-brown) pictures.

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[*] It is much the same thing whether the one or the other chloride be employed. Chloride of ammonium gives somewhat softer pictures than chloride of sodium. The sal ammoniac of commerce (chloride of ammonium), when in the form of crystalline powder, contains much moisture, which must be driven off by heat (100° Cent.) before being weighed. Sublimed sal-ammoniac, occurring in large quantities, is, on the other hand, seldom moist, and does not require hot drying. For chloride of sodium we recommend the pure salt, which may be weighed without previous drying.

PHOTOGRAPHY AND MEDICAL JURISPRUDENCE.

BY WILLIAM MATHEWS.

The Birth of Photographic Composites: A Review of Events.

> "Out of this nettle, danger, we pluck this flower, safety."
> —*Hotspur* [*reading a letter*].

The method of admeasurement of photographs by an adapted geometric process was first promulgated in 1873-4, and the thesis was maintained that determinate identification by means of photography was certainly within the scope and province of scientific solution. The employment of a *datum* line, taking its origin from the centres, respectively, of the pupils of the eye, was an inherent feature of the new analysis, and was an entirely new departure.

There were involved some anterior questions relating to the actual permanence or otherwise of certain leading details of the included area.

These were dealt with, and the results placed before the world — first in a quarto leaflet, subsequently in an illustrated pamphlet. In the year 1875 the British Association held its annual session in the city of Bristol. Opportunity was taken to forward a leaflet through post to all, or nearly all, those in attendance. The *brochure* assumed the form of a challenge to the scientific gentlemen assembled to test for themselves the accuracy of the principles advanced, and especially in their application to the case of the Tichborne Claimant, then recently imprisoned. The formulary of procedure was fully set forth, and all necessary information conveyed. Among those to whom the leaflet was addressed was Professor Francis Galton, to whom belongs the merit of having subsequently introduced the now well-known "Galton Composites."

Shortly after the issue of the pamphlet, the apparatus known as the "identiscope" was matured; and a little later, operating upon the identiscopic lines, the combination was successfully effected of the Tichborne portraits; that is to say, of the Chilian Daguerreotype of young Roger Tichborne and of Messrs. Maull's portrait of the Tichborne Claimant. This was the first-recorded instance of even an attempt to superimpose two separately-produced photographs.

Some twelve months later, mention was made in the pages of the Photographic News of the curious composite portraiture then first brought into notice by Professor Galton at a *soirée* of the Society of Arts. The Professor seems at the outset to have tried his 'prentice hand exclusively upon the photographs of criminals, and the surmise is a natural one, that his first efforts had been bestowed with a view to ascertain whether or not a game of abracadabra had been pursued in effecting the asserted unison of the Tichborne photographs. For certainly it is of the very essence of the Galton process that the portrait of one individual is confederated into apparent alliance with that of another individual totally distinct. But the professor's experiments shortly expanded themselves over a more reputable area, and it began to be seen that for the purposes of ethnography and cognate pursuits, the new departure was a valuable one.

Much ingenuity has been since expended in bringing to perfection the manipulative details of the camera, so as to ensure that, wholly and solely, none but the "points in common" of the conjoined photographs shall come to the surface The experimentalists have multiplied, and various *bizarre* deviations have been sought out. In the States considerable attention has been given to the matter, and as many as thirty photographs have been posed into a single composite.

But these essays and amplifications have rather interfered than otherwise with certain practical and pressing questions connected with individual development and personal identification. The very rise of composite portraiture seemed at the outset to be a menace to the legitimate legal purpose of the identiscope; and in effect it decidedly interposed itself before the public eye.

By a stroke of fortune, early in the present year, in the *Lancet*, in the *British Medical Journal*, and in *Knowledge*, admission was simultaneously given to an article by the present writer. In this, the vitality and interest of the prior questions were duly maintained. And again, in the month of July, the journals of photography opened their columns to an effort on the part of the writer to track into the very territory of the composites the important speciality of identification. The month of September has seen in the same journal the complete and satisfactory realization of the writer's original aim and purpose—the task of educing from photographic portraiture unimpeachable proof of personal identification; and at the same time of affording irrefutable evidence that the Tichborne Claimant is the true and original Tichborne. Out of the nettle, danger, has been plucked the flower, safety.

INFLUENCE OF LIGHT ON THE COURSE OF THE CHEMICAL REACTION OF CHLORINE, BROMINE, AND IODINE ON AROMATIC SUBSTANCES.

BY DR. J. M. EDER.

More than a year ago, Julian Schramm, in the *Chemiker Zeitung* (1884, p. 1654), wrote upon the action of chlorine, bromine, and iodine, upon benzol and toluol. Benzol appeared to suffer no change, but with toluol a reaction took place in sunlight even in an ice-cold solution.

From a communication that has recently appeared in the *Chemiker Zeitung*, it appears that the aniline colour manufacturers have long made use of the action referred to in this observation. In the manufacture of "malachite green," pure benzalchloride is used, and it was found advantageous to prepare this by the agency of sunlight. The work, however, was dependent upon weather, and the next step was the employment of the electric (arc) light. The operation was carried on in white glass globes, into which toluol warmed to 50° or 60° Cent., and chlorine, were introduced. Very good results have been obtained, but whether the method is a practical one must be left for time to determine. In any case it is gratifying that the chemical action of light should be brought into actual use in technical chemistry.

RESEARCHES ON THE CHEMICAL ACTION OF LIGHT.

BY PROFESSOR DR. J. M. EDER.[*]

3.—Various Copper Compounds.

Double oxalate of copper and sodium forms blue crystals of needle-shape, which in darkness remain unchanged for years. In the light after many days it becomes changed upon the surface to a brownish-black colour, but is not altered in weight. The sensitiveness to light is not important.

It appears remarkable that the analogous potassium and ammonium double salts are unchanged by light. I am not aware of any similar example with other compounds. Solution of sodium copper oxalate is also permanent in the light. If, however, the solution contains ferric-oxalate, oxide of copper is deposited after a day's exposure to the sun; later on this is mixed with ferrous-oxalate.

The sensitiveness to light of the so-called Fehling's solution was noticed by Fehling himself in the year 1849.[*] He wrote: "It is very necessary that sulphate of copper, tartrate of potash, and caustic potash be present in proper proportions. When this is not the case, the solution decomposes quickly in the light, and in the sun's rays immediately.

The solution, however, employed in analytical chemistry as Fehling's solution[†] is itself sensitive to light.

I have examined the decomposition of solutions of different degrees of concentration after three and a-half months' keeping in light, and in darkness.

Concentrated Fehling's copper solution gives in the light 0·731 grammes of oxide of copper.

Concentrated Fehling's copper solution gives in darkness 0·021 grammes of oxide of copper. Difference = 0·710 grammes.

Fehling's solution diluted with an equal volume of water gives in the light 0·110 grammes of oxide of copper.

Fehling's solution diluted with an equal volume of water gives in darkness 0·003 grammes of oxide of copper. Difference =0·107 grammes.

Fehling's solution diluted with 6 volumes of water gives in the light 0·040 grammes of oxide of copper.

Fehling's solution diluted with 6 volumes of water gives in darkness no precipitate that can be weighed.

It follows:—1st. That the decomposition of the solution in darkness is much diminished by dilution; 2nd. Under the influence of light there is separated, both in the concentrated solution and in that which is diluted with an equal volume of water, about thirty-five times more oxide of copper than in darkness; 3rd. Highly-diluted solutions are quite permanent in darkness, whilst they are still decomposed to a recognizable extent in light.

4.—Indigo Sulphate of Soda.

Indigo sulphate of soda is in aqueous solution very indifferent to light. Mixed with soda and oxalate of ammonia the solution, after two days' exposure to the sun, becomes slightly bleached. Light acts more quickly upon a mixture of indigo sulphate of soda and grape sugar; nevertheless this is not a pure action of light, for warmth in darkness produces an immediate reduction.

5.—Molybdic Acid.

Molybdic acid dissolved in dilute sulphuric acid, according to Phipson,[‡] becomes blue in sunlight, and in darkness again loses this colour. I have previously shown in another place that this bluing only occurs in the presence of organic substances, and that in this case the blueness no longer disappears in darkness. Mixtures with sugar become blue in darkness as well as in the light (formation of oxide of molybdium in consequence of reduction), but in the light more quickly.

6.—Decomposition of Chlorine and Bromine Water and of Tincture of Iodine in Light, and the Influence of Organic Substances upon this Process.

The first labours in this direction that were published were those of Bärwald and Monheim in 1835, and they have fallen into forgetfulness. The first observed[*] that he had found that chlorine water is not only by itself decomposed in the light, but that this decomposition is assisted when in combination with the chlorine water there is present a substance rich in hydrogen, which, for the most part, is the case with organic substances. Monheim[†] admitted that organic substances accelerate the photo-chemical decomposition of chlorine water, but did not believe that the hydrogen itself played any part in this action. Monheim experimented with vegetable extracts. Städeler[‡] found that citric acid especially was quickly attacked by chlorine in the light. The photo-chemical reaction of gaseous chlorine upon acetic acid, &c., I will not treat further here, but only upon aqueous solutions of chlorine, bromine, and iodine.

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[*] Continued from page 645.

[*] *Annal. Chem. Pharm.* 1849, B. 72, S. 106.

[†] 34·639 grammes of sulphate of copper dissolved in 500 cub. cents. of water, 173 grammes of bi-tartrate of potash, and 125 grammes of caustic potash dissolved in 500 cub. cents. of water.

[‡] Eder's *Ausfuhrliches Handbuch der Photographie*, 1884, I Th., S. 22.

In the first place, I compared the relative sensitiveness of chlorine and bromine water, and alcoholic tincture of iodine[*]; and then studied the acceleration of the process by the presence of organic substances. Chlorine, bromine, and iodine were dissolved in equivalent proportions, and exposed to light in vessels of similar form. Other quantities were, under like conditions, kept in darkness. After exposure to light the remaining free chlorine was estimated by treatment in the known manner, with iodide of potassium, starch, and hyposulphite of soda. No account was taken of the chloric acid which, according to Poppert[†], is formed in addition to hydrochloric acid and oxygen. The analytical examination was undertaken by me in conjunction with Herr Schlagenhaufen.

The concentrated aqueous bromine solution contained 8·000 grammes bromine in 1 litre; the diluted, 0·800 grammes. Chlorine and iodine were dissolved in equivalent quantities. The chlorine and bromine water were further decomposed in the presence of the organic acids as mentioned.

A Solution of	Lost in the Light.	In Darkness.	Difference.	Time of Keeping.
Chlorine water concentrated ...	53·95 % Cl	6·69 % Cl	47·26 %	30 days
,, ,, diluted	41·87 ,,	4 32	37·55	,,
Bromine water concentrated ...	3·5 Br	1·2 Br	1·3	,,
,, ,, diluted	4·1 ,,	2·5	1·6	,,
Iodine in alcohol	0·06 I	0	0·06	,,
Chlorine water concentrated ...	5·0 Cl	0	5·0	2 hours in sunlight
Bromine water concentrated ...	0·8 Br	0	0 8	,, ,,
Chlorine water + tartaric acid ...	60 Cl	7 Cl	53	1 hour ,,
,, ,, ,, ,, ...	100 ,,	24 ,,	76	2 hours ,,
,, ,, + citric acid... ...	70 ,,	46 ,,	34	1 hour ,,
,, ,, ,, ,, ...	97 ,,	91 ,,	3	2 hours ,,
Bromine water + tartaric acid ...	67 Br	2 Br	65	1 hour ,,
,, ,, ,, ,, ...	100 ,,	3 ,,	97	2 hours ,,
,, ,, + citric acid	100 ,,	5 ,,	95	1 hour ,,

It follows from the above that chlorine water decomposes in the light 6 to 12 times more quickly than bromine water, and that alcoholic tincture of iodine is about 1,000 times more stable in the light than chlorine water is. Chlorine and bromine water also decompose in darkness, and always the first-named more rapidly than the second. The presence of tartaric and citric acids accelerates decomposition both in the presence and absence of light; but the presence of light greatly accelerates the action.

Citric acid is more quickly attacked than tartaric acid by chlorine water, both in the presence and the absence of light. With bromine water the decomposition of these acids is slower in darkness than with chlorine water. On the other hand, in the light, the action is nearly as rapid with the former as with the latter.

The chemical energy of chlorine is more strongly exalted by light in the case of citric than of tartaric acid. We find an example analogous to this with perchloride of iron, which is more sensitive to light with citric acid than with tartaric, as I have previously shown.

An alcoholic tincture of bromine becomes coloured in darkness in a very short time (from half an hour to two hours). In direct sunshine the colouring is almost instantaneous. The rapidity of the photo-chemical decomposition of chlorine water, bromine water, and alcoholic tincture of iodine, is in the order of the increase of their atomic weights.

7. DECOMPOSITION OF ALCOHOLIC CHROMATE SOLUTION IN THE LIGHT.

Saturated solutions of bichromate of ammonia were prepared in absolute alcohol, in alcohol of 50 per cent., and in that of 25 per cent., and exposed for three years at a sunny window.

1. The solution of bichromate of ammonium in absolute alcohol was changed in colour in three months time, and had deposited a slimy green precipitate of oxide of chromium. The solution contained acetic acid, aldehyde and acetic ether.

2. The solution in 50 per cent. alcohol had during this time deposited only a little brownish yellow precipitate of "chromate of chromium," and even after three years the liquid was dark red from the presence of chromate, and the precipitate was not perfectly converted into the oxide of chromium.

3. The solution in 25 per cent. alcohol behaved like that of 50 per cent., but at the end of the three years the decomposition was still less advanced than in the other.

It follows that in this case the alcohol accelerates the deoxidation of the bichromate by light, as, for example, is the case with nitrate of uranium and perchloride of iron, whilst, with increase of water, sensitiveness falls off. An aqueous solution of bichromate is not changed by light.

8.—DECOMPOSITION OF MERCUROUS IODIDE BY LIGHT.

Mercurous iodide is a greenish yellow powder which claims a sensitiveness to light near to that of chloride of silver. Upon gum or gelatine paper which has been impregnated with mercurous iodide, a photographic print may be obtained with a few minutes exposure to sunlight.

Upon the extent of the photo-chemical process nothing is known with certainty. According to Artus, darkening only takes place with moist mercurous iodide, and no iodine is given out, but hydriodic acid, from which Artus concluded that suboxide of mercury was probably formed. According to Inglis, it decomposes in a few weeks when air is present, even in the absence of light, into mercury and iodine.

I prepared by yellow light, mercurous iodide by precipitation from nitrate of mercury with iodide of potash, washed the precipitate with alcohol, and placed it in glass tubes. One of these tubes I filled with moist air, another, after lengthened drying at 100° C., with dry carbonic acid, and the third with nitrogen, and sealed them. *All three quickly blackened in sunlight* without the action being hindered by the absence of moisture or oxygen.

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[*] *Wochenschrift fur die gesammte Heilkunde Von Casper in Berlin, 30th October*, 1835. *Bucher's Repertorium, f. d. Pharmacie*, 1835, *liv. S.* 355.

[†] *Bucher's Repertorium. Ibid.*

[‡] *Annal. d. Chem. u. Pharm*, Bd. iii., S. 299.

[*] Aqueous solution of iodine is very permanent in the light, and experiments with it under similar conditions to those observed with chlorine and bromine water gave no results.

[†] *Liebig's Annal*, Bd. 227, S. 161.

The presence of iodine or hydriodic acid I could not detect, even after a week's exposure to light, and blackening through and through of the mercurous iodide, not even by heating to 100° C., and examination of the vapour. Alcohol did not extract any mercuric iodide from the blackened powder. On the other hand, a goldleaf suspended over the powder heated to 150° C. became whitened, so that the presence of free mercury may be deduced.

If, then, in the decomposition of mercurous iodide by light—1. Oxygen and moisture play no part; 2. No iodide or hydriodic acid is set free (contrary to the statement of Artus); 3. A trace of metallic mercury is formed; there can only be a separation into mercury and mercuric iodide. But since spirit of wine does not dissolve any mercuric iodide from the blackened mercurous compound, then mercurous-mercuric iodide (Hg_4I_6 according to Boullay) must be formed.

The chemical decomposition of insolated mercurous iodide will be represented thus:—

$$3Hg_2I_2 = 2Hg + Hg_4I_6$$

that is to say, it is changed into finely divided metallic mercury which produces the blackening and mercurous mercuric iodide. Blue and violet light are especially concerned in producing this change as Chastaing has shown.

PRACTICAL CHEMISTRY FOR PHOTOGRAPHERS

BY RALPH W. ROBINSON.

I.—Soda, and How to Test It.

Soda—or, as it is more scientifically named, sodic carbonate—is a salt which is frequently used by photographers, and it may therefore be interesting to know some of the properties of this body, and how to test it.

Carbonate of soda, as it is generally met with, is a white crystalline salt consisting of carbonate of soda and water in the proportion of 106 parts of actual carbonate of soda to 180 parts of water, or about 37 per cent. of actual carbonate of soda. This salt is what chemists call the neutral or disodic carbonate, and is represented by the formula $Na_2CO_3,10H_2O$. The substance usually sold by druggists as carbonate of soda is of rather different composition. It is, in fact, the mono-sodic carbonate, commonly called the bi-carbonate, and is represented thus, $NaHCO_3$.

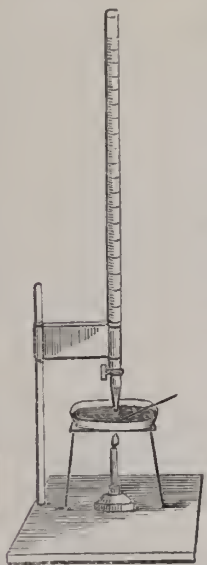
In many cases it is only necessary to test the substance for the impurities which, from the process of its manufacture, or other cause, we know are likely to be present, and which, if they be present, are known to be injurious for the purpose to which it is applied. The most probable impurities are chloride and sulphate of soda.

To test for the chloride, put as much of the carbonate to be operated on into a large test tube as could be raised on a threepenny-piece. To this, add about one ounce of distilled water and pure nitric acid drop by drop till effervescence ceases. Boil by holding the test-tube in the flame of a spirit lamp or Bunsen burner, taking care to move it continuously. Now add another drop or two of nitric acid and boil again to make sure of driving off all carbonic acid. Finally add a few drops of a weak solution of nitrate of silver. The presence of much chloride is marked by a flakey precipitate, but if the solution only turns slightly milky, the quantity of chloride present is very small indeed.

To test for the sulphate, proceed, to commence with, in exactly the same way as in testing for the chloride; but after the last boiling, instead of the addition of nitrate of silver, a few drops of a weak solution of chloride of barium should be added. This, in the event of the presence of a sulphate, will produce a white, finely-divided precipitate. In testing for the sulphate, care must be taken not to add too great an excess of nitric acid, but sufficient, with the help of heat, to drive off all the carbonic acid, is absolutely necessary in both cases.

If, however, it is desired to estimate how much actual carbonate of soda is present in a given sample, more elaborate preparations must be made. The apparatus required consists of a fairly accurate chemical balance, a burette, tripod stand, Bunsen burner or spirit lamp, a porcelain evaporating basin about four inches in diameter, a small porcelain crucible, and a litre measuring flask; also a glass vessel of about one quart capacity. In carrying out all the operations, great care must be taken that everything is perfectly clean. The first thing to be done is to prepare what is called a standard solution of sulphuric acid. For this purpose, we must have some alkali, the exact composition of which we know, and a given weight of which will neutralise a certain quantity of sulphuric acid. The best way to obtain this is to heat pure bi-carbonate of soda (a salt which is easily obtained in a pure state) to redness in the crucible for a few hours. We shall thus obtain pure dry carbonate of soda, Na_2CO_3. Allow to cool, and weigh out 106 grains accurately in the balance. Transfer to the evaporating basin, and dissolve in two or three ounces of distilled water. Now place in a litre flask about three ounces (measured) of strong sulphuric acid, and add water to it till the flask is about three-quarters full. Mix thoroughly.

A burette is now required. This consists of a glass tube about two feet long, drawn to a point at the bottom. To this is attached a short length of india-rubber tubing, ending in a glass tube drawn to a small point. A small brass spring clamp is placed on the rubber tube, so that the flow of the liquid from the small opening in the glass tube may be adjusted to a nicety. The long tube is divided throughout the greater part of its length into equal divisions, each of which is usually made of the capacity of one cubic centimeter. The burette is held in position over the basin, standing on the tripod, by a wooden clamp.



It is now filled up to the top mark, and the solution of carbonate of soda brought to the boiling point, enough solution of litmus having been added to colour the liquid a pale blue. Acid is now carefully run from the burette until the litmus assumes a red colour, the liquid being thoroughly mixed all the time by means of stirring with a glass rod. Heat is again applied, which will drive off more carbonic acid, and the solution again will become alkaline, which is marked by the litmus becoming blue. Addition of more acid and boiling is repeated again and again, until a stage is reached when the litmus remains, *after boiling*, a shade between blue and red, the standard acid being added, drop by drop, towards the end.

We must now ascertain, by reading off from the burette, how much acid has been used. Let us say, for example, that 106 grains of soda, which is 1 grain-equivalent of carbonate of soda, has required 60 c. c. of the acid. We must then take 600 c. c. of the solution, and make it up to 1,000 c. c. (1 litre) with water, and mix thoroughly. The standard solution is now finished, but must once more be tested with 106 grains of the pure sodic carbonate, which should require exactly 100 c. c. for neutralization. To test our sample of carbonate of soda, we weigh out 106 grains of the substance, previously powdered, and proceed as in testing the standard solution. The number of cubic centimetres of solution required for neutralization gives the per centage of actual carbonate of soda. Or, by another method, any convenient quantity of the substance to be tested may be taken—say 70 grains, and let us suppose that 54 c. c. of acid are used. Then the following equation gives the per centage of actual carbonate.

Grs. substance		gr-equiv. sod. carb.		c c. acid.		°/o carb. soda in sample.
70	:	106	=	54	:	81·77

Note.—It will be noticed that while using, mostly, the English weights and measures, in making and using the standard solution, the metric system of measurement has been made use of. The reason for doing this is that chemical apparatus is generally made for this system, and, when it is once understood that 1,000 cubic centimetres are equal to 1 litre, it will present no difficulty to anyone only acquainted with the English system.

Notes.

"Only for My Ears," by F. Whaley—our supplement for this week—is a picture which tells its own tale, and, as a study of facial expression, should be valuable to an artist. Those visiting the Exhibition can see the original.

The season of fogs is approaching, and photographers will soon find these unpleasant earth-clouds invading their studios. Under these circumstances it may be well to call attention to the discovery of Professor Lodge, who finds that a frictional electrical machine—the Wimshurst pattern for choice—provided with an abundance of "points," and vigorously worked, has the power of dispersing fog or smoke in an ordinary room, and of clearing the air in such a space in a very short time. The principle is being applied by lead smelters to the condensation of the obnoxious fumes, which at present they are compelled to condense in horizontal chimneys of immense length.

Bicyclists who use the camera should turn to page 659, where they will find something to interest them. We have made a strut for our bicycle, and find that with the addition it makes a remarkably steady camera-stand.

Reminiscences of the birth-time of photography are getting rarer, and should be cherished. The following is from H. Trueman Wood, Secretary of the Society of Arts.

An uncle of mine told me the other day that he remembers the English papers coming to Buenos Ayres with a note, giving an account of Daguerre's discovery; and the same paper had a paragraph to the effect that the rocks supporting the falls of Niagara had fallen. At his club a friend read out both these items. The Niagara account was put down as natural and to be expected, "for how could any rocks withstand that enormous pressure of water;" but the statement to the effect that a Frenchman had invented a method of taking pictures without a brush or a pencil, was put down as one of the lies those newspaper fellows are always inventing!

R. Kayser has found a cheap substitute for gum-arabic which may possibly be of use as a mountant. By heating milk with a little tartaric acid, the casein is coagulated. This casein is then treated with a solution containing six parts of borax to one hundred of water, and warmed. It speedily dissolves, and forms a very tenacious, durable, and inexpensive adhesive medium. Would not ordinary skim cheese—such as Dutch cheese—dissolved in a solution of borax, answer the purpose as well?

Another tribute to the accuracy and usefulness of photography comes from the British Association meeting at Aberdeen. In the Geological Section, Dr. R. H. Traquair described a new and very remarkable reptile, lately found in the Elgin sandstone, entirely from a photograph of the specimen submitted to him by Prof. Judd. He was able to assign the creature to the genus *Dicynodon*, which characterises similar sandstones in South Africa.

From time to time doubts have been thrown upon the story of Daguerre's accidental discovery of development by mercury. It will be remembered that he left one of his exposed plates in a cupboard containing a little loose mercury, and that an image was produced upon the plate by the condensation on its surface of the volatile metal.

A recent note by the well-known French chemist Berthelot goes to support the truth of Daguerre's story. In his laboratory a bottle of iodine stood at a distance of more than six feet from an open vessel containing mercury; yet a scarlet deposit of iodide of mercury was formed round the stopper of the iodine bottle. This proves not only that mercury evaporates at all temperatures (which was, indeed, previously well known), but that its vapour has great power of diffusion through the air.

The *Court Journal* is of opinion that the photographer who goes in for making pictures of figure subjects has "unwittingly created a new kind of art." He requires, thinks our contemporary, "the histrionic model," one who is as capable as any actor of giving representation by his or her physiognomy of the various emotions the photographer wishes to portray. The painter, hitherto, has asked for models only for form, taking a something from each one gifted with superiority in any particular item. The expression, the painter claims to be able to evolve out of his own brain. The moral the *Court Journal* draws is, that artists may well learn from photographers in this particular, and seek for "accomplished acting models." The demand, it contends, will create the supply.

There is certainly some force in these remarks. It is, however, somewhat singular that actors and actresses who, from the nature of their profession, should be exceptionally good models, often fail when taken in character. The artificiality is so apparent; the expression so forced. They are obviously acting. Is the wooden, puppet-like look which too many have, due to the fact that actors require the footlights and the applause of an audience to give life to their features?

The *Pall Mall Gazette* has been discussing the vexed question of professional *v.* amateur, and has come to the conclusion that "it seems far best to retain the word amateur for inferiority of all kinds; and to leave to the Army, Navy Church, and Medicine, the title profession. We are afraid that this principle would break down were it applied to photography, at least according to present ideas.

It is odd how in numberless instances photography supplies the means to bridge over difficulties. In an interesting article in a daily paper the writer describes how, inspired by Mr. Ruskin's teachings, he has succeeded in reviving the lost arts of spinning and weaving flax in a Westmoreland village. After, amid much discouragement, getting the villagers to take up the spinning, he began upon the weaving, having found an old loom in a cellar in Kendal. The loom, however, was in twenty pieces, and no one knew how to put them together. But photography came to the rescue, for. "luckily, a bright-witted lady-friend remembered that she had a photograph of the weaving on Giotto's campanile, and, by help of that, the various parts were rightly pieced together."

Mr. Linley Sambourne, the well-known *Punch* artist, has made rapid strides in photography. It was only a few months ago that he was taking lessons, and we have him now exhibiting in the shop-windows the results of his instantaneous work in the Zoo. His pictures, photographically speaking, are, perhaps, not so perfect as those which are already in the market, but he has been singularly fortunate in catching characteristic attitudes. There is one photograph of a lion in a pose which is irresistibly comic. His bear, too, which he has taken standing on its hind legs, is also very droll.

Holborn, for some reason not easily explained, is much up with photography. It is in a Holborn millinery where underneath each hat and bonnet is a photograph of a good-looking young lady wearing the identical article of head-gear displayed above. The proprietor of a well-known drapery establishment in the same thoroughfare puts an enlarged portrait of himself framed and coloured outside each of his two shops over his name. Another shop-keeper, the owner of a miraculous ointment, exhibits photographs of the diseased limbs which he alleges he has cured. A peripatetic vendor of sweetstuff, whose "pitch" for some years has been Wood's Hotel, shows his photograph on his stall, evidently considering that he is a Holborn notability. There are not a few people who possess a picture of an omnibus of which the enterprising conductor had a photograph taken because it was the first one that went over the Viaduct. It was the earnest desire of this conductor to sell enough of these photographs to enable him to open a public house in Holborn, but we are inclined to think he was never able to gratify his desire. Somehow, people were not so much impressed by the fact of his omnibus being the first to cross, as he was. When we say that in Holborn and its immediate vicinity are to be found more photographic dealers, photographic instrument manufacturers, and mount and frame makers, than in any other quarter of London, it will be owned we have proved our position.

The photographs of the horse in motion have been turned to practical use, Colonel Dodge using them largely to illustrate his book, "A Chat in the Saddle." The author shows that the belief which old cross-country entertain—that fast hunters, after leaping, land on their hind feet—is erroneous, and says, "I doubt if photography would really show them to land other than on one fore foot, instantly relieved by the second one planted a short stride further on, and followed by the corresponding hind ones in succession." This statement is amply borne out by the photograph given, which distinctly shows a horse, which has leaped a fence, striking the turf with its off fore foot.

Albums, like stereoscopes, have had their day. The ingenuity of designers now runs towards brackets and frames for the table or sideboard. The latest "nick nack" to hold a photograph is described by a trade journal as a bracket with a pocket in which the photograph is stuck, the advantage being that the whole of the photograph is shown. The effect is described as "novel." Very likely.

Patent Intelligence.

Applications for Letters Patent.

11,959. Alfred Walter Dolland, 42, Bishop's Terrace, Fulham, S.W., for "The construction of folding tripod stands."—8th October, 1885.

12,028. Edmund Fortescue Gange, 67, Strand, London, for "An improved shutter for photographic cameras."—9th October, 1885.

Patent Sealed.

7422. Charles Wells, 22, Southampton Buildings, W.C., for "A method of recording by photography the degree of accuracy in aiming ordnance."—18th June, 1885.

Specification Published during the Week.

15,757. Herbert John Haddan, of 67, Strand, in the City of Westminster, Civil Engineer, for "Improvement in heliographic copying apparatus." A communication to him from abroad by Hugo Sack, Engineer, of Plagwitz-Leipzig in the kingdom of Saxony.—Dated 27th August, 1885.

This invention has for its object to obtain a close adhesion or fit between the sensitive paper and the original with a moderate pressure.

For this purpose I employ a partial vacuum in the following manner.

On the glass plate of the copying-frame is first placed the transparent drawing or photographic negative to be copied, upon the latter the sensitive paper; on this paper a sheet of woven fabric or other suitable material permeable for air, and on the said sheet a sheet or lid of india-rubber or other hermetically-closing material, into the centre of which leads a tube. If the edges of the lid close tightly upon the glass plate, and air is sucked from the place situated between the glass plate and the lid by means of the tube, and any suitable exhausting apparatus—for instance, a sort of bellows provided with a suction valve—the sensitive paper is firmly pressed against the original, without exerting undue pressure upon the glass plate. The glass plate may, therefore, be very thin, and may be replaced by a transparent membrane. After the air has been sufficiently rarified, the tube is closed, and the apparatus exposed to the light.

In order to obtain an air-tight fit at the beginning of the exhaustion, an air-cushion may be placed all around the circumference of the lid; this annular air-cushion is exposed to the pressure of a frame, and may either be fixed to the lid or to the frame.

The claim is—

1. The combination of a main frame, with a lid, a glass plate or membrane, permeable sheet, hermetically closing elastic cover, and means for producing a vacuum between the cover and the glass plate.

2. Producing a vacuum in the apparatus between the sheet permeable to air, and the hermetically closing elastic cover for the purpose of obtaining a perfectly uniform contact of the sheets with each other, or between the sensitive paper and the photographic negative.

3. An elastic packing ring adapted to hermetically enclose the volume of air contained in the apparatus.

4. The use of a membrane, instead of a glass plate.

The whole substantially as described.

Patent Granted in America.

327,449. JOSEPH LYONS, London, England. "Stereoscope." Filed April 1st, 1885. (No model.) Patented in England, September 12th, 1884, No. 12,329.

Claim.—1. A stereoscope provided with a support, a sleeve surrounding said support, and a lamp-supporting arm attached to said sleeve, all substantially as stated.

2. A stereoscope eye-piece, in combination with a frame pivoted to said stereoscope, and containing two or more differently-coloured panes or plates of glass, which are arranged to be brought at will across the sight of said eye-piece, for the purpose set forth.

3. A pair of slotted eye-pieces for a stereoscope, in combination with two frames pivoted to said stereoscope, and arranged to turn in the slots of said eye-pieces, respectively, each frame being provided with plates of glass of different colours, arranged to come into its eye-piece as the frame is turned, to colour the view, substantially as set forth.

4. In combination with a stereoscope, one or more movable frames, provided with separate panes or plates of glass having different colours, said frame or frames being attached to said stereoscope, but movable to present any one of said colours in the line of vision, substantially as set forth.

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A VISIT TO THE NORTH OF IRELAND WITH A CAMERA, AND ITS RESULTS.

BY J. ALEXANDER FORREST.*

EARLY in last month I received an invitation from an old friend in the north of Ireland to spend a week or two at his house, and I was specially invited to bring my camera with me. The offer was cheerfully accepted, and every arrangement made in the way of plates, and all the appurtenances thereof, belonging to an old amateur, who joyfully looked forward to the enjoyment of active holiday time, of calm prospecting, and then watching for the opportunity of Old Sol's best display of Nature's sweetest development.

I left Liverpool by steamer for Londonderry at the unearthly hour of 3 a.m., our voyage occupying eighteen hours to reach Derry, and I felt the "rumel-rumels" of the steamer anything but pleasant. Being a good sailor, I was not troubled with the greater evil called "colly-wobbles," therefore there was a minimum of misery to me individually, as compared with many of my fellow passengers. We had nothing but the dreary waste of waters without a glimpse of sun.

My friend awaited my arrival in Derry at 10 p.m., and a jolly supper with cheerful "chit-chat" amongst a group of young folks, whose society I have a decided weakness for, prepared me for my bed; and in the morning I found myself surveying a magnificent view from my host's house of the city of Londonderry, which in picturesque effect is very little short of Edinburgh, possessing also great historic interest. After breakfast I set forth to reconnoitre, and jot down points of interest, and the best time to take the views.

My host and friend was no other than the well-known photographer, Mr. Alexander Ayton; consequently, I was in luck's way. His studio and dark room, along with every possible assistance and attention, made me feel "lines had fallen in pleasant places." Under such exceptional auspices, it is not to be wondered at that my success was everything I could wish. We were too near the equinoctial gales to have settled weather, but we watched the course of the clouds, and took the benefit of any break, that the sun might sparkle the picture.

My views principally consist of the historical scenes of the great siege of Derry in the time of James the Second, and which lasted from December 7th until August 12th of the following year (1688), and the account of the noble defenders, their sufferings, their heroic endurance, is without parallel in the history of this country.

In the porch of the Cathedral stands a pedestal supporting a shell that was fired into the citadel on the 10th of July, 1689, enclosing terms of capitulation. The answer it received was "No surrender!" And nobly it was carried out, for on the 12th of August, 1689, the enemy, finding that two frigates had burst through the impediments they had placed on the river, and relief was certain, they decamped in haste, leaving many traces of discomforture and ruin behind them. The besieged numbered 7,500 when the gates were closed on the 7th December, 1688, and at the raising of the siege 4,300 heroes were left to mourn over their departed brothers, and face their duty of again rebuilding their industries in peace and quietness.

The inhabitants of the "green isle of the ocean" may well feel proud that they possess the blood of the martyr citizens, and well may it be asked who dare propose the separation of one of the brightest gems in Britain's crown. I treasure the views I place before you, not from any merit they possess, but from a sense of their great historic value and association of a trip I can never forget, for Ireland is unique in hospitality and affection. Such is my experience of the sons of the north.

I spent an evening with my friend making gelatine emulsion, and it has since occurred to me that it is the duty of our members to experiment with Mr. W. B. Bolton's suggestion—coating plates with collodion, washing, and then re-coating with gelatine emulsion; in fact, a sort of second edition of the Taupenot process, which our Manchester friends brought to such perfection. If this is successful, I see no reason why it should not be tried with Eastman and Warnerke's plan of negative paper, where the non-halation virtue comes to light.

Whilst waiting at Fahen Railway Station, Lough Swilly, I met a gentleman who told me that the President of the Glasgow Amateur Photographic Association had very lately paid them a visit with his camera, and that he had taken an instantaneous picture of an illicit still, that he discovered in an out-of-the-way place, in full operation. This, no doubt, is a novelty, but most of us will think it strange how to account for the presence of the worthy President. Was it a case of "Willie brew'd a peck o' maut, and Rab and Allan came to prie?" or had the "Deil ran awa' with the exciseman?" Imagine the coolness in taking the focus of such a group. The picture, of course, is a rarity, and we trust will be enjoyed by the Photographic Society of the city of Glasgow, and also by the revenue officers.

I made a running trip to Kerry Kal, on the banks of Milroy Bay, and got half drowned in a deluge of rain, discovering that universal "side-ears" are not the best things for protecting your legs in moving along. After noon we were rewarded by a burst of sun, and the result was a picture of islands in the midst of the bay, and another of Rathmullen Castle.

Photography has been the "handmaid" to all the arts and sciences, and is daily advancing in artistic quality.

As amateurs have been in the past to a very large extent the precursors of all improvements, I should like to see them take a more practical grasp of every detail, from the making of the emulsion to the printed picture. The age is sadly too commercial for high-class aim and excellence. Talent must be fostered by adequate reward, or it ceases to exist.

It may not be out of place to relate a photographic incident that occurred to me some years ago with reference to Ireland. I received an order from the west coast, and, not having a business knowledge of the standing of the contractors who sent it, I requested a guarantee, and received a note from a "noble lord," "I will see you paid." In the course of time, my attention was called to the fact that the contractors were in the Bankruptcy List. I therefore wrote his lordship, and his reply was, "Who are you that you should write me for money?" I felt a little puzzled, because he might question a written copy of his very graphic engagement. I took his original note and fixed it on the wall, taking a photograph of it as a negative, and sent him a print of it. He sent me a check by return of post—£84—stating he was amused at the way I had taken to remind him of his obligation, as he felt the guarantee must have been signed by him. Photographic knowledge, in this case, rendered me great service. I name this, as some of our friends may be in a similar fix as I found myself.

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* A communication to the Birkenhead Photographic Association.

PAPER NEGATIVES.

BY T. G. WHAITE.[*]

I bring before you to-night what has been called a new departure in photography—that of making negatives on a paper support. Seeing that the earliest negatives produced were by Fox Talbot's method, the calotype and old wax paper process, I think it is somewhat of a misnomer. Of more recent date we find Warnerke and Morgan and Kidd have made a commercial article for the same purpose. You will find also in the Photographic News in 1882, and the Year-Book for 1883, a method of coating paper in continuous lengths with emulsion, illustrated with diagrams, to which is attached my name.

What is really new in the method now before the photographic world, by an American company, is the preparation of the paper to receive the emulsion, not the coating of the paper with the bromide of silver; this can be done in several ways without infringing any patent. What the Eastman Company claim is this. They state that, having made the discovery that the net-like surface of paper in its ordinary state causes an uneven deposit of emulsion, it consequently, in developing, causes a greater density of image in the thicker interstices than is desirable. To remedy this evil, they coat the paper first with an insoluble gelatine, then subject it to great pressure, and afterwards coat this levelled-up paper with sensitive emulsion. From my experience of their films they certainly effect their object. I have produced, to my mind, most satisfactory negatives on these films; the only difficulty at present is the want of a reliable, simple, and less disagreeable method of making the paper transparent.

The plan at present is to use castor oil hot, until complete saturation of the paper takes place. Now I find everybody kicks against the castor oil; it was a lesson early instilled or otherwise got into them in the nursery, and they have never made friends with it since.

Making the films transparent, then, is not a difficult matter. Now comes the trouble. After printing off a number of prints from a negative, the oil gradually becomes less and less, from pressure in the frame, and "grain" begins to appear. It is all very well to say oil again, but it must be borne in mind that after you have oiled first—mind your retoucher does his work; now, if you attempt re-oiling, off flows the black lead.

What we want is something as stable as the old wax method, with the same transparency that castor oil gives. I do not doubt that as soon as the process becomes more known and applied, that some of our experimenters will accomplish this much-desired end.

I am sanguine enough to believe that in time paper will entirely supplant glass as the support for our films; and I believe, in capable hands, it will be the means of making our photographs more worthy the name of works of art, not on account of its portability and lightness, but from the nature of the support; we shall be enabled to do more work on the negative (in the right direction, I hope) that we are now prevented from doing on glass, in adding effect and suppressing undesirable and obtrusive detail, as work may be applied to both sides of a paper negative; on the emulsion side for detail and crispness, and on the reverse for softness and broad effects.

We may possibly, by these means, obtain something akin to a painter's sketch. The artist painter says the great evil of photography when applied to picture making is the immense amount of detail a sharply focussed negative possesses. If we could suppress or obliterate some of this detail, which the mechanical photographer considers the perfection of his art, I feel we shall gain a power we have hitherto not possessed—viz., breadth and simplicity. This will only be of real service to the photographer who has a knowledge of art, and knows how to apply it.

The landscape photographer will find in its lightness, as compared with glass, its chief recommendation; he will also find in making interior pictures an utter absence of his old enemy halation. There will be also the entire freedom from dust particles when travelling, for no matter how carefully we dust our slides, after travelling a few miles a new crop will be found on the plates, *over* which the picture will be taken, the result of which will be pinholes, &c. Now, with a roller-holder and a band of paper, this need not be the case, as the paper may be kept rolled up and safe from dust until the very moment it is required for exposure.

Another advantage of the roller-holder will be our almost entire independence of a dark room when travelling; each holder taking twenty-five pictures, and weighing about the weight of four glasses with their double slides, we shall with one charge have a supply for a good day's work, and should we require to change any, it can be done quite as well in perfect darkness as with a light (say, under cloth and a portmanteau). We can go on firing away our twenty-four filmer until darkness puts a stop to it. All this is, I think, in the very near future.

ACKLAND'S SCALE OF PHOTOGRAPHIC EQUIVALENTS.

This is a slide-rule on the same plan as that known to chemists of the last generation as Cuff's Scale of Equivalents; but instead of the long array of chemicals found on that rule, Mr. Ackland has introduced only those likely to be of use among photographers and experimenters.

Those who are fully aware of the advantages of the ordinary logarithmic rule on ordinary calculations, will readily appreciate the introduction of this new form especially adapted to their requirements; whilst its use in working out the required results, and the rapidity of solving the usual problems occurring in photography, will commend it to all who may require its aid.

The principal chemicals are arranged in accordance with their combining proportions in relation to the sliding scale, and the answers can be instantly read off by mere inspection.

In order to test its application we worked out the following:—How much nitrate of silver is required for full conversion of 37 grains of bromide potassium, and how much bromide silver would be produced? We obtained correct answers in less than forty seconds, and, after many trials, we can with confidence commend Mr. Ackland's new form of rule to the notice of our readers.

"SHOTS" IN THE EASTERN COUNTIES.

BY A. W. BEER.[*]

Our next halt is at Stamford, about twelve miles away. Here are, close at hand, materials for the day's stock of plates—Burghley Park, full of magnificent timber, open glades and sheltered avenues, trees with marvellously gnarled trunks and gigantic excrescences, and vistas like roofless abbey aisles.

Burghley House, famous in tale and song, is very fine and imposing, but requiring a spring afternoon's light to see it to the best effect, and very long focus lenses to make a good picture. Back again into the town, and at the Priory, St. Mary's Church, and among quaint streets, are found suitable work for the camera, the light being right (morning) in each case. In the old alms-houses, and on the river, unique picturesque effects may be obtained.

We were tempted by our proximity to Fotheringay Castle to make a pilgrimage to that famous spot, but had only disappointment for our pains. Not a stone is left of the Castle that witnessed the murder of the fair Queen of Scotland, a mound of earth by the river side alone marking the site. The monuments in the church, however, will be found worth a visit.

We wander across the fields to Elton, where by the river side the old Weir and foot bridge, with tall poplars shading the village mill, and throwing cool shadows on the water, compose a picture to our taste. A few miles further down the line we alight at Barnwell. Here we have two churches: one a picturesque old Norman building, with carved courses, window heads, and a fine porch; the other a church in ruins.

Several charming studies can be made in this old-world village, particularly by the stream that flows through it. Close here are the ruins of Armiston Castle, with all the walls and bastions complete and perfect, pointed gate, guard room, &c., almost as when the last tenants left it, though now turned to more peaceful use, supporting the fruit trees prettily trained against its old walls.

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[*] A communication to the Edinburgh Photographic Society.

[*] Continued from page 603.

ARMISTON.

ELY CATHEDRAL.

Again we leave Peterboro' for Ely, through the dreamy, sea-like fen-land, across the old and new Bedford rivers, the banks dotted by lazy anglers of both sexes; cool evening shades gathering round the snug farmstead, or miniature villages; clustering round tiny churches, each on their little fen island. At length, a sharp curve of the line, and we are rounding the base of the Isle of Ely; a little hill in the level country, crowned with its massively-grand Minster, and, as we see it for the first time, with the last rays of the sunlight tinting its noble grey towers, all the intervening space filled with terrace after terrace of red and yellow-tiled houses; and the river winding round the base, deep and sluggish, dotted with smart skiffs or heavy barges, a picture is impressed on the mind that can never be erased. Early in the morning we commence work; and what a plethora of subjects Ely presents! Beginning with the early morning sun at the east window and Lady Chapel; working round to the south-east, where are remains of monastery, Prior Cawdor Chapel, and an infinite variety of quaint buildings and effects, not forgetting the elaborately carved doorway in the Dean's garden; from here also take a "shot" at the famous octagon.

The interior of choir, looking from the altar, should also be done in the morning light, when about two hours will suffice with $\frac{f}{56}$, and this is a picture that should on no account be missed, embracing as it does the canopied tombs, carved choir stalls, octagon, and unequalled painted ceiling of the nave. The decorated chapels behind the reredos are specially fine, the carving being perfectly marvellous.

By this time the light will be about right for the west front, and, with or without the cannon in the foreground, it is a picture that is quite unique. Notice, also, the old palace of the bishops on the right, a fine specimen of domestic architecture of the time of Henry VII.

But we must hurry on, leaving unmentioned many points that the photographic visitor will at once note for himself. We now take our last flight, viz., to Norwich, calling at Bury-St.-Edmunds. At this latter place we find subjects in the old Abbot's Bridge at the lower end of the town, now disused, but still a "picture." The curious Norman tower, with the Abbey ruins behind, and the fine monastry gate with portcullis complete, are all pleasing studies.

Late in the afternoon we reach Norwich, but there is still sufficient light, and in the right quarter, for the cloisters, with their varied arches in decorated and perpendicular styles; while the lofty spire, so richly encrusted with ornament, and so perfect a work of art, stands out clear and sharp.

Norwich is full of quaint corners, old-world courts, clustering gables, and flint-work churches, all curious, and many deeply interesting. In and about "Tombland" some Prout-like corners may be found.

The west front of the cathedral is not imposing, but the famous east end supplies some charming studies, also a morning view from the meadows, including, in the foreground of the view, gabled, red-tiled, old houses peeping from the orchards. That done, continue down the lane to the river side, pass under the old water gate, enter the ferry boat, and cross the river; then turn and look back at the ferry house, old archway, and cathedral tower in distance, and I think the camera will not rest long in its case at Pull's Ferry.

On the other side of the city, about a mile-and-a-half out, is a most delightful old house, now the Dolphin Inn, formerly Bishop Hall's Palace, easily accessible by omnibus.

We have now run to the extreme tether of our time, and reluctantly turn our faces homewards, the tour having afforded a most abundant variety of "food for the camera," and a supply of fresh vigour to mind and body; so that, to amateurs casting about "where to go" during the coming season, we will say with all confidence: Try the Eastern Counties, but—don't forget "Murray."

Correspondence.

NEEDED, A PHOTOGRAPHIC LIBRARY AND MUSEUM.

Sir,—At last, at the B. M. Library, I have traced out the early history of the transparent film to replace glass plates, and am astonished to find that this palpably good notion should have been allowed to sleep for eighteen years, after being worked out to a practical end by George Dawson and others, when at King's College. You shall have my article on this interesting subject in a day or two.

It has struck me with astonishment that there is no perfect collection of periodicals, books, &c., on, or connected with, photography come-at-able, even at the B. M. Library, by photograpic students or workers, though we have so many photographic societies. This ought not to be. What does the old Society do with the books, &c., it had for the use of its members some years ago? At the Inventories the old Society exhibits the basis of a museum illustrative of the historical development of photography—very imperfect, but if it were proposed to make the collection perfect, many would help to make it so. The sooner such an attempt were made, the better, for, to my knowledge, many specimens very illustrative will presently be swept away as rubbish. Only last night I was looking at specimens of some of Wedgwood's experiments with chloride of silver on bibulous paper.

Samuel Highley.

SCIENTIFIC DEVELOPMENT.

Dear Sir,—In Col. Stuart Wortley's article, Photographic News No. 1405, 7th August, 1885, he gives as his standard developer—

Pyro. solution ... ... 1¼ ounces = 10 gr. pyro.
Brom. ,, ... 30 m. = 1 ,, brom.
Amm. ,, ... 25 ,, = 2½ m. amm.

Does he mean that this is to be used without the addition of any more water? because this seems such an extravagant amount of pyro. to use for one plate; for large plates at least 2½ ounces liquid would be necessary = 20 gr. pyro. Ordinary developers are 2 to 3 grs. pyro. to the ounce.

W. Hooper,
Lieut.-Col., 1st Madras Cavalry.

AN ITINERANT PHOTOGRAPHER AT THE PHOTOGRAPHIC EXHIBITION.

Sir,—On Monday evening I resolved to treat myself to a sight of the show; so, arming myself with the necessary sixpence for admission, and disguising myself within the folds of a clean collar, I sallied forth. To one accustomed to cater for the British public on the breezy heights of Highgate and elsewhere, the prospect of seeing some of the productions of those in the "upper suckles" of photographic art presented a mild form of excitement. Arriving at the goal of my hopes, I paid my sixpence, almost expecting to hear the recipient reply, "Nice case for threepence extra;" but he only said, "Catalogue, sir?" But, as I had come to see the pictures, and not to read about them, I declined.

Entering the room, I was at once one of the throng. My eyes were almost at the first attracted by the apparatus, and I think any man who has to use tools in any form for the ultimate end of "keeping the mill agoing," will forgive me for lingering a few moments. I saw, however, little that was fresh. My attention was attracted—I had almost said distracted—by an electric lamp obviously for use in the dark room, a small incandescent lamp being the source of light. But as the particular lamp shown would not work, and the other was giving a light equal to an expiring candle-wick, I grimly pictured the enthusiastic amateur with a plate in the dish—possibly the first he has produced — when the developed image shows some signs of doing other than flashing out, and greying over (some of my readers well know what I mean), then at this supreme moment out goes the light. He pulls away at the handle over the square box containing the four cells of the battery, vainly; meanwhile, things are going merrily on in the dish. This thought compelled me to move on, for I fancied I could hear slow music coming out of that dark room, the note D being forte.

I passed to the other side of the screen. More apparatus—shutters in many forms—and the thought occurred to me, how many practical men used them in preference to the simple drop-shutter with elastic to increase speed. I gazed on cameras by good makers, and showing splendid workmanship. But is all this polish and bright brasswork necessary for making good pictures? Echo answers, "Ask the workmen in photography; they can tell of shifts made with string, cardboard, and glue, and pictures resulting.

Ah! that's good. Boy holding piece of bread to a dog who looks like a dog, and a boy who looks like a boy when teasing. The Peripatetic salutes you as a master, Mr. Robinson. Art, I know, can take strides over the head of a humble "brass and glass for sixpence" man; but I think in "Dawn and Sunset" a *leetle* more light thrown in the top right hand corner over the old man's head would have kept within the demands. I tremble at my temerity: mice should not question what giants do. The old man, and the woman and baby, are truly exquisite both in idea and execution.

Then come some beautiful views of yachts, &c., perfect in their own particular way. Other pictures (on the floor, almost) I tried to see; but as the place was pretty full, and my altitude is a trifle over six feet, I feared to stoop lest I should project some one over my back who was scanning the pictures placed so much higher up—fine case of views, with medal labelled on, and well deserving.

I just managed to see a case of portraits taken "at home." Well, there! I get some attitudes at times, when I pitch my tent; but I expect "'Arry and 'Anner" would demur at parting with the ninepence if I showed such straining after effect.

Now my attention was taken by the announcement that the exhibition of lantern slides would take place. Some passably good, some ordinary, and a series of intensely comic "scenes from the life of Mary, Queen of Scots," were shown. That axe in the execution scene was sublime. The soldiers in their armour looked as though they were not used to it, and showed it at the knees. Oh! Mr. Editor, here was art at last. By-the-bye, how is it that at a lantern show one always expects to hear children sing, "Twinkle, twinkle, little star"?

I saw a couple near one of the stands of pictures taking advantage of the occasion to get forward with their courting, and I breathed a friendly wish for propitious parents. May they be happy!

"Strengthening the Understanding" was almost the next picture I saw, and I can heartily endorse all you have said for it. I should like to have been the maker of it. Mr. Malby, you are an artist-photographer!

An enlargement marked Hunt and Thornton took my attention, pleasing me with its clearness. More enlargements as good as this would tend to make the public appreciate the colour of bromo-argentic paper pictures better than they do at present.

Warnerke's paper negative process has some exponents, a portfolio containing both negatives and prints by some military gentleman affording instruction, as the negatives had some particulars as to exposure, stop, &c., written on them.

Some show-cases more suitable for the door-front, with price labels attached, were passed.

Then came what I take to be the most interesting exhibit in the room. As the reproduction, mechanically, of photographic pictures is one great question of the day, and one in which, although much has been done, much remains to do, yet the picture labelled "Noel Paton," and that to which the name of "Stuart Wortley" is attached, leave little to be desired. The "Fairy Raid" is deliciously delicate, and the little girl with the toy sheep has a delicacy of half-tone that kept me standing in rapt admiration.

But closing time had come, and I descended, and, upon exposure to the cold night air, developed a shivering fit, requiring some fixing solution, which, being properly applied, towards the classic region of Camden Town bent the steps of the Itinerant Photographer.

SPOTS ON PLATES.

Sir,—Please excuse me taking up your valuable time in calling your attention to the following troubles experienced in mountaineering. I took with me gelatine bromide dry plates, which were, and still are, faultless in the studio, but after exposing them on the mountains, and developing them some three days after, I found them covered with curious transparent spots. The unexposed plates, used afterwards at home, showed the same spots. Any reader informing me of the cause and remedy of the above will greatly oblige yours truly,

A Seven Years' Subscriber.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 8th inst., **W. E. Debenham** in the chair.

The employment of tin foil separating clips for packing gelatine dry plates was again discussed, and opinions favourable thereto expressed; but **A. Haddon** thought that strips of paraffine paper of similar thickness would answer as well. This was not the experience of A. L. Henderson, whose plates packed in that manner showed marks either from pressure or chemical action.

J. Barker then showed some negatives exhibiting green fog round the margins only. The plates, which belonged to a friend, had been packed for two years with tissue paper between them, and he supposed that a damp atmosphere had decomposed the unprotected gelatine. The covered portions yielded perfect negatives.

The **Chairman** pointed out the distinction between ordinary green fog and the iridescent kind resulting from an impure atmosphere. A very small quantity of sulphur would, he said, in two years produce a similar result.

A. Mackie spoke of the deleterious effect of house gas upon plates even when kept in a moderately dry room, and he noticed they became less sensitive.

A. L. Henderson remarked that negatives which appeared in development to have clear shadows, often turned out to be bad cases of green fog. Some gelatines were liable to decompose, but speed and quality could be got with them, which was not attainable by other means.

The **Chairman** had attained the highest speed with hard gelatine, and he did not find that hardening with chrome alum altered the result.

This led to a short discussion on frilling, in which Messrs. Cowan, Henderson, and the Chairman took part.

W. H. Hislop showed a negative of the S. S. *Republic*, steaming out of New York Harbour. It was an Eastman film, taken from the deck of the *Urania*, about three minutes previous to the recent collision.

The following question was then read:—"Can anyone explain why salicylic acid, when mixed with water and methylated alcohol, discolours when exposed to light?"

A. Cowan had long noticed this, and attributed it to the methyl. Some samples of spirit had turned it deep red without exposure to strong light.

The subject was further discussed, but nothing new elicited.

Another question:—"Shall this Association henceforth call the usual fixing salt by its proper name, and adopt the decimal system of weights and measures?" was then dealt with.

A. Cowan saw no reason for changing familiar words like "hypo" and "pyro," but advocated giving formulæ in parts as being easier than the metric system.

The **Chairman** considered a dual decimal system preferable to any.

W. H. Harrison, **A. Haddon**, and others spoke in favour of the question, which was adopted, they said, by all scientific bodies, and was universally understood.

W. K. Burton thought there was a good deal to be said in favour of the dual system; and after some further discussion the matter dropped.

"What is the best strength of fixing solution for plates which have been more than ten minutes in developing or other solutions immediately before?" was then discussed.

W. K. Burton could not see that length of soaking would make much difference; and

A. L. Henderson pointed out that gelatine could not absorb more water than it originally contained at the time of coating.

The **Chairman** said that one part of the fixing salt to four of water would be a useful strength, whether the plates had much or little soaking.

C. H. Cooke had some plates which gave pinholes if soaked in water before development.

W. K. Burton thought water would have no effect in producing pinholes unless some substance had been put into the emulsion which was soluble in water.

Several members offered suggestions, but, as the mode of preparation was not given, it could not be settled.

A. L. Henderson had suggested the possibility of an impure sample of alcohol causing the spots above alluded to, and he had, on a former occasion, added naphtha to a perfect emulsion, the effect of which was to cause spots like fine sand dusted over the plates.

Methods of purifying alcohol then became the subject of discussion, the usual plan of shaking it up with quicklime meeting with general favour.

The **Chairman**, having drawn attention to a statement made in one of the journals by a member, that silver citrate gave cold tones for printing out, he desired to say that, in his hands, it was quite the contrary; he did not get either blue-black or blue tones, but warm colours, which was the characteristic of the citrates.

North Staffordshire Amateur Photographic Association.

The fortnightly meeting was held on Wednesday, October 7th, the President occupying the chair.

It was decided that the proposed exhibition of the work of amateurs, to be held shortly, be confined solely to this Society, and that the co-operation of other societies be solicited another year.

F. Leek showed some photographs taken by himself in Dovedale, &c.

J. Burgess showed a negative taken on sensitive flexible tissue.

After some discussion upon the respective merits of paper and glass as a support for the sensitive film, the opinion of the majority of the members was expressed, that until the former was shown to be practically better, or at least equal to the latter, then double-backs would not be laid aside.

The **Honorary Secretary** having at the request of some members promised to give a demonstration of the carbon process at the next meeting, the proceedings terminated.

Derby Photographic Society.

The monthly meeting of this Society was held on Wednesday, October 7th, in the Mechanics' Institute, **Richard Keene** occupying the chair.

The proceedings began with a show of cameras. Among those exhibited were Scott's, McKellen's, and a new one just published by Marion and Co. (shown by Mr. Keene). H. Bolden also exhibited two cameras of curious construction.

R. Keene then gave a short address to beginners on "What to Photograph." Among other things he remarked that those who lived in Derby had no need to wander far abroad to find suitable subjects. Within a radius of five miles there was an almost inexhaustible supply of charming views to be obtained, and of great variety.

H. Bolden followed with advice on "How to Take the View." He recommended the use of good apparatus, and said the best size of camera for general use was the half-plate, 7¼ inches by 4½ inches, or 7½ inches by 5 inches. It was important that the camera should have a swing-back, and also side-swing. Illustrations of the benefit of these were given. He described and illustrated the use of various lenses, such as long distance, wide angle, Ross's Symmetrical, and Dalmeyer's Rapid Rectilinear. He recommended a careful study of the ground with a view-meter before the fixing of the camera. A bright showery day was the best, and the best light was when an extremely thin cloud just veiled the sun. Much other practical advice was given.

C. B. Keene then developed two plates which had been exposed by F. Cooper, and thus a most instructive evening was brought to a conclusion.

At the next meeting of the Society (November 4th), a photograph exchange will be held, and members are invited to bring specimens of their work.

Edinburgh Photographic Society.

The final meeting of the session was held in 5, St. Andrew Square, on Wednesday evening, 7th October, **W. Forgan** in the chair.

The minutes of the last meeting having been approved, Arthur Edwards and Peter Kerr were admitted ordinary members, and sixteen names nominated for election at next meeting.

The **Chairman** then intimated that there had been sent in a large number of pictures for the competition for the presentation print, but he regretted that out of a membership of more than four hundred, only six had come forward as competitors. The Council had carefully examined the work sent in, and awarded the first prize to a picture signed "Caller Herrin'," representing two children, one of a number of platinotype prints sent in by the same hand; the second prize was awarded to a silver print, entitled "Gossips," and signed "Harmony," one of a series of more than fifty by the same hand; and the third place to another photograph signed "Caller Herrin'," representing a fishing boat.

On opening the sealed envelopes it was found that the first prize, a silver medal, was gained by Marshall Wane, and the second prize, a bronze medal, was won by T. G. Whaite, the third prize being also taken by M. Wane; according to rule, this medal is not awarded.

The three pictures were then exhibited and much admired.

The **Chairman** intimated that the whole of the pictures sent in for competition would be exhibited on a future occasion, and he trusted every member of the Society who had produced anything of general interest would send in something to help the display, as the Council had it under consideration to meet on that occasion in a large hall, so that the pictures could be examined with comfort and profit.

T. G. Whaite read a paper on "Paper Negatives," (see page 667), illustrated by a large number of beautiful prints, together with the paper negatives from which they were produced; after which he developed some paper negatives, and demonstrated the mode of rendering them translucent by means of hot castor oil.

Alexander Mathison exhibited specimen negatives by the same process, and also prints from them. He found the manipulations easy, and the results eminently satisfactory; the only unpleasantness in the operations was the use of the castor oil. The main feature in the successful application of the oil was to make it hot enough, and he used for the oil a dish supported within another tin dish containing water kept constantly boiling by means of a Bunsen burner. He had taken the same subjects under identical conditions on plates and films, and found the latter distinctly more rapid; and he felt that with these films and a roller-slide, an amateur was better armed to gain his end than by any means hitherto in use.

Mr. **Bashford** said many workers were in the habit of printing from their negatives without protecting them by varnish. He had never been able to do this, as he found the gelatine surface always absorbed some of the silver from the paper. He wished to know if the films that were neither oiled nor waxed were protected in any way, as otherwise he feared they would rapidly deteriorate.

James Crighton said he had taken large numbers of prints from unvarnished negatives, and had never found them stained. Others also made similar statements.

J. M. Turnbull said the reason why some could print from unvarnished negatives with impunity, while others could not, was due to the former using a paper (probably "preservative") that contained very little or no free silver, while the latter were generally professional photographers who sensitized their own paper, and always aimed at securing an excess of silver in the paper. The professional photographer also often used the paper with a considerable amount of moisture in it, and in either case the gelatine film would require protection.

Bradford Amateur Photographic Society.

The monthly meeting was held on Thursday, October 8th, the President, **Duncan G. Law**, in the chair.

After the minutes of the previous meeting had been read and confirmed, it was resolved that the monthly meetings should be held on the second Thursday in the month instead of the first.

Mr. **Law** showed some film negatives on the Eastman Walker paper, and described the main features in the Inventions Exhibition interesting to a photographer.

Mr. **Scorah**, the Secretary, distributed some tablets of compressed pyrogallic containing four grains each, sent by Marion and Co.; also a new shutter actuated between the lenses.

The rules for the prize competition were then decided on. The prize list comprises seven classes, in which prizes will be offered for the best landscape on full plate, and upwards; ditto smaller sizes than full plate; best instantaneous; best architectural subject; best composition picture; best series of three lantern slides; best picture in the exhibition. In each class, first prize £1; ditto second prize, 10s. All pictures to be the genuine work of the exhibitor, printed from negatives taken this year. All pictures must be mounted on cards with white margins, and neither enamelled nor mounted in optical contact with glass. No retouching allowed, and in the case of doubt, negatives may be called for by the judges. Focal length of lens, size of stop, and length of exposure to be stated on the mount of each picture. Each exhibitor may send in three pictures for competition in each class. The second prize to be withheld unless there are at least three competitors in each class. The lantern slides to be taken from exhibitor's own negatives, and prepared by the exhibitor himself. An entrance fee of 1s. must be paid by each exhibitor in each class in order to meet expenses.

Photographic Society of Ireland.

The opening meeting for the session 1885-6 was held at the Royal College of Science, Dublin, on Friday evening last, the 9th inst., **George Mansfield** in the chair.

After the minutes of the last meeting had been read and confirmed,

Greenwood Pim read some notes on his recent tour in Switzerland, and passed round an album containing nearly fifty views taken in that region during his trip, many of which were very good, especially some of those of snow-capped hills. He also passed around a couple of negatives as specimens, resulting from the use of Beachey's developer.

J. V. Robinson then showed and explained his patent roller-slide for use with negative paper in coils. He also showed some excellent negatives and prints taken with it.

Mr. **Mansfield** also showed some paper negatives on Warnerke's paper, and prints therefrom.

It was announced that the next meeting would be the annual one, and that the nomination of committee and officers should be sent in a fortnight before that date.

The Society will award four bronze medals—two for large pictures and two for small—for the best and most artistic work done during the past season. Pictures for competition must be sent to the Secretary on or before 2nd prox.

Birmingham Photographic Society.

The first meeting of the winter session was held on Thursday, October 8th, in the Technical School, Bridge Street, **W. Jerome Harrison**, F.G.S., in the chair.

The following gentlemen were elected members:—Messrs. Taylor, Hands, Coleman, and Hadley.

Mr. **Harrison** then gave the paper of the evening on the "Eastman Film," showing specimens of the paper before and after development. The prints exhibited from negatives taken on the paper showed a remarkable freedom from the grain, a thing which many members thought would be the failing point. Mr. Harrison next explained the working of the roller slide, illustrating the same by drawings on the board, and the carrier patented by the Company for exposing the tissue in the ordinary slides.

The general opinion of the members present was that the maximum of advantage was obtained when the roller was used.

Some cards were passed round with views on each side which were remarkably well done.

The meeting then adjourned to October 22nd, when Mr. Nock will deliver a practical paper on the "Making of Gelatine Emulsion," &c.

Birkenhead Photographic Association.

The tenth ordinary meeting was held on Thursday last, October 8, at the Free Public Library, Hamilton Street, **J. Alexander Forrest** (President) in the chair.

There was a large gathering of members, and several interesting items were brought before their notice, amongst which was a roller slide, exhibited and described by H. A. Davies; the beauty of its construction and the simplicity of its manipulation called forth universal admiration.

A. W. Beer also passed round a few negatives taken upon films, explaining that he had been compelled to undertake the experiments rather hurriedly, in consequence of the shortness of time at his disposal before the meeting night, but he thought the results would suffice to show that the invention was a most important one; and although he was not of opinion that it would readily supplant the use of glass in the case of the smaller sizes, he had no doubt whatever but that it would be found to be a considerable advantage where larger plates, say 10 by 8 and upwards, were made use of. With reference to exposure, he found that, with a Ross' 4½ inch single lens and a good light, the picture was rather over-exposed in two seconds.

After a lively and critical discussion,

Mr. Forrest read a paperette entitled "A Visit to the North of Ireland with a Camera, and its Results" (see page 666), illustrating his paper by a number of finely-enamelled views.

A hearty vote of thanks was accorded the above-named gentlemen for their interesting communications, upon which

Mr. Davies, in acknowledging the Society's kind reception of his remarks, added that he had been requested by Mr. Atkinson, of Manchester Street, to say that if any of the members of the Society wished to acquaint themselves with the theory and practice of emulsion-making, coating of plates, &c., he should have much pleasure in giving them every information that lay in his power at any time they felt disposed to call at his establishment.

Amongst the exhibits of the evening were some splendid instantaneous yacht pictures by W. H. Davies, in sizes ranging from 12 by 10 downwards; they were the production of Messrs. Symond and Co., of Portsmouth and took a prize at the Inventions Exhibition; also sundry prints by Messrs. Atkins, Carruthers, and Walton.

Talk in the Studio.

"Daily News" on the Photographic Society's Exhibition.—It is interesting to note, concerning what may be called a scientific branch of art, or an artistic branch of science, the extreme rapidity of its development, and, it must be confessed, the more rapid strides of the scientific as compared with the artistic side of photography. It is to the rapid working with dry plates that the greater part of the success of modern photography is due. Effects, impossible to the old wet collodion process, are now made comparatively easy by the extreme sensitiveness of the dry plate, and the consequently instantaneous character of modern work. As instances of the power of the modern system in getting over the extreme difficulty of succeeding in doing justice to the various planes of a mountain landscape, may be cited some of the specimens which have obtained medals for the Amateur Field Club. The Swiss scenes are wonderful for their strength of foreground and excellent middle-distance and distance, impossible to obtain by the older methods. Rapidity in operating also gives almost incalculable advantages from another point of view. The face of what is called inanimate nature is nearly as changeable at times as that of human beauty, and clouds and sunshine vary as swiftly as smiles and frowns. So much for the country—for the mountain tops shrouded in changing mist and drifting snow, the clouds flying across the sea, and the summer showers by the riverside. By the modern process these fleeting effects can be secured with comparative ease. In photographing groups, like Mr. James Crighton's "Newhaven Fisher Folks" (369), the advantage of sparing fatigue to the model is not less apparent, but it is in taking street views, with moving persons and vehicles, that the advantage of rapidity is most strikingly apparent. Mr. Cobb's "Street Views in Paris" (426 and 464) are remarkable proofs of the marvellous swiftness with which a street scene may be secured. The Exhibition also proves the advances made in photo-engraving, and gives a forecast of that future in which glass plates will, it is expected, be supplanted by the Warnerke film, by means of which it is proposed that a roll of paper, like that used for newspaper printing, shall supplant the array of plates hitherto necessary to be carried by the photographer.

Abstract of Chapman Jones' Lecture at the Birkbeck Institute, October 14th.—A scrupulous cleanliness should be practised by the operator, and, having taken every care, nothing but continued work will give the envied skill. "An hour's instruction from an adept will be sufficient to convert the timid amateur into the accomplished artist," was written in a photographic newspaper in 1860; but such happy times for the ignorant and impatient are not yet within sight. A failure is often more instructive than a success. Photography is useful to the painter and sculptor, being more rapid than sketching; to the military engineer who "takes" foreign fortifications; to the military commander when beseiged, for he has pigeons as letter-carriers; to the artillery officer for recording experimental results of new guns or new armaments; photography saves the civil engineer the services of an army of draughtsmen, and gives exact reduced copies of ordnance maps, &c. The scientific man prefers unbiassed records to eye observations, and, in a host of other ways, photography is now indispensable.

Machine-Printed Photographs on Development-Paper.—J. Urie, of Glasgow sends us a band of paper on which are over a dozen prints made by successive exposures to gas light, an automatic exposing machine having been used. They are remarkably equal in depth and tone.

He Claims.—And now Mr. J. Peters claims to have been sharp enough to have taken some "battle photographs under fire," at the late unwholesomeness in the Northwest. Our recollections of "under fire" are, that twenty years ago or more, the *smoke* considerably interfered with good photography. But then there wasn't *much* smoke, Riel-ly, at this last-named battle. Mr. Peters, though, took a picture "during a volley from the rebels' pits about 150 yards distant"—ahem! say 450 feet. Were the feet all on one side—a flank foto.—*Philadelphia Photographer.*

Photographic Club.—The subject for discussion on October 21st will be "Panoramic Views." The date of the exhibition meeting is changed to the 6th of January. Nomination of officers for the ensuing year have to be made not later than October 21st.

To Correspondents.

*** We cannot undertake to return rejected communications.

M. Cappelli.—His address is Craigelcugh, Langholm, Scotland.

Gelatine.—Excellent methods by Abney and Cowan are described on p. 2 of our present volume.

R. B.—The micrographic views, mounted on the usual cylindrical lenses, are, we believe, manufactured by M. Dagron, of Paris.

T. Haig Smellie.—The manufacture is one which involves considerable experience of chemical work, and cannot be undertaken with advantage or economy on a small scale. Your suggestion shall be considered.

A. G. Brophy.—1. The table is certainly wrong, as we have found that there is no deposition until a lower temperature than that you mention is reached. 2. None; except that there is some probability of exposing the wrong half, especially when work is done in a hurry and under trying circumstances.

J. M. C. Grove.—We shall be glad to see the apparatus.

J. Daniels.—As far as we remember, they are made by J. Riley, Humberstone Road, Leicester.

E. E. Bilbrough.—Thanks. You shall have proof in a few days, and the News will be sent as requested.

Amateur (Jersey). The lens you mention will answer very well.

B. (Chelmsford)—We can suggest nothing better than a varnish made by dissolving 60 grains of gum dammar in one ounce of benzole.

Richard.—The albumenized paper has been kept so long in a damp place as to be quite spoiled. Cast it aside and obtain fresh.

W. Ormond.—It is not a desirable course to adopt as a usual thing; but in your case it is difficult to see what else you can do.

H. Manningtree.—It is not a photographic objective, but a focussing eye-piece, and its original value was, perhaps, 4s. 6d. It has been returned by Parcels Post.

O. O. R.—1. They have not been sufficiently washed. 2. Make up a solution of bromide of potassium containing one-tenth its weight of the salt, and add more or less of this to the developer, according to the degree of over-exposure. You may begin with six drops to the ounce. 3. No mischief is likely to result.

B. W. Wells.—Such a notion is absurd. He certainly cannot be regarded as an amateur, because he not only sells photographs and photographic apparatus, but copies of his own photographs either are or were on sale at Spooner's, in the Strand.

P. R.—The following is good:—

Protosulphate of iron	20 grains
Glacial acetic acid	20 minims
Alum	40 grains
Water	1 ounce

The Photographic News.

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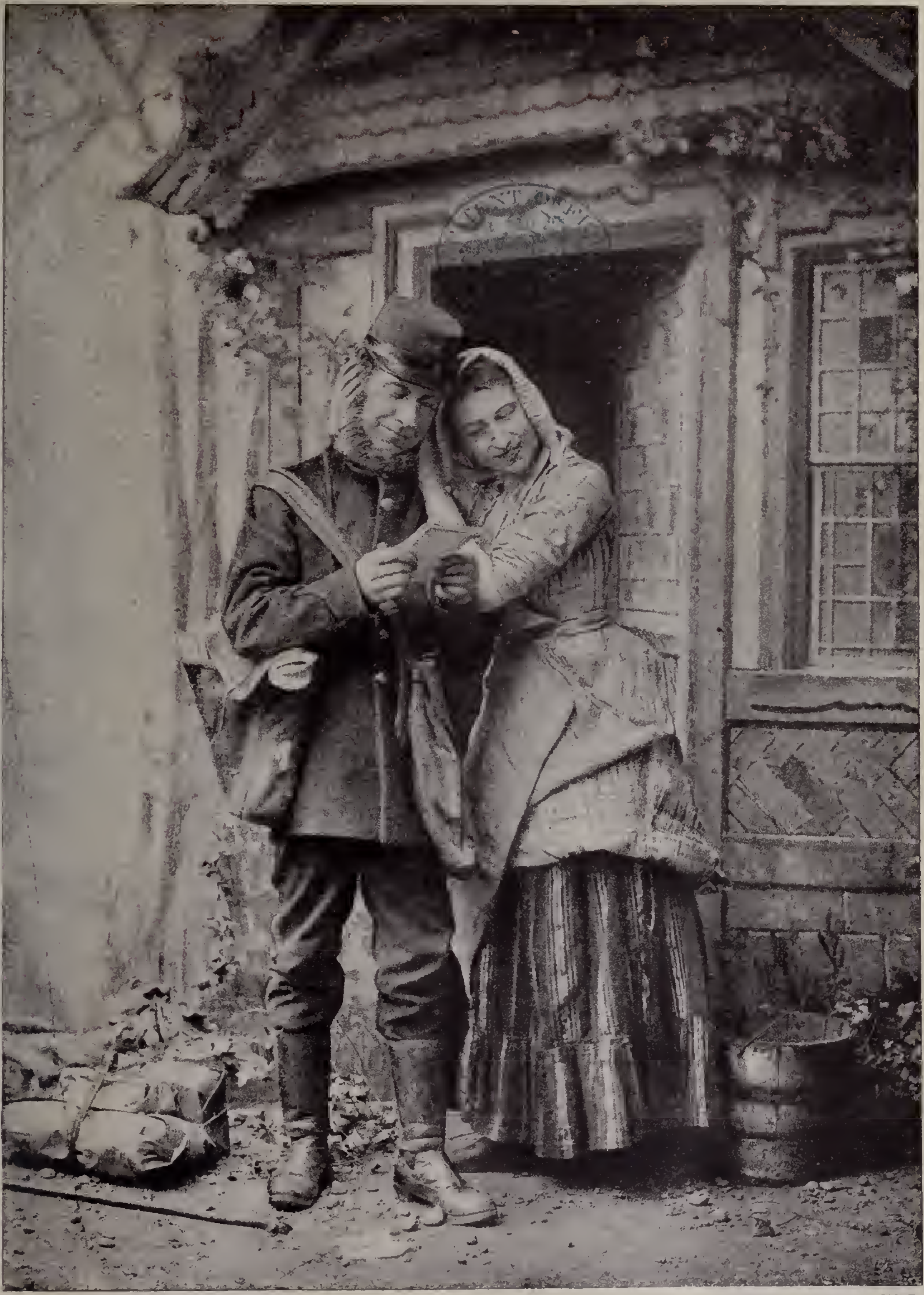

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1416.—*October* 23, 1885.

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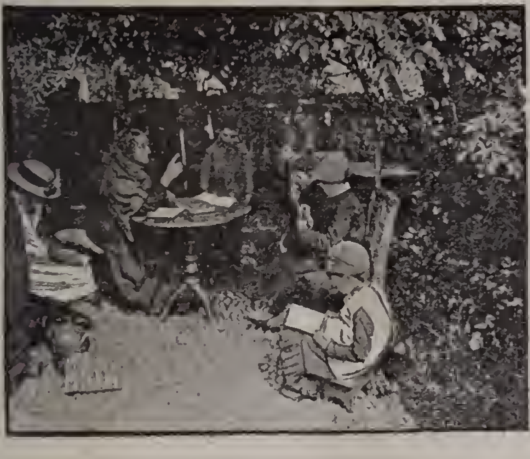
THE PHOTOGRAPHIC EXHIBITION.

[Third Notice.]

The Eastman Company send two life-size portraits (Nos. 50 and 95) from negatives on Eastman's negative paper. There is nothing in these exhibits to show any grain or other defect that might be supposed to be incident to the use of paper in place of the ordinary glass support. W. Atkinson shows three pictures, of which the one that strikes us most favourably is Doddington Lock and Church (No. 55).

The subject of "A Dame's School" (No. 52) seems to belong to a bygone generation. There is merit in the conception and grouping, although costumes of an earlier day would seem more appropriate to the picture. We have been requested to print below the reproduction.



"A DAME'S SCHOOL," BY P. H. EMERSON, B.A., M.B. (CANTAB). COPYRIGHT.

Messrs. J. Robinson and Sons send a large number of frames, of which, perhaps, a pair of porcelains (Nos. 308 and 309) are the best. No. 71, an enlargement on porcelain, is not so pleasing; and No. 373, a frame containing photographs of horses in and out of harness, evidently taken as portraits of the animals, are examples of the unfavourable conditions, as to the premises and surroundings which have to serve as backgrounds, under which photographers are often compelled to work.

G. West and Sons send, in addition to No. 58—"U'erin fouling Queen Mab"—a set of yacht pictures (No. 105) and a frame of panel portraits (No. 444). The excellence of their sea scenes is well recognized, but they do not stand alone, as they did when acting as pioneers in this particular branch. Views in Brittany (No. 59), by H. Manfield, are unequal, some of them showing a tendency to under-exposure. Two, however, are very good, one of these being an instantaneous lake or river view, with a steamer in middle distance.

"Cheston Cheedale" and "Miller's Dale, Derbyshire," (No. 60) is a pair of Platinotypes by H. Victor Macdona. They have some fine points, but, unfortunately, the water in the foreground, falling over a stony bed, has lost some of its beauty by evidences of movement. The tender tones on the cliffs, and the bright tracery of some branches in the foreground, are very effective; but at the top of one of the pictures this brightness is a little lost through halation. 595 and 666 are prints on albumenized paper of the same subjects. It is to be regretted, however, that they have not been hung where a comparison of results could be made. As it is, the silver prints are placed where no light from the skylight falls upon them, but only that which may be reflected from the opposite wall. Whether it is due to this fact that the albumen prints appear somewhat dark and heavy, or whether the negatives are too intense to give the best result by silver printing, or merely that they are over-printed, it is difficult to say. Amongst other contributions by the same exhibitor is No. 179, charming views in the Isle of Man, and some figure studies (No. 185), of which we cannot speak in such praise; a child's portrait in this frame is particularly stiff.

"In Woodland Haunts" (No. 61) is a set of six tree scenes by B. Wyles. Some of these are very effective, but in others the tree tops are faint as if from halation, and the printing-in of the sky over them produces a confused effect. The defect referred to is not peculiar to this exhibitor, but may be found in many of the landscapes shown. Other contributions by the same hand are some powerful cloud effects (No. 364) and a frame (No. 233) containing two good pictures of trees in winter garb, and two groups of fishing figures; the picturesqueness of these groups is marred by the consciousness of the subjects, who are all, or nearly all, looking at the camera.

T. A. Green has several photographs (Nos. 64, 401, and 402) of landscape, in which cattle are introduced with very good effect. Several of this artist's contributions are real pictures; the Nos. referred to and No. 561 are especially worthy of note. M. Anty has, besides "Shields Harbour" (No. 65) and a beautiful Vale with Trees (No. 78), a fine picture of boats and sea, "The Turn of the Tide" No. 101). This excellent work shows vessels at different distances, with their reflections in the water, the hazy effect of which, merging into distance, is very picturesque, recalling some of the impressions we receive from Turner's paintings.

PHOTOGRAPHIC EXPOSERS.

We have from W. H. Pickering a pamphlet on "The Construction of Photographic Exposers." In this pamphlet Mr. Pickering treats, in a very thorough manner, the action of the instrument commonly entitled the "instantaneous shutter," or, as he calls it, the "exposer."

He first takes into consideration the manner of best estimating the length of exposure which any "exposer" gives, and after that goes into the question of the construction of the instrument.

The first thing to determine in connection with this matter naturally is a means of estimating the exposure which any exposer gives, so that one instrument may readily be compared with another. Various methods have from time to time been suggested, and these Mr. Pickering considers. We have more than once stated that, in the case of the ordinary drop-shutters, the dropping part falls, for the first few inches, so far as our means of observation can determine, as rapidly as it would if air friction were entirely out of the question; in other words, that the speed of an ordinary drop-shutter may be calculated from the formula of a body falling in vacuum. In this connection we cannot do better than quote direct from the pamphlet in question:—

> The theoretical and measured lengths of exposure are given below. The first column gives the distance that the shutter fell before the middle of its aperture reached the middle of the aperture between the lenses. The second column gives the theoretical exposure with a 2·5 cm. aperture; and the third column gives the exposure as measured.
>
> | c.m. | Theory. | Observed. |
> |---|---|---|
> | 76·0 | ·012 | ·010 |
> | 15·0 | ·029 | ·025 |
> | 4·0 | ·060 | ·050 |
> | 2·7 | ·083 | ·065 |
>
> Several observations were made in each case, and it was found that they always agreed with one another within less than ten per cent. The reason why the observed exposures are somewhat shorter (about twenty per cent. in this case) than the theoretical ones is, that even a very brilliant object does not begin to produce a photographic impression upon the plate until quite a large portion of the lens is uncovered. The exposures are therefore somewhat shortened.

The method of estimating the length of exposures adopted by Mr. Pickering is an exceedingly neat one. It was ascertained, by means into which we cannot at present enter, that even a light body, such as a ball, silvered on the inside as used for Christmas trees, 4·15 cm. in diameter (about $1\frac{5}{8}$ inch), and weighing twenty-five grams (roughly $\frac{3}{4}$ ounce), fell through one meter ($39\frac{3}{8}$ inches) practically as rapidly in the air as it would in vacuum.

Taking this as granted, it is evidently merely a matter of mechanical arrangement to allow a ball of the kind described to fall in front of the lens, with a scale of feet and inches (or centimeters) behind it, at the same instant that the shutter works, and from the image developed on the plate to judge how long the shutter was open.

It should be here observed that the reflection from a mirror is, without regard to its forms (and after allowance is made for the actual absorbance and subsiding reflection by the glass), as bright as the object reflected, so that in the case of a silvered ball dropping in sun light, the image photographed—although a very minute reflection of the sun—is in reality very nearly as bright as the sun itself. For this reason, a mirror ball is infinitely better to use for the purpose indicated, than a merely white ball.

The next question considered by Mr. Pickering is that of the positions for the exposer. He admits the indisputable fact that to get the utmost possible light on the plate, the best position for the shutter is immediately in front of the plate. To quote his own words:—

> The position is that generally employed by astronomers for taking photographs of the sun itself. It has the advantage that, by using a very narrow slit, the observer may make the exposure for any one point as short as he pleases; but different parts of the picture will be taken at different instants, so that, if the body is in rapid motion, the final result will be distorted, and not represent the condition of things at any particular instant. Moreover, this would be an inconvenient position for a shutter in an ordinary camera.

Perhaps Mr. Pickering is not acquainted with the shutter of B. J. Edwards, in which, so far as construction is concerned, the question of a shutter working immediately in front of the lens is satisfactorily solved.

Next is considered the position immediately in front, immediately behind, and between the lenses, and it is pointed out that a single action shutter placed in either of the first mentioned positions—or, in fact, in any of the three positions—gives a different exposure for the foreground; and for the upper part of the picture, that a double action shutter placed in front or behind the lens favours the centre of the plate as regards quantity of light, but that the same placed between the lenses gives in this matter the best result possible.

The next thing considered is that of the influence which the shape and length of the opening have both on the distribution of the light, and on the co-efficient of the total possible amount of light which the shutter will allow to fall on the plate. To these matters we shall refer in another number of the Photographic News.

◆

THE PHOTOGRAPHIC EXHIBITION.—No. I.

BY A. H. WALL.

Although I promised, in concluding my last paper on skies and clouds in photographs, to continue its subject in this one, I have determined, on the Editor's suggestion, to defer that continuation, and, in its place, take up the photographs in this year's Exhibition. I am, as far as my ability may go, to deal with them critically as pictures—except, of course, where artistic pretensions are out of the question—and make my comments as practical and useful as I can. I do not claim, for my own views, any superiority over those of others who may differ from me, except so far as their opportunities of practical art study may have been inferior to my own. Where this is not the case, the views demonstrated in their practice must be weighed against mine, and the resulting conclusions be the student's own; and so I cannot be fairly held responsible for them.

The artistic possibilities of photography were never, perhaps, more hopefully demonstrated than they are in the present year's Exhibition. In its very interesting collection, the critic will find art qualities of no mean order taking far higher ground than is implied by that perfection of mechanical means, manipulation, and materials, which were once the be-all and end-all of photographic art. And I think if Mr. Gilbert Hamerton visits this exhibition he will modify many of those opinions concerning photography in connection with art, which figure in the second volume of his "Painter's Camp in the Highlands."

It is true that some of its most ambitious attempts fall below the high standard fairly applying to them. And some conscientious press critics may, therefore, be good enough to point out that poetical and imaginative subjects should be avoided by the practitioners of an art which is, as Mr. Hamerton believes, or believed, devoid of poetical or imaginative capacity.

But, if even these photographic pictures are more carefully considered, it will be seen that their sources of failure belong to the artist, not necessarily to his art. If a photographer, wanting in poetical feeling and imagination, uses his models as a painter would use his lay figure, he will certainly fail in producing subjects of a poetical and imaginative nature, however cleverly he may pose, light, and otherwise manage his materials. This technical, artistic, and photographic knowledge may result in telling and powerful effects of light and shade, in well-arranged lines, in figures strongly relieved and roundly modelled, in obtaining that rich, mellow, harmoniously effective combination of varied tones which we call "colour," and in the avoidance of those flat, opaque, uniform patches of light and dark, which too often take the place of air and space in photographs, &c.; but none the less has he failed to accomplish the chief thing he aimed at.

One man will so read a poem that it stirs the deepest and strongest emotions in his listeners. Another will read the same poem with elocutionary correctness, and with as good a voice, without awakening any deep interest or feeling; and a third will render the finest conceptions of a great poet vulgar and common-place, or even ridiculous. If the subject has not awakened the artist's sympathies, or has been beyond his imagining, you will assuredly perceive this in his work, whether his tool be lens, pencil, voice, pen, or brush.

Another good sign observable is the reduced abuse of retouching, which, executed ignorantly or carried too far, destroys, at once, character, expression, the softness and semi-transparency of flesh, and the anatomy of the face; converting the varying surfaces given by bone and muscle, down, &c., into one as hard, smooth, and incapable of revealing anything beneath it as a piece of opaque, polished porcelain would be. This was—and, alas! is—so serious a blunder, that all lovers of the artistic in photography may, I think, rejoice with me in its decrease and discouragement.

Amongst the simpler and more readily-realised subjects in the Exhibition are some of Mr. Robert Slingsby's, who seems generally to hit what he aims at—truthfulness. I fancy, however, No. 5 in the catalogue, called "Will it Float?" a charming picture, truthfully full of light and air (of which I give a slight reminiscence in Fig. 1) would have been improved had the figures not been isolated, each one nearly equi-distant from the other, nor all quite on the same plane, tit-tat-toe fashion. I think I should have preferred placing them more nearly in a group, with the smaller figure on the other side of the taller one, somewhat, but not exactly, in the way indicated in fig. 3. If you regard the four separated figures in this picture as leading lines catching and carrying the eye up and down A first, then B, then C, then D (as in fig 2) right across the picture and out of it, you will see the advantage of an arrangement which brings them together, and, keeping the eye in the picture, carries it from the smaller to the higher as indicated by the line E, fig. 3. The alteration would be very slight, but the effect would have been considerably improved, so far as artistic composition goes. In other respects I regard this little picture as a veritable photographic gem; it embodies such delicate gradations of aerial tones, is so faithful to the harmonies of light and shade, and so full of minute detail. There are no empty, meaningless black patches in it, and no burnt-out patches of flat white paper.

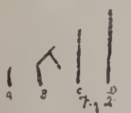


Fig 2

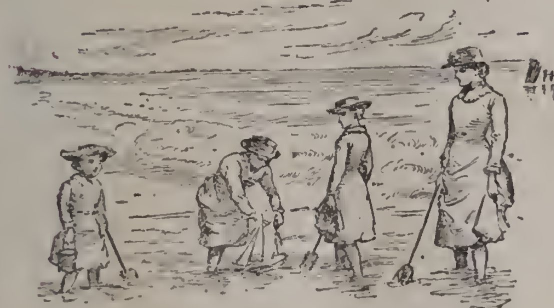


Fig 1

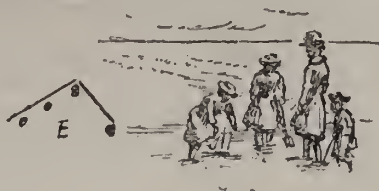


Fig 3

I turn from this simple subject, simply treated, to something far more ambitious, one of the largest and most powerful pictures in the room, No. 74, called "Dawn and Sunset." It is by H. P. Robinson, who has been awarded a medal, and of it I give a hurriedly-made and consequently imperfect sketch in fig. 4. This admirable picture is evidently the result of very careful study, and its technical art qualities are many and good. In it Mr. Robinson has succeeded in mastering many serious difficulties; but I am at a loss to understand why he gave the place of greatest prominence and honour in his composition to a wash-hand basin and a piece of white soap. This seems, from my point of view, a curious mistake. The result of it is that the picture divides itself into a pair of pictures—excellent ones—each side being a picture better than the whole; and another, the middle part, something by itself, which is quite uninteresting, and has no necessary connection with either side. I should have thought that more action and expression might have been secured, and with advantage, if, instead of the baby being ready for bed, the usual washing process, winding up or commencing the infant's day, had been in progress, when more of the little one's chubby face and limbs might have been seen, and some expression of pleasure, amusement, or tenderness been secured in the now placid, emotionless face of the mother. This would give the "Dawn" more forcible contrast with the grave and thoughtful sadness of the ancient countryman's "Sunset." If the too-much honoured chair had taken the place of the cradle, as at C, in fig. 6, and the male figure had been brought nearer the centre, the picture would, perhaps, have had greater unity; and some of the too many straight and parallel lines in its composition might have been thus got rid of (see the skeleton sketch, fig. 5).

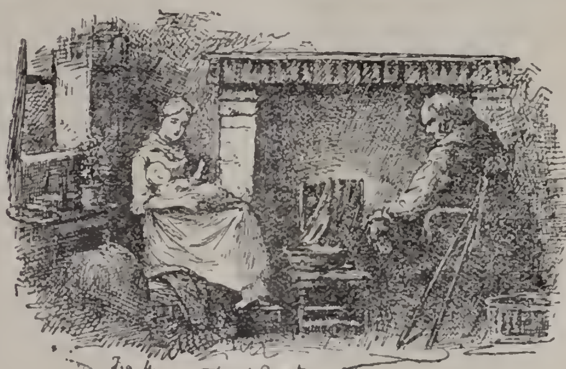


Fig 4 Dawn & Sunset.

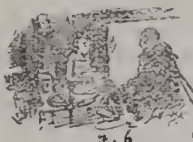


Fig 6

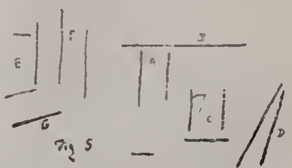


Fig 5

This picture of familiar cottage life is one from which many a pretentious painter of feeble and ineffective flatnesses might well take a lesson. It is so rich in well subordinated tones, tints, and transparent depths of shadow, which, by their composition and relative values, give a photograph that which colour gives a painting, blending contrast and harmony, softness and brilliancy, in a mellow richness and unity of general effect, such as we see in some of the fine old Dutch cottage interiors. We have here none of those dry, hard, uniformly relieved outlines, giving a cut-out, harsh effect, which exist in certain portrait photographs hanging not far from it; but, instead, high lights rendered brilliantly luminous by contrast and gradation, and deep shadows dexterously combined to aid in giving force and relief only to the most important centres of interest, and breadth to the whole. I fancy Mr. Robinson seldom aims at a story requiring strong dramatic expression, but is content with well-posed models, conveying their meaning suggestively, rather than forcibly; but he is certainly a master in his compositions of lights and darks. "Dawn and Sunset," by virtue thereof, catches the eye and attracts attention directly you approach it, and does so long before you are near enough to understand its meaning, or be interested in its story.

There is, however, a danger in the power Mr. Robinson has, which is hardly escaped in the two fine pictures hanging one on either side of the above. In these, the effect of subordinating and toning down, for the sake of brilliancy and concentration, is carried rather too far, giving a forced and somewhat artificial effect. A picture must have a principal light, but there should be no violation of the truth in securing it. Mr. Robinson's composition puts the principal light always where it ought to be, but sometimes where it could not be, truthfully.

That's a mistake. "Many critics," said Ruskin in his pamphlet on "Pre-Raphaelitism," "especially the architects, have found fault with me for not 'teaching people how to arrange masses,' for 'not attributing sufficient importance to composition.' Alas! I attribute far more importance to it than they do; so much importance, that I should as soon think of sitting down to teach a man how to write a Divina Commedia, or King Lear, as how to 'compose,' in the true sense, a single building or picture. The marvellous stupidity of this age of lecturers is, that they do not see that what they call 'principles of composition' are mere principles of common sense in everything, as well as in pictures and buildings. A picture is to have a principal light. Yes; and so a dinner is to have a principal dish, and an ornamentation a principal point, and an air of music a principal note, and every man a principal object. A picture is to have harmony of relation amongst its parts? Yes; and so is a speech well uttered, and an action well ordered, and a company well chosen, and a ragout well mixed. Composition of this lower or common kind is of exactly the same importance in a picture that it is in everything else—no more. It is well that a man should say what he has to say in good order and sequence, but the main thing is to say it truly."

(*To be continued*).

A GOOD SODA DEVELOPER, AND OTHER GOOD THINGS.

BY W. T. WILKINSON.

I have been using for the last four months a developer that I have never seen in print, and as the more I use it the better I like it, I should be glad if some one else would try it, and report upon it. It is remarkably quick in its operation, and gives fine plucky negatives free from stain or yellowness in the shadows. It is composed of three constituents, eack kept separate until the moment of using:—

No. 1.

Pyrogallic acid	¼ ounce
Water	80 ounces
Citric acid	30 grains

No. 2.

Saturated solution of Howard's carbonate of soda	1 ounce
Water	5 ounces

No. 3.

Liquor ammonia	1 ounce
Water	10 ounces

To develop, take 1 dram of No. 2 and 1 dram of No. 3, and 2 ounces of No. 1. This is sufficient for two ¼-plates developed together, or a ½-plate. I find that five or six plates can be developed in 2 ounces of the above mixture, providing no more than half an-hour elapses between the first and last, and even then the addition of another dram of No. 3 will re-start the action, and that without any risk of staining.

I have tried sulphite of soda with the above, but do not find the slightest advantage, negative or positive.

For portrait work, where the exposures are under control, the above developer is the best I have ever tried; but for views where each plate requires more or less restrainer than its fellow, I prefer to use a few drops of saturated solution of NH_4Br to commence with.

I can corroborate your statement in a recent News, that the formula usually given by plate makers is not the best, as I have been trying four different makers' plates, in each case exposing a ¼-plate, cutting the same in two, then developing one half by the given formula on the box, and the other half by the above, and have got some curious and interesting results, always in favour of my own method; but in one plate the maker's formula gave an image much under-exposed, and veiled with green fog; but the other half, developed as above, gave a beautifully clear negative. *Verb. sap.*

Alpha Paper.—I have been using a great deal lately of this new paper, and after wasting a deal of paper and time and temper, following the maker's instructions, I have, by forgetting all about the original instructions, finally got the process into giving certain results, and herewith give the *modus operandi.*

First of all, do not over-expose, because if you do you can get no vigour.

Secondly, *always* soak the prints in cold water before developing, and then the process of development proceeds evenly from beginning to end, instead of being a long time starting, and then finishing with a jump, as it does when the prints are put into the developer dry. Again, when sufficiently developed, placing under the tap and letting the water run upon the developed print, at once stops the action of the developer if the print was wet before beginning development; but if put into the developer dry, a solution of salt or of bromide must be used to stop the action of the developer, and these retard and sometimes stop the action of the toning bath. Therefore, after exposure, place the prints in cold water, and develop in:—

Saturated solution of oxalate of potash... ...	4 ounces
Saturated solution of common sulphate of iron (copperas)	1 ounce
Water	5 ounces
Saturated solution NH_4Br	½ dram
Saturated solution of citrate of potash	½ ,,

The citrate of potash prevents the ferrous oxalate from getting muddy, and keeps the solution in working order for a day or two.

When the print is sufficiently developed, wash under a rose, and keep the water running until all are developed, taking care to see that all traces of oxalate are removed from the dish, which can be seen by the water having a milky appearance when oxalate is present in a dilute state. When all the prints are developed, give two or three changes of water, and immerse in—

Hydrochloric acid	1 ounce
Water	1 gallon

Keep the prints moving in this for a minute or two, then pass each print separately into running water, wash in four or five changes of water, and immerse in—

Water	1 gallon
Carbonate of soda	1 ounce

Allow to remain in here five minutes, then rinse, and proceed to tone in—

Saturated solution of hypo	5 ounces
Chloride of gold	2 grains

and keep a crystal of hypo in the solution, as directly the hypo is weak the toning ceases, and if the hypo is kept fully saturated, it is astonishing how many prints can be toned with a grain of gold. It is also astonishing how much gold may be added to the hypo if it is not saturated, without any toning action being seen.

CHEMICAL ACTION OF LIGHT IN THE FORMATION OF ALKALOIDS AND TANNIN IN PLANTS.

BY A. VOGEL.

The recognised fact that hemlock, which with us contains coniciue, in Scotland does not produce any, leads to the conclusion that sunlight plays a part in the formation of alkalies in plants. The same thing is indicated by the fact that tropical cinchona plants of various kinds yield in our hot-houses—poor in light as they are—scarcely any alkaloid, or none at all.

If, then, sunlight may be considered as a factor in the production of alkaloids in living plants, on the other hand it has an injurious effect upon the cinchonine contained in stripped bark. When this is dried in the bright sunshine, cinchonine is decomposed, and dark-coloured resinous uncrystallizable masses are formed; on this account the bark is at the cinchona factories dried in darkness.

This characteristic behaviour has an analogous example in chlorophyll. This, also, is only formed under the influence of light, but when no longer contained in the living plants it is quickly destroyed by light.

The formation of tannin in the living tree appears to be also influenced by the action of light. This is proved by the fact that the bark of the lower part of beeches and larches contain less tannin than that of the tops, which are more exposed to light. The difference is from 4:6 to 5:10.

Sunny mountains produce fine bark richest in tannin. In dark places trees always contain less than in sunny spots.

It is further to be remarked that those leaves are richest in tannin which are on the sides of the trees which face the sun.

ART AND COMMERCIALISM.

BY WALTER CRANE.*

We have been lately told by a brilliant impressionist, no less in words than in paint, that there never have been such things as artistic periods; that art is solely individual, and lives and dies with the artist. And among other interesting facts we learned that, after all, one thing is as beautiful as another (to a painter) if you only get it in the right light; that, in short, those striking features of modern landscape—wharves and factory chimneys—look just as well as antique towers and palaces when merged in the twilight—that is, when you can no longer see what they really are, and the imagination is free to invest them with the romance of a past age.

Now, whatever germ of truth such a statement contains, it only throws us back upon the question, "What is art?" If it is the art only of the impressionist, the record in paint of the children of the mist, of factory-smoke even, and London fog; if nature must only be seen with the eyes half shut, and the abomination of desolation—the squalid outskirts and Stygian rivers of modern cities—then, indeed, former ages were but poorly furnished in the matter of art. What availeth the clear cut of noble sculpture of ancient Greece, of the work of her vase painters? What availeth the endless decorative invention of the Asiatic peoples, and of mediæval and early Renaissance times, lavished upon all the accessories of life, not to speak of its culminating glories in painting and sculpture? Could all this beauty of design and workmanship, in its constant growth and development through the centuries, have hung upon a thread—upon the lives of one or two persons of genius, springing, like mushrooms, from universal indifference, ignorance, and decay?

Such an opinion is, however, only a sign of the times. When every man fights for his own hand, and every artist has to make his own public, such an individualistic conception of art is not altogether surprising; and, were it intended to apply to the art of the present day only, would be very near the truth But a little inquiry and consideration would show that art has deeper roots. The delight in beauty, be it human or of wild nature; be it of light, colour, form, or sound, is a common possession and a necessity of life, as in the higher sense it must always be, so long as the human has any claim to be the higher animal. And it should be remembered that certain animals and birds have been proved to be sensitive to certain colours and decorative effects, which sensibility is indeed wrapped up with the very fact of the germination and continuity of life itself; and this only convinces us how far down and deeply rooted is this sense in nature which has been so highly developed and specialized in man. Differing, it may be, in degree, but not in kind; cultivated, or uncultivated; modified by centuries of habit and association; influenced by modes of thought and conditions of life; wheresoever humanity dwells, in northern snow or southern sunshine, it flowers and seeds, and springs anew.

Art, in all its forms, is normally but the language of this universal feeling which, shared more or less by all, consciously or unconsciously, is fully comprehended, passionately expressed, and communicated in tangible and eloquent shape by comparatively few. But I should say that every one whose heart is stirred at the voice of music, at the music of poetry; everyone who feels the magic of beauty and is touched by its pathos; who is moved by the strangeness of the shifting drama of life; everyone who vibrates, as it were, to the harmonies of nature, is a potential or latent artist.

As far as we can judge from its history, it would seem that this power of artistic expression, controlled as it is by countless influences of soil, climate, and character; constantly intercrossing and blending; springing from simple beginnings, and passing through various stages of growth, development, and decline, with the life of nations—this power, I say, seems to have reached its noblest and most beautiful results under collective conditions—of the arts, at all events—when all art was decorative, and all were allied with architecture, depending technically upon a certain continuity of tradition, and intellectually on a certain consentaneousness or universality of sentiment, ere it reached a high perfection among a people, being always at its highest in public monuments. It is obvious, since these conditions depend upon a vast number of other conditions. Since art is the flowering of the tree of life in man's moral nature, the form in which it is cast must, finally, be the outcome of the social, political, and economic conditions of society.

We have only to remember the temples and palaces of antiquity, whether the colossal fragments of the crumbled civilizations of the East, the sculptured triumphs of Greece and Rome, or the cathedrals of public halls of the middle ages. Art in such buildings touches sublimity. The effect, for instance, of such a building as that of St. Mark's, at Venice, is like embodied music—rich, mysterious, splendid, harmonious; storied with the legends and emblems of a faith, and a conception of the universe then corresponding with the knowledge and aspirations of mankind, full of solemnity, pathos, and dignity. But one of our own English Cathedrals, where the ruthless hand of the modern restorer is not too obvious—say our historic Abbey of Westminster here—will impress us in the same kind; and this impressiveness is not due merely to the effect of antiquity, though it no doubt contributes. We feel it to be the collective work of artists and craftsmen, as well as of ages, and we feel it embodies the aspirations, the religious sentiment, even the humour and satire of its time, and, speaking through the architect, the mason, the carver, the glass painter, is heard the voice of a whole people.

But if one should go into a modern church in search of the ideas of the time, I am afraid he would only find the ideas of the new curate.

The former dignity and impressiveness of art is usually accounted for by the fact that it was in the past chiefly devoted to the service of religion; but that was only because religious ideas had the strongest hold upon the human mind—because, with religion, was wrapped up all other ideas, and the sources of knowledge were in the hands of the priesthood. Art is bound by its very nature to give expression to ascendant ideas. But both art and religion have since been broken to fragments, and these are often so small and so incongruously pieced together, that they refuse to reflect any ideas at all; or so feebly and falsely, that men, in distrust of both art and religion, have turned to nature and science, which in the strongest minds fill the place of both.

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* Read before the Fabian Society.

But this, after all, is only like saying that the loss of the eyesight is compensated for by the increased stimulation of the other senses. It is a serious loss all the same.

Let us try to find, however, what ideas, even in the fragmentary and artificial condition to which it is now reduced, art gives us in our day. The one great distinction and difference which marks it from the art of ancient times, consists in the absence of what is called popular art – the art of the people, hand in hand with every-day handicraft, inseparable from life and use—that spontaneous native art of the potter, the weaver, the carver, the mason, which, as it has been so forcibly pointed out by William Morris, our economical, commercial, industrial, competitive capitalistic system has crushed out of existence. By division of labour, the factory system, and production for profit—yes, our three-headed Cerberus—has devoured the art, together with the well-being and the independence of the people, and stands unappeased at the smoke-gloomed industrial gate, over which is written, "All hope abandon ye who enter here." But this basis of popular art was the soil in which all art germinated, and from which the goodly tree grew and branched out, to blossom in the more delicate kinds of painting and sculpture which, since they have ministered to the caprices of wealth, fashion, and luxury alone, branded in a separate class as fine arts, have turned their backs upon their humble relations, the handicrafts, with the result that their house is left unto them desolate. Cut off, as it were, like flowers from their natural stem, they presently languish and wither away, or linger in fantastic ghosts, shadows, and travesties of their former beauty.

But we are calmly told that "we must recognize, however, that modern art has no tendency in the latter direction (that of beauty). Beauty no longer suffices for us."[*] This is clear and emphatic enough. It comes from the French, too, who have assumed the position of dictators of taste, at least in painting, to the world at large. It is from a book on æsthetics, by Eugene Vévon; I quote from the English translation. The book is an attempt to find a scientific basis and reasonable position for art under the conditions of modern society, and while the author fails to recognise the causes of its deterioration in the quality of beauty, he boldly acknowledges the difference between past and present aims, and insists on freedom of development. Yet the writer is possessed by a distinction which he himself sets up between decorative, and what he calls expressive art, applying this latter title to the pictorial art of the present day. As if all good art was not expressive!

In my view, however, all forms of plastic or graphic art, properly so-called, must be dominated by the sense of beauty, as the condition of their normal existence and the condition of their successful appeal to the eye. The expression of beauty naturally controls all other expressions. Otherwise, it seems to me, art is overstepping the border line which divides it from other operations of the mind; from scientific analysis, for instance, and from photography, where the object is totally different, and everything is sacrificed to the attainment of fact.

Yet this is just what is happening in modern painting—everything is being sacrificed to the attainment of fact in some form or other, and painting has almost ceased to be an art of design.

The modern French view is frankly expressed in a passage quoted by Véron from Fromentin, who says: "The time has come for less thought, and for less lofty aims. We must now look at things more closely, and observe better. We must paint as well, though in a different fashion. We must work for the general public, for the citizen, the man of business, and the *parvenu*—everything is now for them." And he goes on to point out in effect that the painter must do the best he can under these rather depressing circumstances, copy his model, and take comfort in the belief that henceforward the greatest genius will be the man of the least invention, Here, at all events, it is clearly recognized that painting now exists for a class, which, possessing the wealth, commands all things that may be commanded by wealth, and as these things are many, a money standard is set up, which is in danger of becoming the only standard and test, whether of virtue and character, or artistic ability.

The results of such a state of things are visible on every side. We have seen that in all ages it has been natural to art to express the ascendant characteristics and ideas of its time, as well as to reflect the material facts of life.

Art is the sensitive plate in the dark camera of history, which records both the mental and physical features of humanity without prejudice, when all other sources of light are shut out.

So in an age when commercialism is supreme, and bourgeois ideas are triumphant, it is only natural that they should make themselves felt in art.

Accordingly, we see the influence of profit-making principles in the way in which painters become specialised for certain sorts of work, and in the rise and progress of the middleman or picture dealer. As illustrating this, it is said of Verboeckhoven, the cattle painter, that the dealers were in the habit of sending orders couched in terms like the following:—"Wanted, by Monday, three pictures of the usual description—cow, with two sheep." There is a story told of him, too, which is very suggestive of the effect of commercial ideas on art. One day an American entered the studio; he saw a picture which pleased him, and bought it at the artist's price—1,200 francs. He could not take it away with him immediately, and, when he came for it some time after, the painter had another, just like it, nearly finished. He was putting in an extra lambkin, when the American returned. A happy thought struck the latter; he would take the second picture too; it would form a pendant to the other. But Verboeckhoven wanted 1,300 francs for it. His customer hesitated. "Well, well!" said he, "the same price, then;" and, dipping a rag in turpentine, he wiped out the lamb.

That grand development of the shop, the modern picture exhibition, is, again, another triumph of commercialism in art, which, faithfully following the accepted theory of the trader that supply will produce demand, succeeds in something like real over-production. Consider the huge annual pictorial displays and their chief product—the child of competition in art—the "pot-boiler." Truly the temple of art is the market, and its high priest the picture-dealer! "Take your choice (or, rather, the recommendation of the adroit salesman), go to so-and-so for your fish and your salt water pieces—fresh every year, but all alike. If your fancy is flesh or fowl, you must go further. This other gentleman will give you game pieces—he has a special licence. Then you can finish with flower and fruit," and so forth. Yes, division of labour has triumphed even in painting, and, to excel, a man must specialize his talents; that is to say, adapt them to the continual production of the same sort of thing. Thus, and thus only, can he hope to make either reputation or a living.

Very good; but what becomes of art, unless the whole of art is comprehended in portraiture? For, in spite of our classification, our labels for landscape, portrait, genre, historical, under this specializing, ticketing, commercial system, the tendency is for painting to become really limited to forms of portraiture. I do not mean merely the production of portraits, though that is a noticeable feature, but I apply the term to characterize a certain literal and prosaic habit of regarding all nature, and literal methods of representation, whether of persons, scenes, or animal life; while the conditions of the market, even apart from the tastes of the ascendant class we have been considering, cut against even honest and faithful portraiture. but encourage that conscious making up, dressing, and forcing of effect to catch the public eye, amid the further falsification of pictorial values caused by the entire want of classification and harmonious arrangement in the picture exhibition. So that in the result, where every inducement is held out in this fierce pictorial competition to painters to consciously work for forced effect, and put out their possible neighbour, pretentiousness and meretriciousness too often win the day.

When the decline in modern art is mentioned, it is usual for the average man, imbued with the commercial ideas of the age, and with the all-sufficient standard of money-value in his mind, to point triumphantly to the enormous sums given for certain pictures in these days, and to the wealth of certain successful artists. But those enormous sums only show that pictures are a marketable commodity in which the chances of large profits are involved, and the fluctuating values in the market make them objects of speculative investments for capitalists. Reputations fall and rise, often according to what appears to be the mere caprice of fashion, though even fashion is controlled by commercialism. And as to the wealth of successful painters, is that always in proportion to the excellence of their work, or the labour bestowed upon it, and is it always the accompaniment of the highest skill and the loftiest aims? Overwhelmed with commissions, the fashionable painter has the alternative before him of over-work or inevitable deterioration. In many cases he becomes the victim of both. Then, too, for one favourite of fame and fortune, how many unfortunate, struggling, obscure? Thus, at both ends of the scale, the influence of commercialism is only for evil.

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[*] The same author says, in another place, "No! perfect art does not necessarily concern itself with beauty of form, unless the object has been specially designed for art use. We must expel the idea."—[*Æsthetics*, page 125.]

Consider, too, the waste of energy and talent in this unequal struggle for artistic life and recognition—this pictorial lottery, where so many blanks are drawn. Think of the capacities now swallowed up in the tasteless contention of exhibitions, which, properly organized and directed, might co-operate to adorn our streets and public places, our lecture halls and railway stations, left desolate now to another and more hideous form of competition in the clamorous posters of commercialism, which cover our waste walls and hoardings, and crowd upon the weary eye in all their shameless self-assertion and sordid language of the market, shouldering one another in the unspeakable coarseness of colour-bedizenment and graceless superscription.

In spite of our refinement, our care for art, our æstheticism, forsooth! and the lavishly decorated private interiors of wealth, to this complexion must we come out of doors!

And in the meantime we are so inured and hardened to such disfigurements that we cease to feel their enormity. Nay, we must grow to like them, for are not advertising and bill-sticking an inseparable part of our system? There is no escape. So it is, and so it will be, so long as we allow this selfish, demoralizing, and unscrupulous demon of commercialism to tyrannize over and exploit us, ever with its continual cry of "Profit, profit, profit!" Every aspiration will be shouted down as visionary and unpractical; every real attempt to better our disorganized condition will be opposed by the dead weight of vested interests.

It is on record that one of the few living artists, properly called ideal—George Frederick Watts—offered to decorate the hall of the Euston Station with frescoes without charge, if the Company would bear the cost of the materials; and the offer was refused. How can monumental art, which is but decorative art in its highest form, exist in such apathetic conditions? To grow the flower, you must not only have the seed, but a favourable soil and climate. It will be written of our age that we squandered the talents of our more original writers and artists upon the newspaper and periodical press. We preferred to be amused with a constant succession of brilliant trivialities and passing sensations, to beholding our best thoughts embodied in enduring and noble forms of art; and it did not seem to signify how many lives might be frittered away—how much energy and talent ground to powder in the process.

But monumental art demands the sympathy of a people bound together by common interests, interested in the drama of history, and proud of their own struggles and sacrifices for freedom; accustomed to dwell with ennobling thoughts and aspirations, and accustomed to give them free and forcible expression; sensible both of the joy and the tragedy of life, delighting in phantasy and invention, and, above all, in beauty and form of colour. Yet there is nothing in these things but what naturally belongs to humanity.

Can such art be found where the best energies are engrossed in the feverish and unequal race for a more or less precarious existence on the one hand, and, on the other, made artificial by excess of wealth?—where the aspect of life, whether public or private, is neither simple nor dignified, and where cities become unlovely and inorganic accumulations of bricks and mortar?—where, with an appearance of zeal for art, education, and refinement, and the elevation of the masses, we allow mile after mile of mean or pretentious dwellings to carry the desolation of our unwieldy human warrens further and further into the green country, as the capitalist and the jerry-builder join house to house and brickfield to brickfield?

So we are thrown back on economic conditions, which, it is impossible to doubt, are finally responsible for these things, as, indeed, they have always been responsible for the form in which the art of a period is cast. How hopeless it is, for instance, to expect varied and beautiful street architecture with the present system of house tenure and the contract system in building? Here and there a dwelling, with some claims to beauty and distinction—or, at least, individuality—perchance arises from the sordid crowd; but these are the homes of men of wealth and exceptional taste who build for their own delight, and have secured their ground. Here and there a board-school building relieves the monotony, and seems to point to the possibilities of better things. But the mass of modern London consists of the erections of the speculative builder—miles of absolutely uninteresting house fronts composed chiefly of the repetition of one pattern, and that of the meanest and most uninventive kind crowded together—the ready-made packing-cases for civilized humanity which enters in and dwells there. Could these things be, were it not for the powers of commercialism, based upon the individual possession of land and capital, with the one object of money gain in their disposal?

But all things are in the grasp of commercialism. Let a band of artists and craftsmen associate together, and, working quietly, make to themselves and all whom it may concern, things of beauty and utility for the use and adornment of simple homes. Straightway there is a growing desire for these things as a relief from the dreary monotony of ugliness, or the pretentious luxury of second empire taste. Thereupon commercialism, perceiving a demand, brings out what it calls art-furniture, art-colours, and so forth—the addition of the magic word being supposed to make all the difference—sucks the brains of designers, steals their designs, and devotes them to objects for which they were never intended; deluging the market with strange travesties and tortured mis-applications of ill-digested ornament, which overruns everything like an irrepressible weed, until, coming down to its lowest forms in the cheap furniture shop, one is tempted to think that, in the matter of taste, our last state is worse than the first.

Thus are all the channels of production fouled. Does not commercialism hold the keys of the kingdom of both art and industry? Everything has to pass through the sieve of profit before it reaches the public; and to keep the huge and wasteful machinery of competitive production and distribution going, even at an ordinary jog-trot, it appears to be necessary in every department of trade to make a vain show of so-called "novelties" every season, whether they are really new and better than the old, or not.

But the counts of the indictment against commercialism are not yet filled up. The subject is, indeed, too vast and far reaching to be adequately treated in the limits of a single paper. Hitherto I have kept very near home, but if we look abroad over the world we shall see the same causes at work, the same deterioration going on. Look at the effects of our rule on the native arts of India. The same process of extinction of the art of the people, of the village crafts, is taking place there as has resulted from the action of commercialism at home. (On this point I cannot refer anyone, who is desirous to pursue the subject, to a more competent authority than Sir George Birdwood.) But all over the East, wherever European influence is in the ascendant, the result is disastrous to the arts, and thus the very sources of ornamental design, beauty of colour, and invention are being sullied and despoiled by the sharp practices and villainous dyes of Western commerce. Even in Japan, where the artistic sense seems instinctive among the people, so that everything touched by them bears its impress, since the results of ages of art labour and exquisite craftsmanship have suddenly been placed within the insatiable grasp of commercialism, there are signs that these riches are becoming exhausted, and the rarer and finer kinds grow scarcer every day. We can no longer expect to be given of the best, and wares are being consciously prepared for the European market. This is but the "retort courteous" for the compliments of Manchester in china, clay, and size. We actually hear of proposals to establish schools of design on the British model, the more effectually, I suppose, to drive out those quick, spontaneous, characteristic, native methods of art-expression, than which nothing, perhaps, has so refreshed and stimulated the jaded sensibilities of European design. Thus even by contact with a vicious civilisation the natural quickness of intelligence of a race may bring about its own destruction.

Thus, in the fierce and unscrupulous struggle for wealth, one after another, virgin markets are opened, and new peoples exploited by commercial enterprise, which, like a huge steam plane, is passing over the world striving to reduce all art, and with it humanity, to one dull level of common-place mediocrity, leaving us but of vital and beautiful varieties the relics and shavings. Greedy eyes are now turning to central Africa. The next act in the commercial drama will probably take place there. Already the rampant explorer, posing as the benefactor of humanity, has gone far and wide, and the representatives of the blessings of civilization, with the Bible in one hand and the revolver in the other, call on the Aborigines to stand and deliver. Wheresoever commercialism sets foot, the curse of gold seems to follow. As regards its effect upon art, it is like the old Greek story of Atalanta's Race, but with a sinister climax. Milanion, the hunter (representing commercialism) enters for the race, and, carrying the fatal apples of gold, casts them one by one in the path of the fair fleet-footed, whom no competitor could hitherto outstrip. She yields, alas! to the seductive spoils—to the greed of gold—and henceforward her fate is sealed.

But commercialism, which seems now so triumphant, carries the seeds of destruction in its own bosom. The penalty of fast living must sooner or later be paid, by nations and systems, as by individuals. Dissolution must inevitably set in. Already there are signs of the beginning of the end. Already men's thoughts and hopes are turned to that which shall succeed. "The old order changeth, giving place to new." Meanwhile, the only hope, alike for art as for humanity, lies in Socialism.

Notes.

Our supplement this week, "Hope Deferred," by H. P. Robinson, exhibits in a marked degree the power, which is possessed by so very few, of influencing the expression as well as the pose of the model so as to make them in harmony with the idea which it is intended to represent. The *chiaroscura* is bold, natural, and effective, and the whole work bears evidence of that artistic treatment which we expect from its author.

The failing which strikes us as the one most frequently occurring in the present series of Pall Mall exhibits, is that of weakness in those parts of the picture adjacent to or cutting across the sky. The number of otherwise good pictures in which foliage or bare branches show weak and grey instead of bright against the sky, is remarkable. In the case of near objects—as leafage overhead—a great charm lies in the force with which in nature and in good transcripts therefrom they stand out against the sky. This charm in the cases we refer to is lost, and the loss is due to halation. Even in distant and middle distant objects the lack of vigour which naturally occurs is generally quite sufficient, without the addition of loss by halation.

The evil of halation which is now so frequent was more guarded against in the collodion period. Wet collodion was much less subject to it than a thinly-coated gelatine plate, and with dry collodion, "backing" was recognised as a necessity, and generally resorted to. Backing ought certainly to be adopted with ordinary gelatine plates when used for subjects of the character referred to. Other remedies are, staining the film, coating the plate thickly, and the use of a non-transparent support, as paper.

Perhaps the introduction of paper in place of glass as a support for the negative film may bring about the banishment of halation. Whether or not paper is destined to supersede glass, the production of a large number of pictures which, owing to freedom from halation, are endowed with the charm of truth in this respect, cannot fail to influence those who use glass to provide against the evil of halation by the employment of one or other of the means indicated.

As regards the show of apparatus at the Pall Mall Exhibition, little need be said, as if there is anything which has not already been described in our columns, we have not been able to find it. There, are, however, several contrivances in which unimportant alterations have been made, and to which new names have been given.

The Year-Book will be published, as usual, soon after the middle of December, and those who intend to send communications should do so before the end of this month, if possible.

Short articles dealing rather with questions of every-day work are especially acceptable, and we shall appreciate them, whether sent by new contributors or old friends. When an illustration can serve to make the author's meaning clearer, a sketch should be sent.

Already we have enough in hand to justify us in saying confidently that our next Year-Book will be in no way behind its precursors; but, at the same time, we may hope —confidently hope—that for comprehensiveness and practical utility as a complete guide to every-day photographic practice, it will be the best yet issued.

"Ugliness made its initial inroad upon art when the first bust or portrait was constructed." So said Oscar Wilde in commenting upon Walter Crane's discourse before the Fabian Society upon "Art and Commercialism" (see page 677).

Oscar Wilde supported his views in a singularly lucid and eloquent speech. In the first days of art, nothing but the purely symbolic was aimed at. Egyptian art was in no sense of the nature of a portrait or an exact representation, but it was simply symbolic. Next come the glories of the best period of Greek art, in which neither symbols and exact representations of actualities were represented, but to produce the "literally and absolutely beautiful" was the sole aim and end of the artist.

Then came the portrait, the portrait bust—let us suppose, as an example, a bust of Socrates. Here we may have a fine work of exact reproduction, but no longer true art. Ugliness is now introduced in art, and mixes with the "literally and absolutely beautiful" as seen by the eye of the artist.

In the Renaissance—say the thirteenth and fourteenth century—the symbolic again appeared, and our efforts in the present day should aim at that which is simply beautiful.

Oscar Wilde's notion of a portrait seems to be a crude and slavish representation, whether of a man or a thing; but the true artist is he who can see and reproduce beauty where least expected.

The railway station, the squalid home of the unfortunate, the hoarding covered with the brazen and unblushing lies of the commercialist, may now and again be so lighted by the silver grey of the moon, or the gold of the setting sun, that it becomes lovely in all its lines and gradations, with which the artist may be as delighted and inspired as by the exquisite beauty of a Japanese fan.

There is another kind of beauty, said Oscar Wilde, the beauty of fitness and complete adaptation to purpose. We often see this to perfection in a plough or a wheelbarrow. He who cannot admire a well designed plough or wheelbarrow speaks falsely if he professes to admire the Parthenon.

The exhibition of a few harmless photographs by a well-known Parisian photographer has this week excited the Radical party in Paris to something akin to madness. The photographs shown in a shop window at the corner of the Boulevard des Italiens and the Place de l'Opera comprised portraits of the members of the Orleans family, Prince Waldemar and Princess Mariè d'Orleans (whose marriage is the sole talk in aristocratic circles), a group of the Prince and Princess of Wales, their children, and the families of the Comte de Paris and the Duke de Chartres. These unfortunate photographs, we are told by the *Globe*, had on the Radicals the effect of a red rag on a bull. The *Bataille* and the *Cri du Peuple* shriek about the impertinence of the foreigner coming to beard them in their den, and talk of the Royal and family visitors as so many hostages for the good behaviour of the pretenders. On the whole, these unlucky photographs have had rather a bad time of it.

A correspondent writes to us *apropos* to the discussion, inevitably renewed at this time of the year, as to our method of managing passengers' luggage on our railway. "It is objected," says he, "that English people are so often in a hurry, and arrive at a station so late, that the system of registration in vogue abroad is not to be thought of—it takes too long. "If this be so," he goes on, "there is surely another plan by which luggage can be unmistakably identified, which would not take at most more than a couple of minutes to carry out. Instead of troubling to make elaborate entries in books, why not simply take duplicate photographs of the Saratago trunks, portmanteaus, and what not, which passengers successively arrive with?"

"With an instantaneous camera," he continues, "the two views of each person's baggage—be it made up of one piece or half-a-dozen—could be taken literally in half a jiffy, and, armed with the exact portrait of his portmanteau labels, letters, straps, and everything, it is difficult to see how a passenger could fail to easily identify and secure it at a journey's end. The guard would of course take charge of the duplicate luggage cartes, for the purpose of checking the copies presented by the passenger, and the appropriation of baggage by a thief would be made impossible.

So writes our ingenious and ingenuous correspondent, concluding his letter with the remark: "Doubtless you will be able to develop the crude idea I send you." Our reply is, Yes; we will willingly try to develop the crude idea in question on one condition; that is, we will do so if our correspondent will, on his part, first tell us how the duplicate photographs he alludes to are to be developed in the few hurried seconds which elapse between their being taken and the starting of the train. When he has developed his luggage cartes, as he calls them, it will be time enough to talk about developing his idea.

Mr. Stavely Hill, in his recently published book on American travel, relates how he was "sold" through trusting to other people. He had taken what he had thought were six valuable photographs—two on the Atlantic of icebergs, and four others. Coming across an underground cellar at a settlement called Standorf, Mr. Hill determined to utilize it for the purpose of changing his plates. After making all preparations for the thorough exclusion of the light, he proceeded to open his six slides, and found them —perfectly empty! As he says, "The managers of my photographic apparatus, before leaving England, had omitted to put any plates in the slides which I had been using, so that these six endeavours, though carried out with the greatest pains, had been productive of no results." Moral—When you start on a photographic tour, always pack up every part of the apparatus yourself.

Mr. Hill had great difficulty in persuading some of the Canadian Indians to be photographed. They were, it seems, annoyed with the Canadian Government, and looked upon the photographer as "after no good." The women, however, were more tractable, and one of the photographs in the book shows an Indian with his face rolled up in his blanket to prevent his likeness being taken, while the squaw by his side is, with a woman's curiosity, peeping over hers and laughing. Mr. Hill, we judge from internal evidence, did not develop his plates during his tour. The photographs with which the volume abounds are very interesting. They are printed by the heliogravure process.

Olszewski has succeeded in producing a temperature of 225 degrees below zero on the Centigrade scale. This is the greatest degree of cold ever obtained. It will be remembered that the "absolute zero" of physicists—the lowest temperature *possible*—is only 273 degrees below zero.

The Hell-Gate explosion, by which a dangerous shoal has been removed from New York Harbour, must have furnished Transatlantic photographers with a fine opportunity for instantaneous pictures. The great mine, containing many tons of gunpowder and dynamite, was fired by an electric spark, Miss Newton, a little girl of eleven, the daughter of the chief engineer, completing the galvanic current necessary to produce the spark, by simply pressing a button.

A dull roar was heard, and over an area of nine acres the water was simultaneously elevated to a height of 200 feet. Then for a moment the mass seemed to remain motionless in the air—an enormous liquid iceberg of crystal clearness and dazzling white surmounted by pinnacles of foam; and at this moment, it is reported that the click caused by the discharge of the drop-shutters belonging to the army of photographers present was distinctly heard at a distance of five miles! Down came the torrent, collapsing into mountainous waves, and in a moment it was seen that the success of the operation was complete (and off ran all the photographers to develop their plates, and very pleased we shall be to see some of their results).

How to restore plates to usefulness after they have once been exposed—or, in other words, how to obliterate the latent image—is a problem which we thought had been solved by the use of a bath of potassium bichromate, followed by a copious washing. C. Glissenti has, however, tried numerous other chemicals—apparently selected at random—and among those which he finds to answer well are five per cent. solutions of formic acid, pyrophosphate of soda, sulphate of ammonia, sulphate of soda, nitrate of ammonia, and chloride of ammonium. It is difficult to understand why some of these should obliterate the latent image.

Patent Intelligence.

Applications for Letters Patent.

12,227. Walter Griffiths, 139, Belgrave Street, Highgate, Birmingham, for "Improvements in photographic plate boxes."—14th October, 1885.

10,533. Arnold Rocholl, 8, Quality Court, London, for "Improvements in photograph stands."—5th September, 1885.

10,594. John Rudolph Gotz, 19, Buckingham Street, Adelphi, W.C., for "Improvements in or connected with photographic cameras."—8th September, 1885.

12,374. Thomas Samuels, 53, Chancery Lane, London, for "Improvements in apparatus for holding dry plates or films, and for changing them in the photographic camera."—16th October, 1885.

12,474. Edward Slater, 6, Lord Street, Liverpool, for "Improvements in and relating to photographs."—18th October, 1885.

Patent Sealed.

13,103. Ludwig Hermann Phillippi, 55, Chancery Lane, London, for "Improvements in reproducing photographs by printing, and in producing printing blocks or rollers therefor."—Dated 2nd October, 1884.

Patent which has become Void through Non-payment of the Fourth Year's Renewal Fee.

3014. G. Smith.—"Photographic cameras, &c."

Patent Granted in America.

327,778. William G. Entrekin, Philadelphia, Pa. "Photograph burnishing machine."—Filed April 10th, 1885. (No model.)

Claim.—1. The combination of the burnishing-roll and its bearings, with a petticoat enveloping the lower portion of the said roll, and hung to the shaft of the same, so as to be thrown to one side or the other to expose the roll, as set forth.

2. The combination of the frame, the upper and lower rolls, the pins, the spur-wheel on the lower roll, and the locking segment, as set forth.

3. The combination of the frame, the upper and lower rolls, a spur-wheel hung to the frame, a spur-wheel secured to the spindle of one of the rolls, and a spur-wheel held in place on the spindle of the other roll by means of a thumb-nut in the end of the spindle, as set forth.

PHOTOGRAPHIC APPARATUS AT THE ENGLISH PATENT OFFICE.

BY CHAPMAN JONES.*

Camera Backs.

Changing boxes, roller slides, and matters connected especially with focussing screens and cloths, besides methods of screening a part of the sensitive surface, and plate-holders which are also baths, or allow of immersing the plate in a bath connected with the camera, will be separately dealt with.

The simplest method of focussing is by moving the focussing screen, for a movement of the lens changes its distance from the object, as well as the distance between it and the plate-holder. The camera described by M. Berry (August 14, 1839), as used by Daguerre and Niepce, had a back that moved along the baseboard, and could be secured where desired by a thumb-screw and nut; and A. J. F. Claudet (December 18, 1841) applies a rack-and-pinion for moving the back. W. Lawley and H. S. Starnes (December 21, 1881) have a back that slides to and fro *within* the camera, so that the camera body extends behind the back, an arrangement that exists in many of the old forms of cameras.

A. J. F. Claudet (December 18, 1841) makes the Daguerreotype plate-holder to slide vertically on a rod with a screw to fix it in the suitable position. He does not state what advantage is gained by having this adjustment, but doubtless it was simply to get the picture well on the plate, the movement being an exact equivalent for a vertically sliding front. A. Ceileur (February 21, 1863) describes a plate-holder that slides vertically and horizontally, and is provided with the necessary stops, so that different parts of the plate may in turn be brought behind the opening of a screen that determines the size of the picture. He mentions one hundred small, or two dozen large pictures on the same plate. (Note.—25 pictures, each $6\frac{1}{2}$ by $4\frac{3}{4}$, would require a plate $32\frac{1}{2}$ inches by $23\frac{3}{4}$ inches.) H. du Mont (June 8, 1861) and T. A. Dillon (March 18, 1879) both have a long frame that holds a number of dry plates; Dillon's is moved by clockwork for automatically copying a series of documents, &c.

The effects of a swing-back seem to have been first provided for by J. C. Bourne (March 27, 1855) by a complicated and uncertain movement of the front, which has already been described. H. E. Palmer (November 26, 1856) has a back that slides for focussing inside the camera body, and the plate-holder is supported on two horizontal pins, like a swing looking-glass, and has curved guide pieces at the top and bottom. H. Macfarlane (November 17, 1860) says that the benefit of a slight inclination of the picture plate is "well understood by photographers." He makes the back part of a sliding body camera to enter the front part only a little way, and attaches it thereto by a pin at the top, and another at the bottom, so obtaining a slight movement about the vertical axis. A vertical swing is got by having a pair of movable rests, against which the plate frame bears. W. J. Stillman (November 14, 1871) rounds the bottom edge of the back, and supports it in a hollowed shoe, in which it can be fixed by a screw at any inclination. Vertical swings are also provided for by W. B. Woodbury (April 27, 1877, and S. W. Rouch, April 11, 1878). G. Smith (July 8, 1881) secures the back to the base-board by a single screw, which allows of both a vertical and horizontal swing simultaneously, and requires only the one screw tightening to fix the back in any position. The back turns, hinge fashion, on a horizontal pin in the top of the screw, and the screw itself, passing through the base-board, is the vertical pivot. He also describes variations of a ball-and-socket joint for giving the universal motion to the back, and fixing it by one screw only. G. Hare (June 27, 1882) hinges the back frame on the base-board, and fixes it at the required inclination by a metal plate pivoted to the base-board, and fastened to the back by a thumb-screw through a slot.

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* Continued from p. 619.

Dark-slides are generally made so that the face of the sensitive plate is protected from the light by a shutter or slide that can be removed to expose the plate after the dark-slide is affixed to the camera; and it is usual to have a way of introducing the plate other than through the front of the slide. The camera back used by Daguerre and Niepce, as described by M. Berry (August 14, 1839), however, was solid at the outer side, the plate being introduced from the front side by opening the folding doors. When in the camera, these folding doors were opened for exposing the plate, by pushing a semi-circular arm attached to the bottom of each door, and projecting outside through the back of the camera. T. Skaife (June 10, 1856) also employs vertical folding doors, but they are self-closing by means of springs, and opened by pulling a cord that rotates a drum attached to the axis of each door. It must be a great convenience to be able to uncover and re-cover the sensitive plate as easily as the lens is opened and closed by a shutter, when getting instantaneous views that can only be caught at short notice; but it seems that this facility must be sacrificed in modern instruments for the sake of other more important conditions. The back described by C. Langlois (September 16, 1856) has a hinged door on each side; one is opened for introducing the plate, and the other for exposing it. The opening in the camera is done by the hand through a sleeve attached to a hole in the side of the camera. W. and W. H. Lewis (September 7, 1857) mention a slide that is withdrawn entirely from the camera back for exposing the plate, and the opening left is closed by a thick rod of black glass being pushed sideways across it by a spring. The cut-off is of glass for convenience in cleaning.

A. J. Melhuish (November 10, 1859) makes a very important improvement, which also is denied the modern operator. He uncovers the sensitive plate by drawing a slide downwards through the bottom of the camera. Now-a-days we may draw our slides out sideways or upwards at the imminent risk of moving the instrument out of position—especially if the tripod is light and its hold on the ground not firm—but never downwards. Thus, by modern methods, the opening edge of the back invariably points towards the sky, vertically or horizontally, and a focussing cloth must be used lest the light gets in as the slide is being drawn out. Melhuish's camera back is made entirely of metal for his metal camera. J. E. Grisdale (March 12, 1862) has four hinged flaps that open back against the camera for exposing the plate; and W. B. Woodbury (April 27, 1877) has sliding shutters of flexible metal, or of stiff metal with a part flexible, that they may be turned back when drawn out.

Double-backs are described by A. J. Melhuish (November 10, 1859) entirely of metal, and by W. B. Woodbury (April 27, 1877) of wood with metal slides, and both inventors place the plates back to back, and introduce them at one end of the dark-slide.

The back is fitted into a recess in the camera, and retained there by springs, by A. J. Melhuish (December 28, 1859), and W. F. Stanley (August 18, 1880) prefers to push the back on to a projecting tongue rather than to slide it in grooves.

That sensitive plates need not be carried in the dark-slide, nor in what is commonly called a changing-box, and yet be ready for use, has been shown in two or three instances of recent date. W. F. Stanley (August 18, 1880) has what he calls "inner adapters" to the dark-slide, each carrying two plates with the sliding covers as in the usual double-back. T. Bolas (November 3, 1881) carries plates singly in receptacles from which they are transferred to the camera for exposure, and then returned. The receptacles may be roughly compared to dipping baths with sliding covers, and fit on to a suitable opening in the camera; the transfer takes place by turning the apparatus over. J. E. Atkinson (October 4, 1883) uses loose envelopes for sensitive plates, after the principle of Stanley's, mentioned above, but prefers to carry the plates singly. The front of the envelope has a slide for exposing, and the back (where the plate is introduced) has a flexible flap joined to each of the four sides; the flaps are simply folded down over one another after the plate is put in. (Are the corners of the plate securely protected from light by this means?) The back that accommodates these envelopes may be hinged to the camera, that it may turn away for the focussing screen.

A back adjustable for different sized plates is described by T. Pegram (August 22, 1863), who supports the plates on opposite sides by means of two slips that slide in grooves either by hand or by screws. W. and W. H. Lewis (September 7, 1857) have a glass gutter to catch drippings from the plate when in the dark-slide, and support the plate on corners of solid glass with a rebate, instead of against the wood and silver wires as is usual for wet plates.

(To be continued.)

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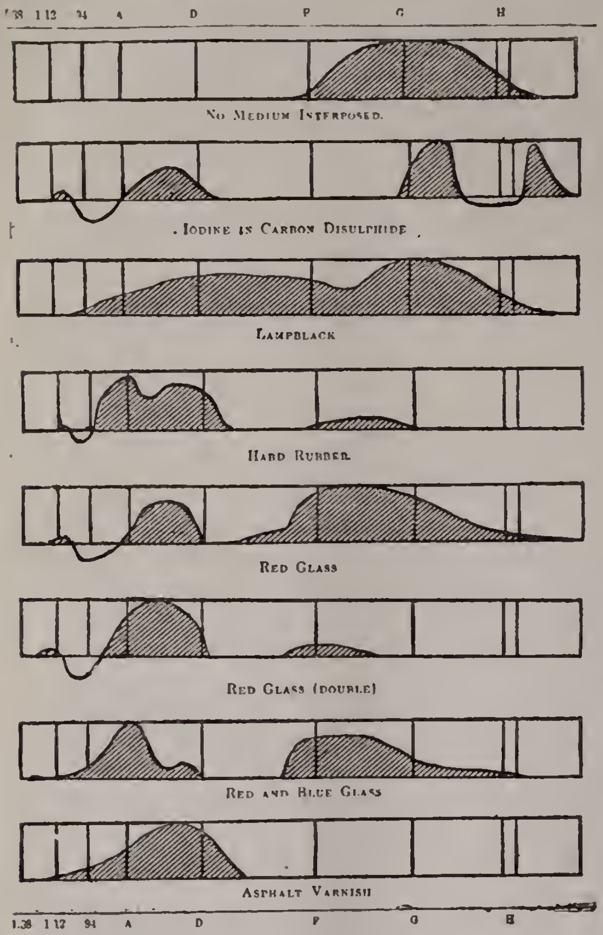
PHOTOGRAPHY OF THE INFRA-RED REGION OF THE SOLAR SPECTRUM.

BY WILLIAM H. PICKERING.

It has been generally assumed, and indeed distinctly stated by Abney and some others, that the gelatine dry plate is insensitive to that region of the spectrum lying beyond A. On trial, however, this proved not to be the case, as the following results distinctly show. It was found that there was a great difference in the plates, those made by Allen and Rowell, and those by Walker, Reid, and Inglis, giving the best results, the latter being somewhat better than the former. This result was indicated by experiments on the sensitiveness of the plates to daylight and gas-light—the two above-mentioned kinds being the most sensitive of all to the latter, while only moderately so to the former light. The object of the research was to determine to how great a wave-length the plates were sensitive, rather than to obtain a good representation of the lines. A very broad slit was therefore used, and a camera lens of large diameter and short focus. The condensing lens, collimator, and camera lens were each 10 cm. in diameter, and the last of 30 cm. focus. The first two lenses were each of about 90 cm. focal length. The prism measured 10 cm. on a side, and had a refracting angle of 30°. It was so placed that the rays struck the first surface at a slightly oblique angle, thereby obtaining a dispersion equal to that which would be had ordinarily with a 60° prism, and employing only half the thickness of glass. The camera lens had an angular aperture of 19°, and the slit, as usually used, of $1' 20''$. It should be stated here, however, that in the earlier experiments made with a common spectroscope, using the object-glass of the telescope as a camera lens, results were obtained which compared very favourably with those reached with the larger instrument. The prism was composed of dense yellow flint glass, and experiments with specimens of ordinary flint and crown glass 7 cm. in thickness gave no more absorption in the infra-red spectrum, as far as observed, than they would in the visible portion, which is entirely contrary to the general belief. An absorptive medium was placed in front of the slit, in order to destroy all light save that of the wave length which it was desired to photograph. This precaution is necessary, as, owing to the reflections from the surfaces of the lenses and prism, a certain amount of diffused light finds its way to the plate, together with the spectrum, and should this diffused light be of short wave-length it would fog the plate, and the spectrum image would be destroyed. It is also necessary to coat the back of the plate with black varnish, in order to prevent the formation of a halo, owing to reflections from the back of the plate. The absorptive medium consisted either of two pieces of red copper glass, or of a piece of red and a piece of blue glass, or of a thin layer of asphalte varnish on glass, of such density as to be slightly lighter than the combined red and blue glass. These all gave about equally good results, with possibly a slight advantage in favour of the asphalte. Other media were experimented upon, including red glass (single, triple, and quadruple), iodine dissolved in carbon bisulphide, lampblack, and hard rubber.

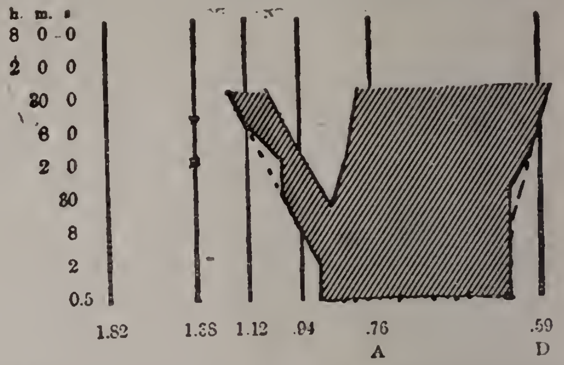
The iodine solution (see diagram) transmitted a large quantity of light in the vicinity of the H lines—so much, in fact, as to reverse the spectrum in that region. The lampblack showed a slight broad absorption band between F and G, with a maximum at G. Otherwise the spectrum was quite uniform between A and H, and faded away at the two ends, disappearing at wave-lengths ·37 and ·94 micron. If one wished for a photograph of the visible spectrum only, it would seem as if it might be obtained very satisfactorily by merely inserting a piece of smoked glass in front of the slit. The glass should be smoked until it is about as dark as two pieces of ordinary red and blue glass, placed together, appear when viewed by transmitted light.



The hard rubber spectrum was obtained with a piece of rubber about ·025 cm. in thickness. One could readily see the sun through it, and by close examination detect the window bars when no light came over the shoulder. In structure it was not transparent, but translucent like porcelain, and filled with little irregularities, consisting of short, narrow, opaque lines, lying in the direction in which the sheet had been rolled. On placing it in front of the slit, its spectrum showed a maximum photographic intensity in the neighbourhood of the A line, whence it gradually faded away to line ·94, where it reversed, and became direct again near 1·12, where it disappeared. This reversing action was noticed more markedly in the case of the red glass, to be presently described. On the more refrangible side of the A line there was a faint absorption band extending half-way to D, and after that a uniform spectrum till D was reached. Here it began to fall off, and soon disappeared. Between F and G there was a small amount of light transmitted.

With a single red glass there were three maxima, the largest between A and G, the next in size between it and D, and a small one in the neighbourhood of the line 1·12 micron. Between the last two maxima there was a reversed band culminating in the neighbourhood of line ·94. By the insertion of another red glass the maximum between F and G was reduced to a small band in the vicinity of F, and the reversed area was transferred somewhat lower down in the spectrum, so that its maximum occurred near wave-length 1·04. With the red and blue glasses, and with the asphalte, there was apparently no reversed area. The former had three maxima—at F, just below D, and just above A. The last was the strongest marked, and the one near D was very small. The asphalte had only one maximum, and that was just below D.

If the length of the exposure with two pieces of red glass be increased, the limits of the reversed area will advance in both directions, as is shown by the figure, where abscissas represent the wave-lengths in the prismatic spectrum, and ordinates are proportional to the logarithms of the exposures. The shaded area shows the darkened portion of the spectrum, while the deep notch represents the reversed portion. This series of exposures was taken on a fairly clear day, but occasionally wave-length 1·38 has been reached in from two to ten minutes, as is shown by the two crosses on the left.



There was a great difference in the transparency of the atmosphere noted on different days. This was noted by Abney. Strangely enough, quite as good results have been obtained in December as in May and June.

The A line is one of the easiest in the spectrum to photograph, and with the slit 5′ in breadth it may be taken in one half-second. If the slit is 1′ 20″ wide, the spectrum may any day be photographed as far as wave-length 1·00 in two minutes, and under favourable circumstances as far as 1·38, but beyond that it is not easy to obtain satisfactory results.

◆

THE EASTMAN FILM.

BY HUGH REID.[*]

Upon receipt of the films, and in order to secure as correct exposures as possible (for there was no number on the wrapper to indicate their rapidity), I tested a portion of one by Warnerke's sensitometer, when the very high number 23 was registered, equal to 180 times the rapidity of the wet process. From the high number obtained, I had some doubts regarding its correctness, and wrote to the Company, requesting them to inform me of the number they gave by the standard sensitometer. In their reply they corroborated the number obtained by me. Here, then, to begin, I had very sensitive films to work with.

One Saturday in September, having fine light (for the season of the year), with a high wind, I wished, if possible, to make an exposure or two, and for that purpose arranged for a short drive into the country, and endeavoured to get some quiet nook to secure a bit of landscape; it was all to no purpose, on account of the wind. Failing in the landscape, the camera was rigged up, and an exposure made on the pony trap.

Before exposing I had considerable doubts as to exposure and size of stop to use; the wind being so high, I resolved to use the drop-shutter and stop $\frac{f}{24}$, this being the smallest stop I had previously used for drop-shutter exposures.

The formula for development used was that sent along with the films, easy to manipulate, the washing after fixing occupying about half an hour. After washing, the negatives are squeegeed, film side down, on to glass previously oiled or rubbed over with powdered talc.

We now come to the oiling for the purpose of removing the grain of the paper. Castor oil is recommended. Knowing the disagreeable nature of it, I procured what was considered the best, and labelled "The perfect castor oil, free from unpleasant taste and flavour." The former I did not try, and it was almost void of the latter. The formula sent with the films for oiling differs from that given in the circular sent out by the Company. My first experiment was by that received with the films, which proved a failure on my part; the iron used was either too hot or too cold. No matter how I tried, the grain was still left in the paper. The following night saw me at the mode recommended in the circular, heating the oil to near boiling point, and pouring it over the negative, then wiping off the surplus oil with a soft bit of cloth. After a time the grain of the paper disappeared.

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[*] Abstract of a communication to the Glasgow and West of Scotland Amateur Photographic Association.

Now, I have a word of caution for those who have a desire to invest in films that require castor oiling. I would advise them to try the experiment of oiling a few pieces of paper, and, if successful, and do not find it very disagreeable, good and well. For my part, I found it most disagreeable.

Since writing the preceding, I observe the use of vaseline recommended, and by a method which I will here describe. After the negative is removed from the washing water, and squeegeed on to the glass and allowed to dry, rub over it some vaseline, and put it over a tray with boiling water set over a Fletcher burner, which will have the effect of melting the vaseline and penetrating the paper. For removing the oil or other medium from the film side of the negative, it requires to be wiped with a little cotton wool and alcohol.

Regarding film-carriers, I took the trouble to have half-a-dozen weighed against half-a-dozen average glass plates, and found that the carriers weighed as near as may be half the weight of the glass. The great advantage of films will be during a tour, and no small factor in the matter. You can always be sure of having an even-coated surface. As for roller-slides, they have their advantages and disadvantages, so far as I have seen of them, and I would not advise any one to dispense with their present double backs, but rather invest in film-carriers, which are inexpensive.

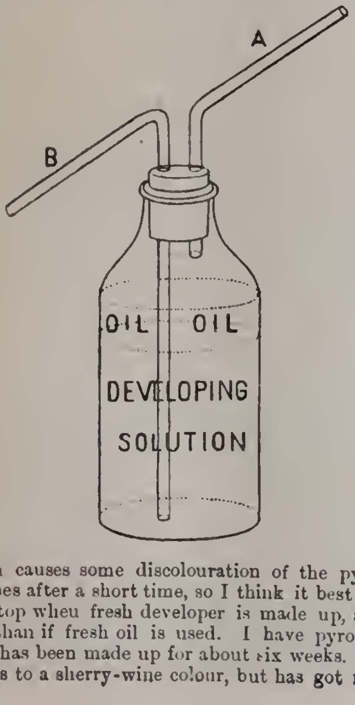
◆

MY DEVELOPER BOTTLE.

Something not very Novel, but Good!

BY H. SCHOONMAKER.

To protect pyro solution, use a layer of oil (I use good headlight) about an inch thick. Same for ferrous-sulphate or ferrous-oxalate solution. The potassic oxalate solution has a disagreeable habit of crawling up the inside of the bottle and around the neck. A thin layer of oil is a sufficient preventive of this. The pyro solution seems to exert a slight action on a fresh layer of oil, which causes some discolouration of the pyro solution, but this ceases after a short time, so I think it best to keep the same oil on top when fresh developer is made up, as the action will be less than if fresh oil is used. I have pyro solution on hand which has been made up for about six weeks. It changed in a few days to a sherry-wine colour, but has got no deeper in colour for several weeks, and is perfectly free from any muddiness or granular deposit. This, I think, is a good test. I attribute most of the discolouration to fresh oil, but perhaps it was impure sulphide or pyro. It cannot be caused by contact with oxygen.



The method of operation is plain. Simply blow in the tube A, and the pressure on the liquid will force it out of tube B as desired. Don't tip up the bottle towards the lower end of B, or it will be apt to act as a syphon. For the same reason the bent portion of B should not have the end lower than the level of the liquid in the bottle. If this bottle, in its simple form, is not elaborate enough to suit, just attach a piece of rubber tubing to A with a rubber bulb (such as are fitted to the ordinary atomizers) at the end, and squeeze this in the hand. This will enable you to allow the bottle to stand on a shelf, which may be a gain when using large bottles.

I have ascertained that this developer bottle is not a new thing at all. No use to publish it unless to emphasize its great utility for the purpose. I find it *ne plus ultra* for any solution much used—developer mixed, pyro, potassic oxalate, ferrous sulphate, soda or ammonia, hypo, mercuric chloride for intensification, &c.—*Philadelphia Photographer.*

◆

PHOTOMICROGRAPHY FOR WINTER EVENINGS.

BY MR. GOODWIN.*

During the dark days, now fast coming upon us, when outdoor work is perforce suspended, we are all liable to be seized with the desire to photograph something, and there is no more interesting outlet for this desire than microphotography, as it used to be called, or photomicrography, as it is now termed. This may be defined as the art of making enlarged pictures of minute objects. There seems to be a very general impression that it is an extremely difficult and expensive branch of photography, but it is only so in certain cases, and many hundreds of most interesting photographs may be made with very simple apparatus. Expense and difficulty only become great when extremely delicate work has to be done. If we turn, however, to preparations showing the structure of plants, insects, or the smaller animals, we shall find that very simple optical arrangements will be sufficient.

I propose to show you how such objects may be considerably enlarged by artificial light with apparatus mostly home-made, and, moreover, made in the course of an evening.

As a matter of course, anyone who has, or can have, the occasional use of a complete microscope cannot do better than use it. Such an instrument as I have here is very suitable; it has a very short tube, with an interior draw-tube, and this is an advantage, as the usual long tube contracts the field of view considerably. To use it the "objective" or lens is screwed on and the eye-piece removed; the slide bearing the object is placed on the stage in the usual way, and the microscope turned down horizontally. A beam of light is sent through the object and lens, and the enlarged image received on the ground glass of an ordinary camera. It is not, however, necessary to have a complete microscope, the only essential part being the lens. I am going to use to-night a lens of 1½ inches equivalent focus, and for the class of work I have mentioned it is quite powerful enough. The only other optical appliance needed is a condenser or "bull's eye lens," mounted on a stand. Turning to the rest of the apparatus, there is first an ordinary camera from which the rising front has been removed, and in its place a piece of wood is fitted on to which is screwed one end of an empty cigar box, and through both of these is cut a hole about two inches in diameter. In the other end of the box is bored a hole into which the objective fits tightly. Below the box is fitted a sliding board, which carries at its outer end a stage to support the object, and a focussing arrangement, consisting of piece of wood travelling on three little brass rods, and moved by a fine screw, against which it is held by two rubber bands.

To use this apparatus the sliding-board is moved outwards or inwards till the object is roughly focussed, and the adjustment completed by means of the fine screw. The size of the object is regulated by the distance of the ground glass from the lens, and is adjusted by the ordinary focussing-rack of the camera. Should great magnification be required, another cigar-box may be added, or a double convex lens may be used as amplifier. The detail in these minute objects cannot be well seen on ground glass, so I have removed it, and substituted a piece of glass coated with gelatine dissolved in milk. The lamp is a common single wick paraffine one, with ¾-inch wick, burning good oil with a considerable quantity of camphor dissolved in it. It would certainly be an advantage to use a more powerful lamp, but I wish to show you what can be done with the least outlay. The lamp being placed about six inches behind the object, the condenser is moved about between them, till strong and even illumination is obtained.

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* Abstract of a communication to the Glasgow and West of Scotland Amateur Photographic Association.

The exposure is the only difficulty. It varies with every object according to density and colour, and it also varies with the distance between lens and plate; experience alone can teach this part of the process. I am now going to expose a plate on the tongue of the honey-bee, which requires about eight minutes, and afterwards one on a thin slice of that useful material, cigar-box wood, which will do with about two minutes.

Very rapid plates should not be used, as there is always some difficulty in obtaining density when artificial light is used. About fifteen sensitometer is quite quick enough. A strong and well restrained developer should be used, so as to counteract the tendency to thinness. Last winter I tried soaking the plate in very strong pyro solution, and pouring that off, then flooding the plate with ammonia and bromide. This method was very successful, and the image went easily and rapidly through to the back of the film. My object in using the solutions separately was to save using about ten grains of pyro for every plate, but I noticed that it was a very clean way of developing. Of course prolonged development would probably give density just as well as the strong pyro, but it is tiresome.

The application of photomicrographs is, beyond doubt, the preparation of lantern slides, and the enormous magnification thus obtained displays in a most striking manner the wonders of nature.

◆

Correspondence.

SPOTS ON DEVELOPING.

Dear Sir,—Your correspondent complains of having transparent spots on his plates on developing. They are, I have no doubt, caused by dust on the plates before exposing, and as the latter intercept the light, would, on being removed in the development, leave marks which on fixing appear transparent. I think he will find a remedy if he will adopt the method I use on my Swiss tours. I may say that out of some hundred of plates I have exposed this season, almost every negative is perfectly free from spots.

The plates should be packed with a thin piece of pure paper between, and not in grooved boxes, which is a great source of dust in travelling; also they should not be placed in the holders till they are required for use. I need hardly say that the latter should be thoroughly dusted, as also the interior of the camera. These precautions I take before commencing work after arriving at my destination. I also avoid, if possible, keeping the plates in the holders during a long journey, as dust is pretty sure to accumulate, particularly if the slides are not well constructed.

I think, if your correspondent will adopt these precautions, he will have no cause to again complain.—I remain, dear sir, yours truly, W. England.

INDIA-RUBBER AGAIN.

Sir,—It has probably been the experience of every photographer that he would like to intensify a negative, but has been unable to do so because parts would be too much done. Take, for example, a picture before me—instantaneous—a group of horses watering; the shore—light pebbles—exactly exposed, the horses wanting intensification. If the whole plate were intensified the shore would be a mass of snow. By covering this shore with the white india-rubber solution, and working the edge carefully when the solution is moist, to avoid hard lines, it is waterproofed, and the other parts can be intensified at will. I have worked this with east windows of churches with good effect, and have succeeded when local intensification with brush would have been patchy. The india-rubber, when dry, rubs off without damaging the plate.

W. Cotesworth.

EASTMAN FILMS.

Sir,—Allow me to recommend the use of the following modification of Eder's ammonium sulphite developer for Eastman paper, or for bromide plates generally:—

No. 1.—*Pyrogallic Solution.*

Pyrogallic acid	64 grains
Ammonium sulphite	3 drachms
Sulphurous acid	3 ,,
Water ... ... to make up	4 fluid ounces

Mix.

Each drachm contains 2 grains pyro. This keeps indefinitely.

No. 2.—*Ammonia Solution.*

Bromide of ammonium	48 grains
Strong ammonia	2 fluid drachms
Water ... ... to make	1 fluid ounce

Mix.

Add half a drachm or one drachm of No. 1 to each ounce of water, according as the subject is more or less wanting in contrast, and flow over film, adding No. 2 in portions of about five drops at a time, until sufficient density is gained. As this developer is pretty well restrained, it may be well to have at hand a solution of ammonia 1 to 3, to add a drop or two if under-exposed. This developer gives pure black and white on Eastman films.

J. Hodkinson.

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Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 15th inst., W. K. Burton in the chair.

The fading of a silver print was drawn attention to by the Chairman, in an example which had been for some months in the Tropics. The producer's name and address was printed upon both sides of the mount, and fading was especially marked on and in the neighbourhood of the letter-press.

A. L. Henderson said that some years ago he had a large quantity of mounts printed with bronze powder, and he often received some of them back with the photographs as badly faded as that shown by the Chairman. Unfortunately, the bronze spread its damaging influence to other photographs in the same album.

It was observed that only certain kinds of bronze produced fading, but the immunity was thought to be due to some sort of protective varnish being employed in the manufacture.

W. M. Ayres contended that the prints were not carefully produced, and therefore more liable to sulphur bleaching.

The subject of H. S. Starne's recent article on lantern slides having been introduced, W. E. Debenham said that the statement that citrates in a chloride emulsion gave cold tones was contrary to his experience and that of many others. If Mr. Starnes obtained cold tones, it might be due to some other condition, as, for instance, the use of ammonia.

H. S. Starnes replied that he had used citric acid and bicarbonate of soda in one case, and obtained cold tones; those plates had been shown; they were of a bluish black, and the image was thin. He then proceeded to read extracts from "Hardwich's Photographic Chemistry," upon Citrate of Silver.

W. E. Debenham then continued at some length in order to show that an alkaline condition of the citrate, or a somewhat high temperature, might have been the cause of the cold tones spoken of, for no other experimenter except Mr. Starnes had found citrates to give other than warm tones. The reason why Hardwich mentioned cold tones was because he was dealing with paper, and that would be distinctly different to gelatine emulsions.

A. Cowan had made positives by Captain Abney's formula of silver citrate and chloride in equal proportions, and there was no doubt about the warm tones by that formula.

The Chairman said that if it were a fact that silver citrate could be made to give either warm or cold tones, it would be interesting to photographers for the Society to decide what the conditions were; and he proposed a series of experiments to be carried out for this purpose.

A Cowan: For warm tones use half citrate and half chloride, and no more heat than necessary to melt the gelatine.

A. L. Henderson thought it was a matter of indifference whether a blue or red colour was obtained in printing, if toning was resorted to afterwards. Some fumed papers printed blue, but would redden quickly enough if soaked in salt and water.

W. M. Ayres recommended the use of platinum and gold for toning lantern slides; he made, in separate bottles, stock solutions of the chloride of these metals, the strength being 2 grains per ounce. For steel-black tones he used the former without dilution; and for warmer tones, equal parts of the stock solutions were diluted with ten parts of water.

After some further discussion on the properties of citrates and acetates with silver in gelatine, the members were invited to form themselves into a group around the Chairman in order that Mr. Henderson might expose some rapid plates under the ordinary conditions of gas lighting. Four exposures were made, 13, 15, 60, and 5 seconds respectively.

Newcastle Photographic Association.

An ordinary meeting of the Newcastle and Northern Counties Photographic Association was held in the Wood Memorial Hall on October 13th, Mr. James Downey presiding.

The President, Professor Herschell, gave an interesting address on the progress made in the sciences having bearing upon the art of photography, including heat, light, optics, and chemistry, and the discoveries made in these sciences by Galileo, Kepler, Roger Bacon, Copernicus, Priestley, and others. He afterwards, by means of the limelight, exhibited a number of views, one of which was an excellent view, taken by Mr. Grey, of the Flying Scotchman train passing through Low Fell Station at the rate of sixty miles per hour.

At the next ordinary meeting in November, a competition, mainly suggested by the President, will take place. Professor Herschell offers a naturalist's camera and appliances as a prize for the three best pictures taken by a *bona fide* amateur member of the Society. In addition, the members of the council offer, as a second prize, a piece of apparatus, value not to exceed two guineas.

Bolton Photographic Society.

The October meeting was held at the Baths, on Thursday, the 8th inst., Mr. J. C. Sewell in the chair.

After the minutes had been read and confirmed, Mr. C. L. Jackson, Astley Bridge, was elected a member of the Society.

The Hon. Sec. drew attention to the value and convenience of Marion's new compressed pyro, and distributed samples to the members present.

Time permitting, a lantern exhibition will be given at the November meeting.

Leicester Photographic Society.

At a meeting held in the Mayor's Parlor, Old Town Hall, on Wednesday evening, the 14th inst., Mr. S. S. Partridge in the chair, it was resolved to form a Photographic Society for Leicester and County, to be called "The Leicester and Leicestershire Photographic Society." The following officers were appointed:—

President—Mr. W. S. Hobson.
Vice-President—Mr. George Bankart.
Committee—Messrs. Toller, Sculthorp, Underwood, and Pochin.
Treasurer—Mr. Sculthorp.
Honorary Secretary—Mr. H. Pickering, High Cross Street.

A code of rules was drawn up and submitted to the meeting *seriatim*, and, after a little discussion, agreed to unanimously, and ordered to be printed.

A vote of thanks to the Chairman for his able assistance closed the meeting, which was adjourned until November 11th.

Glasgow and West of Scotland Amateur Photographic Association.

The first monthly meeting of the Winter Session was held in the room of the Association, 180, W. Regent Street, on Tuesday evening, the 13th inst.; Mr. Hugh Reid, President, in the chair.

The following new members were admitted:—Miss Jessie Gibson, Robert C. Graham, Alfred H. Coulson, George Coulson, John Rennie, Thomas Taylor, Robert G. Paterson, Simon Cameron, W. T. Logan, and Robert Fraser.

The Secretary then showed a sample box of Marion's compressed tablets of pyrogallic acid, which seemed especially convenient for development when away from home.

As the rooms of the Fine Art Institute could not be had in December, it was agreed that the Exhibition be held in January.

The President then read a short paper on "The Eastman Films" (see page 684), and showed some of the paper negatives, also prints from same, taken both before and after oiling.

John R. Reid and Ralph Elder also handed round some of their results, which were very good.

Some conversation ensuing, it was generally admitted that the films were very satisfactory results, but that the great objection was the oiling of the paper with castor oil. It was also thought that while admirably adapted for touring purposes, for studio work glass would still hold its own.

Mr. Goodwin then repeated his demonstration on "Micro-Photography" (see page 685), showing how interesting this branch of photography could be made for winter evenings, and costing almost nothing. Mr. Goodwin exposed and developed a couple of plates in a thoroughly satisfactory manner. These plates were developed by first soaking in pyro and then in ammonia, &c., which he found gave excellent results without a trace of staining.

After the usual vote of thanks, the meeting closed.

Manchester Amateur Photographic Society.

The usual monthly meeting was held on Tuesday evening, in the Technical Schools, Princess Street; the President, the Rev. H. J. Palmer, in the chair.

Colin George Day, Heaton Norris, and R. O. Gilmore were elected members.

On a discussion raised by Dr. Tatham, one of the Vice-Presidents, some valuable hints were given as to the quality and maximum quantity of light allowable in the dark-room.

The Council had made arrangements at this meeting for an exhibition of lantern transparencies, and as this was the first of its kind the new Society had held, there was a large attendance. Considerable interest was shown in the slides of the members, many of whom, having only taken up photography with the advent of the Society, were exhibiting their first attempt at picture making. From a photographic point of view the hundred and sixty pictures thrown upon the screen were, with a few exceptions, extremely good, and comprised scenes from the most picturesque parts round Manchester, as well as general landscape views, studies of animal life, copies, statuary, photomicrographs, photographs of the osteological specimens in the museum at Owens College by Mr. Ward, and a fine set of views from Switzerland, taken by the President.

The following gentlemen brought slides for exhibition:—Messrs. Bathe, Flower, Graham, Duncan, Harrison, Hutchinson, Jameaux, Lane, Lomas, Roddis, Palmer, Stanley, and Ward. Every well-known maker of transparency plates found his exponent, the wet and the dry processes being pretty equally divided.

Mr. R. B. Wilson manipulated his own lantern in an admir able manner, and at the close of the exhibition a cordial vote o thanks was accorded to him.

A whole plate and half-plate, two new lenses of the rapid type, were shown by Mr. H. P. Aylward.

Bristol and West of England Amateur Photographic Association.

The ordinary monthly meeting was held (for September) October 14th, Col. Playfair, Vice-President, in the chair.

Some preliminaries having been gone through, Mr. E. Brightman exhibited the Eastman Roller Slide and Paper, emphasising its excellent construction; the careful manner in which every little detail had been provided for; the exact registering, so valuable a characteristic; and the noteworthy lightness, an 8½ inch by 6½ inch containing a band sufficient for twenty-four pictures, weighing less than two double slides of light make, charged with four plates. Mr. Brightman exhibited a number of paper negatives and prints therefrom.

Mr. Wright, who had also adopted the paper films and roller slide, brought some excellent examples for the inspection of the meeting, and remarked that there was a great deal in the oiling, as evinced by the great difference in those which formed the speaker's first efforts, and one which had been oiled by the Company's representative in London, the latter being remarkably transparent, and printing very beautifully. It had been literally *boiled* in castor oil for a few moments, at a temperature of about 280°.

The Chairman considered it to be a great convenience to be able to use sheets or the roll of tissue, but should think it advisable to adopt the sheets at first for experimenting upon. One could not help thinking that for the use of amateurs glass plates were almost doomed as regards landscape work.

Mr. Wright stated that he used the Platinotype Company's sulpho-pyrogallol for development; the colour resulting was much better than when using Eastman's formula.

H. A. H. Daniel presumed that a most important point was to use a metal dish, and keep the oil really boiling when oiling. He was delighted to find that varnishing was unnecessary, as he considered the process of oiling far less disagreeable than varnishing.

Mr. E. Brightman was quite prepared to find that, to ensure immunity from staining, it would be necessary to collodionize the film side.

Mr. Wright suggested squeegeeing the negative on to a collodionized plate when drying, so that when lifting it, it would be already collodionized.

Mr. Stephens thought it a great advantage to be able to use sheets instead of the roller, if desired.

Mr. Daniel thought it was not one of the least of its advantages to be able to wash the negatives in the same apparatus as the prints.

After some further discussion (during which very few could state which prints exhibited were from the glass, and which from the paper negatives), a vote of thanks was accorded to Mr. Brightman.

Talk in the Studio.

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will take place on Tuesday next, October 27th, at 8 p.m., in the Exhibition Gallery, 5, Pall Mall East, when the apparatus and appliances now on the table will be explained by the exhibitors. Also on Monday evening next (optical lantern night) transparencies will be shown, produced by members of the Amateur Field Club.

The Identiscope.—Mr. F. H. Carter writes to combat the assertion made by Mr. Mathews at the close of the communication from him which appeared in our last issue, to the effect that the identiscope afforded "irrefutable evidence" that the Tichborne Claimant is the true and original Tichborne. Mr. Carter suggests that if the identiscope "proves" that which an accumulation of facts—such as the absence of tattoo marks where they had been known to exist—disproves, the obvious inference is that the instrument itself is untrustworthy. Our correspondent adduces other arguments against Mr. Mathews' proposition, but, as he remarks, the columns of the Photographic News are not intended for the discussion of such matters, and therefore we cannot afford space for disputation on the question.

Photography applied to Topography.—At a recent meeting of the Academy of Sciences, Captain Mœssard exhibited a photographic apparatus adapted to topographical purposes. It enables panoramic views to be taken, which, completed by some simple topographical work, provide a representation of a district on a map. The obstacles to obtaining panoramic views, owing to the necessity of emptying glass plates and several of them, have been met by Captain Mœssard's cylindrograph, which is not bulky, and very light. The sensitive plates are necessarily of a flexible substance, carried by a curved frame. The positive proofs can be arranged in a cylindrical frame, and so viewed as to present a panoramic view. This contrivance is called a cylindroscope.—*Science Monthly*.

Abstract of Chapman Jones' Lecture at the Birkbeck Institute, October 21st.—J. H. Schulze, in the year 1727, copied writings by sunshine on a surface of chalk moistened with nitrate of silver, and Lord Brougham, in 1796, used ivory instead of chalk, and got pictures by using a dark chamber with a hole in it. The Royal Society refused to publish Lord Brougham's observation, and maintained its short-sighted policy towards photography by turning a deaf ear to Niepce in 1827, thus driving him and the subsequent Daguerreotype discovery to the French Academy. The son of the great Wedgwood, in co-operation with Humphrey Davy, got photographic pictures in silver salts in 1802, but could not fix them. Hyposulphites date from 1819. We do not know what light is, but suppose it to be due to the undulations of "luminiferous ether," a substance whose properties can be neither imagined nor described. White light may be divided into coloured lights by various means. Light causes fading or bleaching, besides producing the darkening of certain compounds; it also rots or destroys, as well as causing the production of the green colouring matter of plants and other compounds. It is blue and violet light that is chiefly thus chemically active.

Photographic Club.—The subject for discussion on October 28th will be "Local Intensification and Reduction."

To Correspondents.

⁂ We cannot undertake to return rejected communications.

Pharmacy.—Most of the formulæ used in toning will give a purple black if the action be continued long enough. There are, however, certain conditions necessary; the printing must be carried to a depth which is only admissible with a rich, powerful negative; from a thin, poor, or fogged plate, a rich black print is not to be expected. Try the formula with chloride of lime given in the Year-Book.

William Goode.—It is not only possible, but very common, to produce lantern slides from negatives of a larger size. A copying camera is employed—that is, one which has fittings to hold the negative at one end, and the focussing screen at the other, with the lens between. Wet collodion is generally employed, but emulsion plates may be used; but they should be of a kind giving perfectly clear shadows and good range of tone. These characteristics are more frequently to be met with in slow plates than in rapid ones.

W. Goode.—Very great over-exposure commonly produces a reversed image; so, to a certain extent, will great under-exposure when the film is affected strongly with green fog, and this is developed sufficiently to overpower the image produced by light.

J. E. Forrest.—Medium for retouching is generally applied after varnishing. Rub it with a soft rag, but not sufficiently hard to remove the whole of the solution from the varnished surface.

J. W.—Forfar is a better material for painting backgrounds upon than calico or sheeting, being stronger; but it is difficult to procure it more than 72 inches wide. Bed-tick can be obtained of 86 inches; perhaps that will answer your purpose.

T. B. H.—The brass fittings for cameras are specially made in a department of the camera maker's workshop, or sent out to some brass finisher to make to order. We are not aware of any factory specially for their manufacture, but certain parts—nuts and screws, certainly—can be obtained of some of the dealers in apparatus.

Constant Subscriber.—Liesegang's "Handbook of Photography" is not, so far as we know, published in English. The latest German edition is well brought up to date.

E. Ernest Bilbrough.—The subject of rendering paper transparent is receiving considerable attention just now, and various methods, old and new, will be put upon their trial.

Harry Pointer.—The hanging committee undoubtedly possess the right you refer to. Unless the space at their command were unlimited, they must of necessity exercise that right.

W. J. Anckorn.—We do not profess to answer legal questions; but it appears to us that in adopting the wording you send us, you are within your right.

Litho.—Detailed instructions for collotype and photo-litho printing have been published in the Photographic News, and we cannot, in the limits of this column, repeat them.

Walter H. Cox.—We have forwarded your offer to the gentleman named.

J. McL.—Some of the paper enamellers, whose addresses are to be found in the London Directory, will probably be able to supply what you require.

J. C. O'L.—We believe the firm has changed proprietorship, and is now carried on under another title.

J. J. Harrington.—It is undesirable to keep ready sensitised paper so long as for it to become discoloured; but we do not see that this proceeding is likely to induce subsequent fading, which is probably due to some cause that you have not traced.

The Photographic News.

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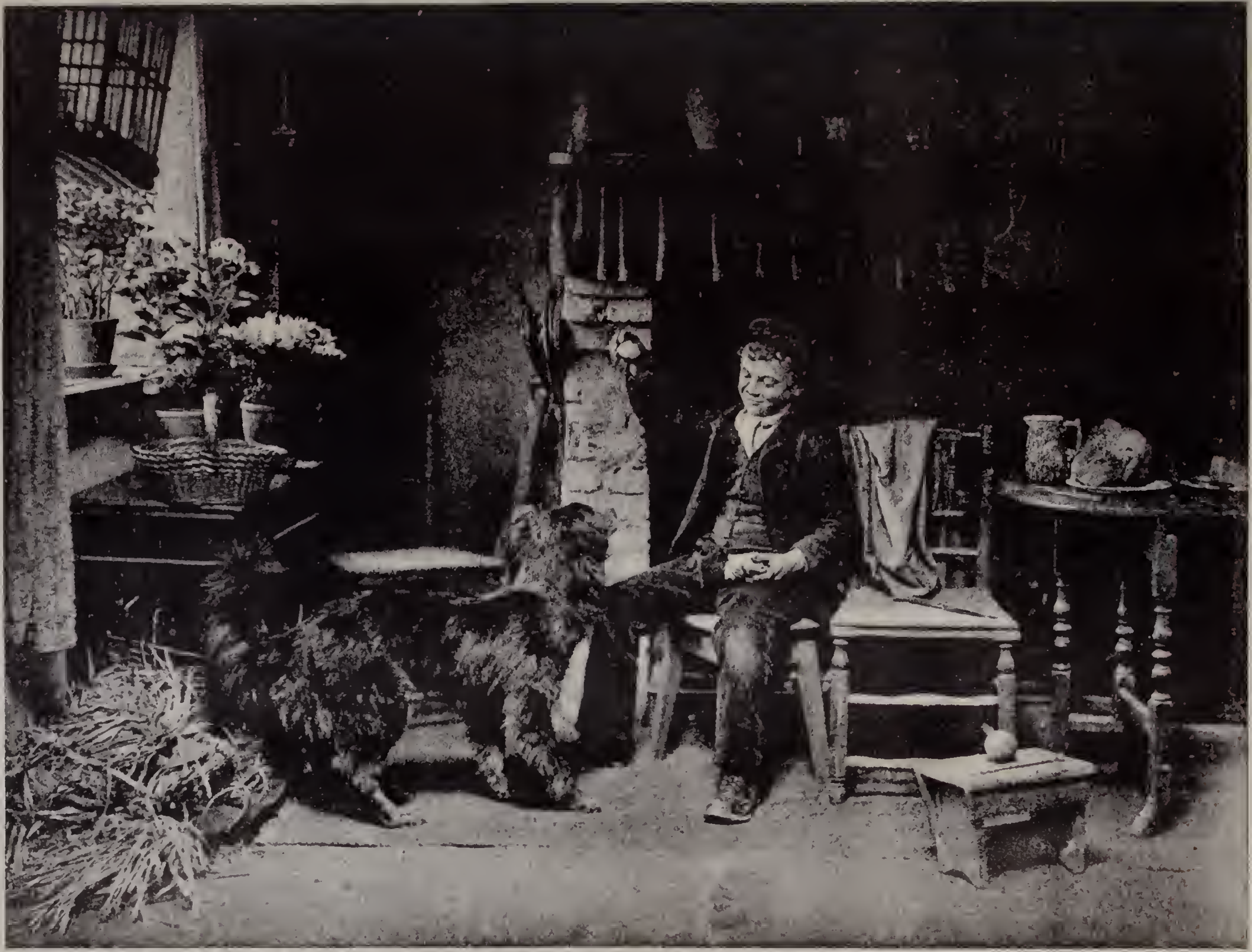

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1417.—*October* 30, 1885.

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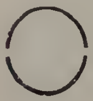
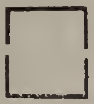
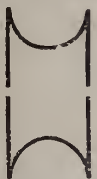
THE CONSTRUCTION OF PHOTOGRAPHIC EXPOSERS.[*]

The influence of the shape of the aperture on the distribution of the light, and on the total co-efficient of possible light which is allowed to pass, is discussed by Mr. Pickering. Six forms of aperture are considered. These will be readily understood by reference to the annexed cuts.







First are considered slots of the precise forms shown, the length (vertically) being taken in each case as equal to the diameter of the aperture of the lens. In the next three "the slots are supposed to be lengthened out by the insertion of a square between the terminations, so that the length down the middle is now twice the breadth," or twice the diameter of the aperture of the lens.

These six apertures are considered first as forming single-acting shutters, second as forming double-acting; that is to say, in the first case as single slots moving across the aperture of the lens, in the second case as double slots moving across each other and across the aperture of the lens at the same time. An exhaustive analysis illustrated diagramatically gives the distance which the shutter will move whilst various points of the aperture between the lenses are exposed. We have not time to enter into consideration of this matter further than to say that the diagrams show that in the case of all slots which are no longer than the diameter of the aperture of the lens, whether used singly or two crossing each other, the closing of the shutter commences at the same instant that the opening is complete; in other words, that however slow the motion of the shutter may be, the advantage of the full aperture of the lens is only permitted for an infinitely short time; and that in the case of figure 1, aperture used as a single actor, and figures 1, 2, and 3, used as a double actor, some parts of the aperture are uncovered for only an infinitely short period of time. The latter fact will lead to an inequality in the lighting of the plate; or, rather, to an inequality additional to that which exists already with all lenses, if the shutter be placed either behind or in front of the lens; but, to use Mr. Pickering's own words, "By placing it between the lenses, no trouble of the sort can occur, as every portion of the aperture exposes all parts of the plate at once." Besides which, there is, in the case of a single action shutter working either before or behind the lens, the fact to be taken into consideration that although, if the movement of the drop be uniform, the foreground and the top of the picture may receive the same length of exposure, they will not receive it *at the same time*, a curious kind of distortion being the result of the want of coincidence if there be any moving object in the picture.

Leaving out of the question for the time being shutters, which work either before or in front of the lenses, "since all parts of the aperture between the lenses are of practically equal value, it is evident that the best-shaped slot is that one which lets through the maximum amount of light per unit length of total exposure. That will be the slot which gives the best representation of the dark object, with the least motion of the bright one" (of something in motion which it is desired to photograph).

For all the apertures described, used both single and double, Mr. Pickering has worked out a series of figures; amongst others, "the percentage of light transmitted by the various apertures in terms of the theoretically perfect slot." In other words, the co-efficient of light allowed to pass by the shutter, the greatest possible being taken as the unit.

The highest co-efficient is ·79, and this is by the elongated form of figure 2 in double action. Next follows ·72, the elongated form of figure 3 in single action; and very near that comes ·71, for the elongated form of figure 1 in double action.

It will be seen that the highest co-efficients are in all cases got with long apertures. If the apertures were still longer, the co-efficients would be still higher. It is to be observed that, with the same speed of moving parts, a shorter exposure is got with a double action shutter than with a single action. for which reason the former is to be preferred, although it presents more mechanical difficulties of construction when high speeds are desired.

It is sometimes impossible to use a long aperture, especially when a short exposure is required with a large lens, as the shutter simply cannot be made to work rapidly enough. In such case a short aperture must be used, and the double-acting form will be found the best. Figure 2 is the best form of aperture, as it gives the highest co-efficient, which, however, is only ·57.

The remainder of the paper is taken up with description of the construction of a shutter, and as supplement there are five reproductions from negatives which have received very brief exposures. Of these we think the most remarkable is that "caused by dropping a six-inch stone mortar into a pail from a height of six or seven feet."

We conclude with a quotation having regard to the best means of accelerating the speed of moving parts:—

> As to the driving force to be employed. It has been found that, with a very sensitive plate, and a rapid rectilinear lens, an exposure of $\frac{1}{200}$ sec. was sufficient to make a fair printing nega-

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[*] Continued from page 674.

tive. The ideal shutter should then give a minimum exposure of not more than $\frac{1}{200}$ of a second, and a maximum of perhaps $\frac{1}{2}$ a second. Let us suppose that the aperture between the lenses is one inch in diameter. The slot, if single, must then be capable of moving with a maximum velocity of two inches in $\frac{1}{200}$ of a second. Theoretically this could be obtained by the force of gravity alone only by a fall of sixteen feet. But a shutter of these proportions is evidently out of the question; therefore, for rapid exposures, one must resort to springs. Thesea re of three kinds—india-rubber, metallic coiled, and metallic spiral. The former are convenient and cheap, but cannot be relied upon to give uniform results. Coiled springs, after they are wound up two or three turns, unwind with a nearly constant velocity, so that, if there is to be much variation in the exposures (for example, a ratio greater than 1 to 3 or 1 to 4), we must resort to complicated gearing. For those who are satisfied with these small ratios and comparatively long exposures, as those who are engaged in photographing yachts exclusively, a coiled spring leaves little to be desired, as it is compact and readily carried. On the other hand, if one wishes to vary the exposure through a large range, such as 1 to 100, or to get an exposure of less than $\frac{1}{50}$ of a second, the drop-shutter arrangement offers peculiar advantages.

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THE PHOTOGRAPHIC EXHIBITION.

[Fourth Notice.]

Morgan and Kidd send a number of enlargements on gelatino-bromide paper (Nos. 62, 84, 234, 256, and 517), and two (Nos. 301 and 327) on opal glass, the same material that some exhibitors describe as porcelain. The enlargements are good, but the original negatives show various grades of artistic merit, and are presumably the work of several hands. Harry Tolley sends a number of views (Nos. 70, 85, 532, and 533) displaying considerable judgment and taste, but some of them are injured by the printing-in of the sky over the trees and distance.

"Grasmere and Rydal" (No. 72), a panoramic view by T. A. Green, is a picture to look at and remember with pleasure. There is one drawback to it in a shade on the water near the middle of the picture, which strikes us as being artificially produced. No. 561 is a scene with a tree in the foreground, the branches of which reach to the top of the picture, and stand out clear against the sky. The natural brightness which freedom from halation and artificial treatment gives, is made the more striking by the proximity of a photograph in which the edge of the foliage is weak from being shaded, to allow of printing-in an artificial sky, that has been in turn partly printed over the weakened foliage. Of Adam Diston's "Mending the Nets" (No. 76), and "A Smoker" (No. 77), we prefer the latter. A "View at Morpeth" (No. 81) is by J. George Gibson, who also shows a picture of a boat (No. 207). The mast and rigging are much weaker than the hull, as if they were enveloped in a special fog of their own, apparently due to their having been partially shielded during printing, and then having a "sky" printed over them.

"Blackberrying" (No. 86), by E. A. Maxwell, would be very good but for the figure to the right, whose hand has moved a good deal, and who lacks the naturalness of pose of the other model. Nos. 225, 226, and 227, are woodland scenes with figures representing action. No. 490 is a frame of views with some powerful effects, but in one or two the trees are somewhat harsh, as if from under-exposure. "Caldicot Castle" (No. 88), by H. Forsyth, is one of a series of large photographs mounted in optical contact with the glass. Of these we prefer No. 659, "Clifton Suspension Bridge." "Sandown Bay" (No. 96), and "A Rolling Wave" (No. 263), by J. Milman Brown, are photographs with sea and sky that remind us of the effective pictures produced some thirty years ago by Gustav Le Grey; we think, however, that the first named picture has suffered somewhat from partial masking during the printing. Other exhibits by the same hand are Nos. 131, 447, 558, and an "Old Oak Tree, the Landslip" (No. 571). This charming picture represents a fine old tree in the foreground, boldly delineated, yet without harshness, and foliage well marked as belonging to varied distances. In a path, some little way off, stand two figures, just where they assist the picturesque effect, without any of that consciousness of forming the subject of a photograph that is often apparent. It is a pity to have to find any fault with such an excellent work, but there is a little halation in the upper part of the branches which somewhat mars the perfection of the whole.

In No. 99, "At Rivington," by Edwin Smithells, the foreground and middle of the picture compose very well. Some trees to the right are rather heavy in the trunks, and at the top the foliage is in parts weak. "A Bit on Loch Katrine," by the same exhibitor, is a really fine picture. The sky is here not printed too dark, but of a clear delicate tone, which at the same time allows the white clouds to tell, and the trees to stand out with their proper force. This picture, and others by the same hand (Nos. 578 and 615), show good, genuine photography combined with artistic perception, and the style produced by this union is worthy of study.

Charles Reed sends "The Meet," a hunting scene, which shows naturalness of grouping, and is good, considering the difficulties of the subject. The figures are, however, somewhat under-exposed, and the tree-tops out of focus. No. 292, "The Gipsies," is a frame containing several groups of the character indicated by the title. "Forbidden Fruit" (Nos. 102 and 103), by Malcolm H. Clerk, strike us as stagy; other exhibits by the same hand are Nos. 652 and 673.

Lieut. C. E. Gladstone contributes a frame of interiors of Salisbury Cathedral (No. 104), printed in platinotype. The illumination in these pictures is remarkably equal; the avoidance of large heavy shadows, so common in photographs of interiors, gives to these pictures a good deal of the character of fine engravings. "At Southampton" (No. 108), a quarter-plate seascape, is by John Lewis, who also shows an enlargement of the same (No. 574). In this picture the whole is in harmony—the sky apparently natural; the water with its merry ripple in the front, and the vessel in the centre, make up an admirable whole.

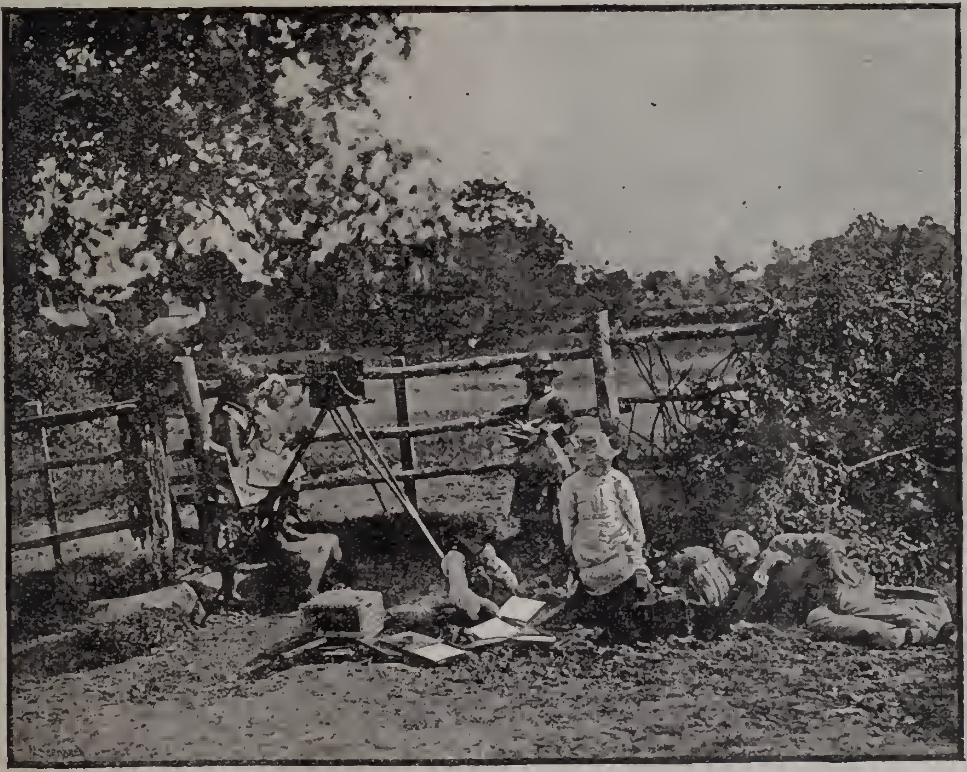
Lieut. Hawker sends an interesting series of photographs, showing the rise and fall of a column of water thrown up by a submarine explosion. G. F. W. Sage exhibits Nos. 100, 237, 500, and 612, of which No. 500, "A Whale," is the most striking. "Prince Alfred's Shrine," three views by G. Fowler Jones, printed in platinotype, have very much the dingy appearance of faded silver prints. One of them, however, is very picturesque; "Studies of Fir Trees" (No. 515) are bright and clear. J. T. Blair sends a frame of seven "Views in North Wales" (No. 116). The centre picture of this set is a very striking example of a fault which occurs in too many of the landscapes exhibited. The edges of the trees and the distance have been so vignetted away to make room for printing-in the sky, that the effect is produced of a dissolving view during the change from a tree picture to a cloud one. There is something of the same effect in the central picture on the frame (No. 672), "Weeping Birches.'

F. W. Broadhead contributes a fine set of interiors of Belvoir Castle (Nos. 117 and 253); one from the last-numbered frame forms the subject of our supplement this week, and another is reproduced on a small scale on p. 691. Two other frames (No. 229). "The Sleeping Photographer," and No. 230, "The Village Blacksmith," serve to display the artist's ability in another field. Nos. 118 to 121 are four scenes by Thos. Galloway, of which the Fish Quay, North Shields, would be really good if the sky had not been printed unnaturally dark. No. 174, "The Sunny Hours of Childhood," is so much under-exposed, that the children's faces have to be looked for, and in the case of one of the children, the search proved, so far as we were concerned, unsuccessful. A hat and body suggested that there should be a face between them, but we could not find it. Nos. 122, 176, 177, and 469, portraits by A. G. Dew Smith, are too dark and heavy to meet with general approval. W. W. Winter sends a number of portrait studies (Nos. 125, 126, 311, 312, 313, 314) displaying good sound photography, and bold and skilful lighting; he also has "A Snowy Morn" (No. 387).

Harry Pointer's "Studies from Nature" (No. 127), is a frame which, in addition to some good pictures of cats and dogs, and a portrait group playing chess, contains a number of cabinet portraits which are as much studies from nature as cabinet portraits generally are. In No. 129, "Going a Milking," a composition picture by Harry Hughes, the "composition" is a little too evident; the figure in some parts looks cut out and stuck on to the background. No. 261 is a set of tree pictures, some of which are rather heavy. No. 130, "Breaking Waves," is by S. H. R. Salmon, who also shows a number of village street scenes, some of them picturesque, but having plain white skies. Even this, however, is better than the confusion produced by vignetted trees and printed-in skies that so largely prevail in the present exhibition.

Valentine Blanchard sends three large head studies (No. 134, 138, 159), of which the last mentioned, an "Italian Boy," pleases us most.

Robinson and Thompson send a fine large view of Amalfi (No. 135), and another view of the same place (No. 168). They also send a frame (No. 432), scenes in Tangiers, Malta, Italy, and Sicily, containing a number of interesting scenes, including the two of Amalfi, from which Nos. 135 and 168 have been enlarged. "A Gateway, Tangiers" (No. 462), is a very fine picture, including a gateway and an Arab figure and donkey; the figure is exceptionally well caught.



BROADHEAD—SLEEPING PHOTOGRAPHER.

No. 140 is one of a series of fine enlargements by the Autotype Company. The superscription upon this particular one, "John Ruskin (untouched enlargement from negative by Barraud)," may mislead those not versed in photographic procedure. The enlargement is no doubt untouched, as stated; the retouching, of which there seems to have been an unstinted amount, having probably been done upon the original negative.

Luke Berry sends a beautiful pair of snow scenes (Nos. 141 and 144), which, however, we should have preferred to see a little re-inforced in development or by intensification. They are, however, truly artistic productions. Nos. 142 and 143 are rustic scenes; and 232 and 391 represent incidents in humble life.

Mavins and Vivash send some powerfully lighted bust portraits (Nos. 145 and 255); they show artistic feeling, but the shadows on the flesh are too heavy for most tastes. The Rev. H, B, Hare sends four 12 by 10 landscapes mounted in optical contact. There is in these pictures an avoidance of coarse shadows, due no doubt in great part to sufficient exposure having been given to allow of proper detail appearing throughout. No. 148 has the fault (so common) of trees and sky being vignetted into each other.

No. 154, "The Fortune Teller and other Studies," is a frame containing, besides two fortune-telling pictures—one of which we reproduce—three field scenes. The background of the one we have selected, consisting simply of grass and field plants, is very well chosen, and does not distract the eye from the figures. No. 636, "The Old Well," is also a pleasing picture. No. 157, "Jesmond Dene," by John Jackson, is a beautiful scene, artistically treated. No. 502 is an enlargement from the same negative. "Views of the Engadine, Switzerland," by W. Muller (Nos. 161 to 163), have already been mentioned when speaking of the medal pictures; we now only refer to them as illustrations of the natural beauty given to a picture by absence of halation, and of that "dodging" of the sky, from which so many of the landscapes exhibited suffer.

Mme. Marie Roze (No. 165), by the London Stereoscopic Company, is a portrait of a lady standing upon a carpet or floorcloth, with a wooded background. One foot is placed upon a property set of steps, and a hand rests upon a photographer's balustrade. Other exhibits by this firm, enlarged portraits, without accessories of the character referred to, are much to be preferred. "Views in Chesterfield House" (No. 166), by Dickinsons, display good sound photography.

Charles Andre sends some excellent "Views Inside Westminster Abbey" (No. 167), described as being on "plates of own make;" and some charming "Views in Yorkshire and Durham" (No. 192). In these pictures there is a beautiful ærial perspective, due, no doubt, partly to their having received a proper exposure, and partly to good plates and judicious development. J. Daniels has, besides "Under Way" (No. 169), a group (No. 340) in which all the figures are looking at the camera; and a picture, "Nearing Home" (No. 341), which we much prefer to either of his other exhibits. In this picture the sky is good, and the effect of the sea is placid and soothing, in harmony with the idea of that rest after labour to which the occupants of the boat are entitled.

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NOTES FROM NEW YORK.

Fall Meeting of the Society of Amateur Photographers of New York—Development of Paper Negatives—Improved Camera—Combined Hoover Shutter and Diaphragm—The Great Flood Rock Explosion—Improved Electrical Standard of Light.

During the summer months the chief excitement among photographers here has been the meeting of the Buffalo Convention, which appeared to be more satisfactory in several respects than the Cincinnati Convention of 1884, as shown by the reports and papers published in previous numbers of the News. Paper negatives, and the ingenious yet simple apparatus for making them, have been the most prominent novelty of the season, and will, doubtless, suggest further improvements which will be likely to simplify the process. The advantage paper possesses for large sized pictures, and the avoidance of halation on interiors, is strikingly illustrated in some 24 by 36 negatives we were recently shown, made by Rockwood, of one or two interiors, of churches and a life-sized direct portrait of Robert Bonner, the owner of the *New York Ledger*, and also some of our fastest horses. The prints were entirely free from grain, and as distinct as if made upon glass.

In introducing apparatus of such high order of workmanship, the Eastman Dry Plate Company have raised the standard of good apparatus, and rendered a service which will, in the future, be appreciated by amateurs. Some of the first photographs made on their films were exhibited before our Amateur Society here about a year ago, and at its recent September meeting the new process was practically demonstrated by Mr. Cooper, who developed negatives at the meeting taken on the same day by means of the improved holder. Respecting the development of the negatives, Mr. Cooper forcibly illustrated the advisability of commencing with a weak solution, and this is about the way he did it.

Before commencing his demonstration in development, he mentioned that he had gone out in the afternoon to make some instantaneous exposures to be used in demonstration; but the sun had gone back on him, and so he had to make all his instantaneous pictures without sunlight direct. He didn't expect much of them, but would try to do the best with them under the circumstances. They were made from the dock, and exposed upon the steamer *Shady Side*, near Fulton Ferry; looking towards the bridge, it would appear in most of them. The time was between three and four o'clock. The stop used was about half-inch; a lens of 13-inch back focus, and 2½ inches diameter. The shutter used is known as the Prosch, and was worked at about three-fourths of its greatest speed.

The lights being all turned out—with the exception of one burner with a ruby chimney attached—Mr. Cooper commenced development, aided by Mr. Jones, who did the cutting of the paper from the spool.

The developer used was from the formula given hereinafter, and was composed of—

No. 1	2	ounces
No. 2	2	"
Water	32	"

This being very dilute, the paper sheets, after having been soaked in water about twenty seconds each, were placed as rapidly as possible into it, and, after an interval of about two minutes—which were occupied by Mr. Cooper answering questions, from various members, pertaining to development—the images began to appear. There were ten 8 by 10 negatives in the developer, being developed simultaneously. After the images had presented themselves fully, and were allowed to advance sufficiently far enough to admit of the amount of detail in the shadow expected from such being seen, Mr. Cooper made the addition of sixty grains of pyro, dissolved in two ounces of water, with 200 grains soda carbonate, when immediately the intensifying began, and the negatives rapidly increased in density. As soon as development was complete—which was judged after the negatives presented about one and a-half the strength of an unfixed dry plate—they were placed, after thorough rinsing, by Mr. Jones for half a minute in a solution composed of—

Common alum	16 ounces
Water	64 ,,

After which they were transferred, without further rinsing, to a bath consisting of—

Hyposulphite of soda	8 ounces
Water	32 ,,

In all these operations the negatives were treated as nearly simultaneously as possible. The fixing was quickly accomplished, which was apparently the result of the solution acting on the negative on both sides. This fact holds good in the process of washing also, greatly facilitating that operation.

Following the development, the following questions were asked by the President, and answered by Mr. Cooper :—

The President.—How do you varnish the paper negatives ?

Mr. Cooper.—I do not consider it necessary to varnish them, except possibly in the case of portraiture, when it is desired to specially protect the retouching. The process of oiling renders the surface of the negative repellent to moisture, and is therefore quite as good a protector as varnish.

The President.—Please explain the process of oiling.

Mr. Cooper.—The negative being washed, and thoroughly dried either by squegeeing to the surface of an oiled glass, from which it will fall when perfectly dry, or by laying back down on clean paper, is ready for oiling. To oil, it is well to provide, first, a pad consisting of about six thicknesses of folded manilla paper. On this lay the negative, face down, and with a thick bunch of flannel or cotton-wool swab the back with castor-oil. using, say, a tea-spoonful for a 5 × 8 negative. Then with a flat iron, as hot as is generally used for laundry purposes, rapidly smooth it with an even pressure all over, following the path of the iron rapidly with the swab of cotton, which, being saturated with oil, fills rapidly the pores of the paper as soon as they are freed from the air in them by the heat. A negative, when properly oiled, should present an even dark surface, without any appearance of grain or mottle. It is only necessary after this operation to wipe the free oil from both the face and back of the negative, drying the face as carefully as you can, and then proceed to print in the ordinary manner by laying it on glass of suitable size and bringing the sensitive paper in even contact by pressure. No fears need be entertained of injury to the print from the presence of oil. In my experience so far, I have not seen a single print that was injured by the presence of oil. Although I have seen many that certainly had oil on them, which could only be seen by holding them up so as to transmit the light, it was quite impossible to see it on the surface.

[Here some prints were shown to demonstrate this fact].

The President.—Can lantern transparencies be made from these negatives that will show no grain when projected on the screen ?

Mr. Cooper.—My own experience is limited on this point, but I will state that of a gentleman who ordered a full outfit to make pictures in the Yosemite for lantern transparencies, a branch of the profession he devotes himself to exclusively. His decision in favour of paper was made only after he had practically satisfied himself of the possibility of making perfect slides from the paper negative.

The President.—What is your reason for starting development slowly, and finishing subsequently with stronger solutions ?

Mr. Cooper.—My reasons were three : First, because I was desirous of speaking on the development while at work, and wanted time to do so ; second, developing ten at once needed a dilute starter, so as to control them more readily ; third, very dilute developers have the tendency to make thin flat negatives full of detail, but weak. I obtain this result first, and then rapidly intensify by my addition of strong pyro. This gives me softness of detail, if wanted, or extreme density, if desired. The development of paper negatives should be continued until the image presents about from one and a half to twice the density of a glass plate.

The President.—In the formulas you employ, do you use 437 or 480 grains to the ounce ?

Mr. Cooper.—All formulas for this work should be made up at 480 grains to the ounce, except in the case of the No. 2 solution, which is based on 437 grains to the ounce.

The President.—How do you judge when a negative is properly fixed ?

Mr. Cooper.—By looking through it as with a plate. The appearance is marked, and cannot be mistaken. Wherever the bromide of silver remains, an opaque appearance is presented.

The President.—What light do you prefer for development ?

Mr. Cooper.—Either yellow post office paper, or green and yellow cathedral glass, if of safe tint and density.

The following is his formula :—

No. 1.

Sulphite sodium crystals, pure (480 grs. to oz.)...	6 oz.
Distilled or boiled water	32 ,,
Pyrogallic acid	180 grs.

No. 2.

Carbonate soda, pure (437 grs. to oz.)	4 oz.
Water	32 ,,

It will be noticed that there may be some drawbacks in the amateur getting the paper well oiled, as from the nature of castor oil it will dry out in spots occasionally.

In addition to the demonstration, an improved Parsell camera for instantaneous pictures was shown by Mr. Beach for 4 by 5 plates.

The camera proper is enclosed in a neatly-covered black leather box. The rear of the camera is provided with a ground glass for focussing, which is attached to upright springs. The plate-holder is put in place by pulling the ground glass back, and slipping it down between the glass and the camera. The conical metal front portion of the camera slips over the tube of the lens, and at the joint is lined with billiard cloth to make it light-tight. To focus, a clamping screw is released, and the back of the camera is then quickly drawn in or out by the hand.

A shutter rotates between the lenses, and is operated by a flat spring, the tension of which can be easily increased or decreased. Directly adjacent to and in front of the shutter, working vertically between the lenses and in the same plane, is a diaphragm disc, which rotates on its own axis similar to the discs in wide-angle lenses, enabling the operator to quickly bring any sized diaphragm into position, thereby dispensing with loose diaphragms. The arrangement permits the camera to be used for a time exposure with a small stop when desired.

The releasing trigger is provided at its lower end with a direct attachment to the piston of a pneumatic cylinder, which latter is connected by a flexible rubber pipe to a coupling tube fixed in one side of the box. The rubber bulb and its tube is, by a very simple device, easily and quickly fastened to and removed from the coupling tube on the outside of the box. The trigger can, by this means, be operated by pneumatic power when the bulb is compressed in the usual way, or it can be independently worked by pressure on a spring button on the outside corner of the box. The shutter can be set for time exposures when desired, and quickly closed by pressure on the releasing trigger. The box has a dovetail metal plate secured to its bottom, which allows it to be fastened on to the metal head of a tripod by a sliding motion, thus dispensing with the usual tripod screw. The weight of the box loaded with one double plate-holder was less than 4½ lbs. A convenient handle and a neat nickle-plated spring lock gave it the appearance of a medicine case instead of a camera.

In addition to a new compact 6½ by 8½ camera, constructed after his own design, George H. Ripley showed an improved Hoover shutter and diaphragm combined, which attracted considerable attention on account of its novelty and the number of things it was capable of doing.

The shutter was placed at right angles to the length of the lens-tube, midway between the two lenses. The working parts are enclosed in a neat vulcanite case, and as the shutter acts as a diaphragm as well as a shutter, loose diaphragms are not required. Two thin vulcanite slides, having square-shaped apertures equal in size to the full opening of the lens cut in one of their ends, are worked to and from each other in the direction of their length by a pivoted operating lever, pivoted in the centre of its length, and loosely attached by a pin at each end to each different slide.

Attached loosely by a pin half-way between one end and the centre of the operating lever is the loose arm of a toggle flat metal strip. Its opposite end is pivoted to the moving or rigid arm, which is rigidly fastened to the axis of the power mechanism. This particular arm rotates in a half-circle from the top of the case to the bottom. About its axis is a loose barrel held in check by a ratchet or toothed wheel and a suitable pawl. On the outer end of the barrel is a wire projection for twisting or turning it, and also for winding up the spring. One end of the operating flat steel, coiled well-tempered watch-spring, is secured to this barrel, while the other is fastened to the rigid arm of the toggle strip. The axis of the rigid arm, the barrel, the steel spring, pawl, and ratchet wheel are all supported on a long lever pivoted only at its extreme lower end, while the upper end engages in notches on metal strip at the top on the outside of the case. This may be termed the diaphragm regulator, for, as it is moved by the finger towards the lens, it causes the shutter slides to make a longer movement through a greater motion of the operating lever, by reason of the rigid arm of the toggle approaching the lever. On the other hand, if the regulator is pushed away to the left in the other direction, the motion of the operating lever will be small, and so also that of the shutter slides. In the former case a large diaphragm is produced, in the latter a small one.

To operate the shutter, the rotating rigid toggle arm is moved upwards, until the shutter is caught by the releasing trigger. Pressure upon the latter at once allows the spring to act and bring the rigid toggle arm down; this in turn operates through its loose connecting arm, the operating lever, which pushes the shutter slides open, so their apertures coincide, until the toggle arm reaches the centre of its half-circle, when, on its lower half of the half-circle, it reverses the motion and draws the shutter slides back. The motion is consequently what is termed a "go" and "return" movement, and, as all the parts are nicely balanced, no jar is perceived. The speed of the shutter is regulated by winding or unwinding the flat spiral spring. For time exposures a special latch is provided for holding the shutter slides open, and for focussing.

A simple pneumatic attachment is provided when desired, for actuating the rotating rigid toggle arm in place of the spring, or with it when the same is loosened, whereby pressure on the bulb gradually opens the shutters, and, releasing it, closes them. By a constant slow pressure and release, the shutters are slowly moved during an exposure, so that the plate receives the full benefit of the full opening of the lens and the sharpness derived from the small stops. The releasing trigger can also be operated by a pneumatic arrangement. One of the advantages claimed for this shutter is that it cuts a sharper instantaneous picture than would be possible for an open lens with a simple drop shutter, as the diameter of the diaphragm constantly varies with the motion of the shutter slides.

At a meeting held on September 22nd, a new Prosch shutter working between the lenses was shown, with some excellent specimens of work by it. A dissolving magic lantern, wherein the gases were made, as consumed, on the spot without cylinders or large weighted bags, was exhibited by Professor G. Fairchild, and worked well.

Photographing the International Yacht Race furnished many opportunities for our amateurs to practise instantaneous work, and several excellent views were obtained. The funeral procession of General Grant was also abundantly photographed, in spite of the many disadvantages as to light and position. The most recent widely-photographed event was the sudden but successful submarine explosion of nine acres of rock in the East River, New York, at a place named Hell Gate, which has for years been a dangerous barrier to vessels bound to or from New York by way of Long Island Sound. The rock known as Flood Rock was honey-combed underneath the water, and then loaded with one hundred and fifty tons of dynamite. At the touch of his daughter's finger General John Newton saw in a twinkling, like a flash of lightning, the grand work he had devoted himself himself to for nine years successfully accomplished. The little key sent the flash through the mine, and instantly a grand transformation took place. The Society of Amateur Photographers had members stationed at various points, and succeeded in obtaining several good views. Many comical and curious events happened to crowds of amateurs and others who were on hand with their cameras, the relation of which I will reserve for a succeeding letter.

An improved form of the Edison Electric Standard measurement of light apparatus for dry plate manufacturers is soon to be brought out, which will be as complete in its way as the Eastman Roll Holder.

The New York Amateur.

* * *

THE PHOTOGRAPHIC EXHIBITION.—No. II.

BY A. H. WALL.

I closed my last paper by a quotation from Ruskin, and my present one will open with a quotation from the same source. "It is a sorrowful thing to me," says that grand old art critic, "and one bearing witness very bitterly to the dishonesty of criticism in general, that people should be so ready to call every kind of fault-finding 'hostility' the moment they can bring it home to a known person. One would think, to hear them, that there was no right or wrong in art; that every opinion which men formed of it was dictated by prejudice, and expressed in passion; that all praise was treacherous, all rebuke malignant, and silence itself a mere pause of hesitation between flattery and slander."

It is mainly because I know only too well how real this "sorrowful thing" is, that I strive to give the why and the wherefore side by side with my critical remarks, anxious only to be useful and honest to the best of my ability. To resume.

The photograph roughly indicated in fig. 7 is one of Mr. Ralph Robinson's subject studies—53 in the catalogue. The female model is here capitally posed; her attitude and expression tell the artist's conception of the poet's story with considerable force; but the male model, although well posed, does not seem to enter so well into the feeling or spirit of his part. The towy, ill-fitting, palpably theatrical wig is bad; the white table-cloth goes far to spoil the composition of light and shade. The linear composition is simple, good, line balancing line, and one leading on to another. But was Longfellow's lady so unblushingly bold as to invite a gentleman to make love to her in this direct

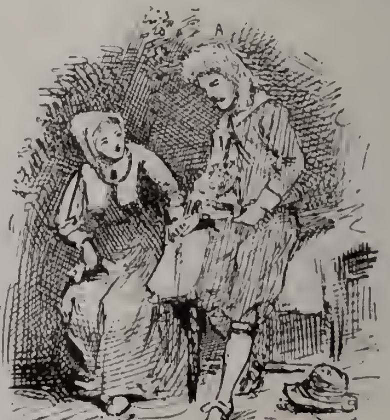


Fig 7

"Why don't you speak for yourself John?"

unhesitating fashion? Was there not even the faintest touch of timidity and tremulousness about the delicate affair—a bashful looking down and away from, rather than a bending forward and looking up into the face of the young man? I confess this is not my conception of the poet's heroine or her story. The photography is particularly good.

Fig. 8 is a pen-and-ink jotting from another of Mr. R. Slingsby's picturesque and admirably photographed seaside subjects. The figures are posed in a simple and natural, yet thoroughly artistic, way, without any apparent effort, the subjects appearing to have been caught unconsciously by the lens, rather than deliberately prepared for it, which is just the idea they should convey. I have, by the bye, only sketched two figures from the picture.

Fig. 9, another thumb-nail jotting, is from Mr. J. Byrne's collection of ladies in drawing-room costumes, for which he has been awarded a medal. The posing is varied, and, on the whole, fairly good; but some of the figures have the arms terribly and awkwardly ill-placed. With this sketch I give one of my skeleton maps, A, to show the ungraceful angularity of one arm, and in fig 10 similar black lines emphasize the same fault in another portrait (see A and B). A similar defect, in a slight degree, mars the delightful portraits of Mrs. Scroop Bernard and child, one of the most admired and beautiful photographs in the collection, as I have shown in the leading lines of the partially foreshortened arm and hand.

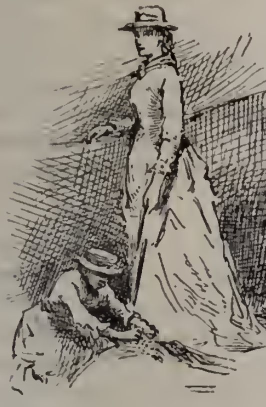


Fig 8 -

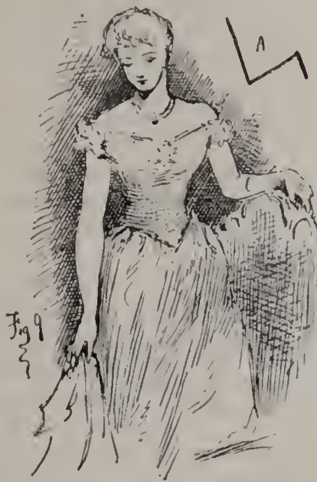


Fig 9

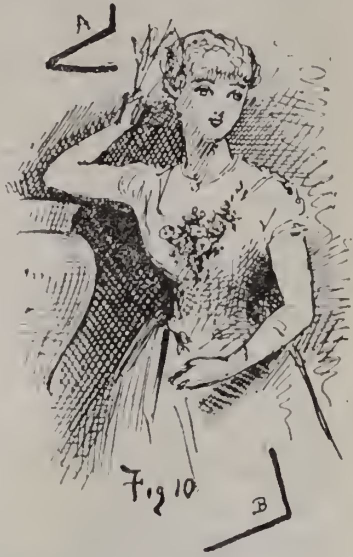


Fig 10

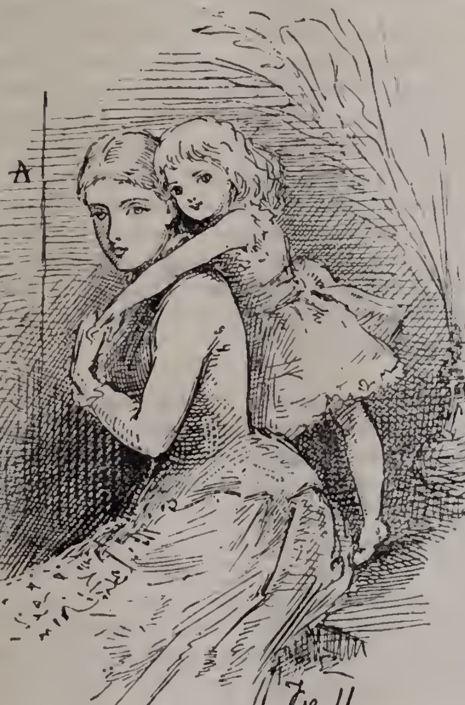


Fig 11

But the greatest defect in this picture is the thoroughly inartistic character of the background. It is so flat, so little indicative of surrounding space and air, so weak and ineffective in its light and shade, giving a poor, commonplace effect to what might well have been one of the most forcibly attractive and charming pictures in the Exhibition. In the hands of Mr. H. P. Robinson, I can easily imagine that such happily secured and sympathetic models would have produced a very superior production—a picture richer in colour, bolder in relief, rounder and more forcible in modelling, &c., &c.—without losing any of those tender and delicate effects of feeling and expression which now constitute the photograph's best features. The plant in

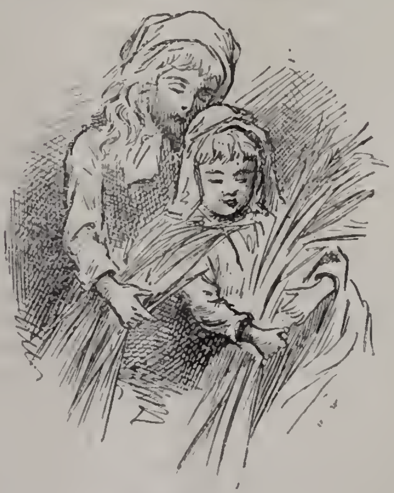


Fig 12

the background on one side, the conventional ornamentation lines on the other side, the table, curtain, &c., are not sufficiently subordinated ; no outlines melt softly away into obscurity—important or unimportant, all are defined with equal distinctness ; no brilliancy is given by cleverly contrasting tones ; there is no principal light, no subordinate parts—in short, no composition.

Fig. 12 is a hasty jotting from a specimen of the old-fashioned make-belief photographs which once were common, and which is also exhibited here. It shows a couple of children pretending to be asleep, in very unlikely attitudes, and there is an utter want of subordination of any one part to any other part, unless the wheat-straw is intended to be dominant, the hero of the composition—or want of composition.

Here I must pause, and if I have somewhat boldly expressed my opinions, remember, please, that in these papers I must be critical—or nothing ; but no harm will be done. The reader can take my hints and suggestions at his own valuation, and apply them or not, in his practice, accordingly. One hint, at any rate, will be worth his having : it is by no means a new or bad plan to translate the leading forms of a picture into lines as I have done, for then you may see, with greater ease and certainty, how they compose—whether they group, or stand single and isolated ; whether they lead the eye into or out of the picture ; and in what way they serve the general aim or design. There is no part of a picture, remember, however obscure or subordinate, that may not be made to play its part in strengthening the general effect, and especially in emphasizing the sentiment or feeling.

While the Exhibition remains open, I fancy we may make a very good use of it by blending our studies in this way, so I shall, in my next paper, return to it.

Notes.

Our supplement this week is a reproduction from one of a series of interiors of Belvoir Castle, by F. W. Broadhead. Technical excellence is by no means so commonly achieved as it is sometimes assumed to be, and this series possess technical excellence in a high degree. Profuse decorations, no doubt, afford a favourable opportunity for photography to show its powers, but the manner in which these details are rendered in the picture before us, and particularly the clearness with which the pictures right and left of the saloon come out, are worthy of notice

How much better it would be to trust to good genuine photography and natural perception of the beautiful, than to assumed artistic ability, to improve pictures by "dodging," is well illustrated in many of the landscapes shown. A number of pictures at the present Exhibition that would otherwise be really good, if not quite first-rate, are damaged by the manner in which it has been attempted to "improve" the sky. Near foliage and objects belonging to the front plane of the picture naturally stand out in strong relief wherever they cut across the sky. This force in foreground objects is so well recognised, that it would seem unnecessary to refer to it, but for the fact that it is destroyed in so many of the photographs at Pall Mall by the way in which these objects have been first weakened by shading them off while printing, so as to get a white ground upon which to print an artificial sky, and then the lights on these foreground objects are toned down with this artificial sky ; an unnatural, weak, insipid production is the result. It is to be hoped that those exhibitors who have indulged in the practice referred to will learn something by comparing with their work the fine examples of landscape of which there are, happily, many in the exhibition room.

The weekly display of lantern-slide photographs which is held during the continuance of the Exhibition was, last Monday evening, worthy of the Photographic Society of Great Britain. The slides, however, were, with one exception, the production of the members of the Amateur Field Club. We do not propose to make comparison where all were good, but in one point that is worth remark, freedom from those small blemishes which—unnoticed in a small plate—attain formidable dimensions upon the screen, Mr. Seymour Conway's exhibits were particularly commendable.

The show upon the previous occasion was not of the same general high character ; and with respect to some of the slides it is difficult to understand why the visitors should be kept in darkness, and prevented from inspecting the pictures round the walls, whilst these slides were thrown upon the screen. The remarks, such as "hurry them along," which reached our ears, were not calculated to uphold the dignity of the Society. There was, however, one really fine set shown, and as each exhibitor will recognise this criticism as intended for his own productions, none will take offence.

The setting in of cold weather brings with it a change of conditions too apt to be overlooked by those already acquainted with the fact, and quite confusing to those who experience it for the first time. The effect of temperature upon the action of pyro and ammonia developing solution is very great, so that in warm weather it is necessary to cut down the proportion of ammonia to a minimum. Per contra, when the dark room is very cold, the quantity of ammonia required to develop a negative in a reasonable time is increased ; and the photographer who does not take this into account is apt to think that he has under-exposed his plate.

Another trouble that not unfrequently arises with the coming of winter is a slight deposit of moisture upon the lenses, scarcely enough to be noticed, but sufficient to produce a certain amount of fog upon the plate. This evil most commonly occurs when the lens is brought from a cold place into a warm one, and is more likely to occur with the first pictures of the day, before the temperature of the instrument and that of the studio have been equalised, than afterwards. The obvious remedy is to slightly warm the lens, or to keep it at night in a warm closet, instead of a cold, damp one.

To Rome should be directed the steps of him who wishes to see photography at its very worst ; and we cannot be surprised at an artist who has here received his training being strongly prejudiced against photography and photographers.

The views of the ancient monuments are—taking them on the whole—execrable, the efforts of the photographer having been apparently directed toward framing each subject as neatly and symmetrically as possible within the limits of a sheet of paper; but in doing this he is only catering for his Philistine customers, who are mainly tourists from the United States and England. The work of the portrait photographer in Rome is also bad, retouching being not only carried to an extreme, but very badly done; and what makes matters worse is the circumstance that almost every portraitist of note has in his show-case a photograph of a peasant woman of the Campagna in an attitude so awkward, so ungainly, and so uneasy, as to at once suggest the idea of the model being hastily called up into the glass house and posed out of all naturalness.

Speaking of Rome, we refer to the deep feeling of disappointment expressed by almost every one on first entering into the city; that which first strikes the visitor being streets of shops and houses which are a cross between those of Paris and Turin, but with a strong dash of London. When, however, he has wandered in and about the Forum and the Colosseum, and paused several times before the temple of Minerva—a gem set in the midst of a busy street—he realises that he is in the city of the mighty ones of a bygone time. Perhaps it is in the small and dirty streets, which are rarely visited by foreigners, that one feels oneself most closely in contact with the ancients, for here, in the smoke-begrimed drinking shops, he may now and then meet with examples of the typical Roman face and bearing, as he has learned to know them from the chiselled records; but the scenes in the dark shops and work places of the by-ways appear to be utterly and completely beyond the power of the camera. Rome, if not one of the best places for the photographer, must for many years to come be the school and delight of the artist.

Really well lighted with abundance of electric-arc lamps are many of the large stations in Italy, but more especially does the lighting of the station at Genoa contrast favourably with that of our most brightly lighted stations in London.

During the half hour or so (just past midnight) that the night mail from Milan stops at Genoa, there would in all probability be sufficient time to secure a photograph either of the inside or the outside of the station; perhaps time for both. Many of the English and Americans who travel by this train are accompanied by the camera, and we would suggest the exposure of a few plates. A large aperture should be used, and time economised by having the apparatus ready adjusted as far as possible. It is also possible that a really good photograph of the statue of Christopher Columbus, which stands opposite the station, might be secured, but probably an exposure of over half an hour would be necessary.

That now-a-days the number of actual plate makers is small is a circumstance we noticed not long ago. There are manufacturers of plates on a large scale who do not sell to the consumer, but only to those dealers who supply the plates as being of their own manufacture.

Not long ago one of these wholesale manufacturers of plates made an excellent series of photographs—a series which became famous in a small way—and no less than four of his customers claimed that the views were made on their plates. In the meantime, the real maker had freely stated that they were on plates of his own make This is the result of putting the same plates in the market under four different names, and not one of them that of the actual maker.

On Friday evening, November 13th, the Photographic Exhibition will be specially open for the benefit of the funds of the Photographers' Benevolent Association. The doors will be open at seven p.m., and an exhibition of lantern transparencies will take place at nine p.m. The price of admission will be sixpence.

The Liverpool Astronomical Society fully appreciates the value of photography, and the first meeting of the session was almost entirely occupied by papers on this branch of astronomical observation. The President, Mr. J. Roberts, gave the details of his own and other observers' photographs of the new star in the nucleus of the nebula in Andromeda, pointing out where they agreed, and where they differed. These differences were not easy to account for; and while it was to be expected that hand-drawings should vary, he thought it disappointing to find photographs differing. The different instruments employed, the sensitiveness of the plates, the time of exposure, and the state of the atmosphere, might account for some of this; but it was possible that the nebula itself had changed. A paper by Mr. Gage was also read on the same subject, and a discussion followed, showing the interest taken in the subject. The point as to whether the new star is a portion of the nebula or not still, however, remains unsettled.

At the same meeting an interesting account was given of the photographic charts which are now being taken at the Cape of Good Hope. The whole southern hemisphere will be divided into sixty squares, each one overlapping another adjoining it. Two plates are being taken of each picture, which will make a thousand. The work up to the present has been very successful; it is expected to take three to four years.

The *Lady's Pictorial* has initiated a new departure in fashion plates. Instead of the stereotyped expressionless ladies with the impossible waists, feet, and hands of the fashion artist, the *modistes* themselves have been photographed in the "novelties of the season," and their photographs—forty-eight in number—presented to the readers of the *Lady's Pictorial* in the form of an autumn supplement. We took the opinion of an experienced lady on the subject, and gather from her that the result is satisfactory and not satisfactory. She gets, she says, a better idea of the dresses, but thinks they are spoilt by the faces. This is a severe judgment upon the unfortunate young lady dressmakers, but we are bound to say there is some truth in it. The faces, with but one or two exceptions, are as expressionless as those of the fashion artist. They are nearly all of the same type, and that type not a particularly fascinating one. We do not know why ladies connected with the dressmaking profession should have large straight mouths, but, according to the forty-eight photographs now before us, this is the rule almost to a woman. The face certainly detracts from the costume, and divides the attention, and it is doubtful, on the whole, whether the new departure is an improvement.

Messrs. Scott and Hopkins, of St. Thomas, Ontario, secured an excellent photograph of the dead elephant—Jumbo—as he lay by the side of the railway line on which he met his death. The proportions of the dead Colossus are truly mammoth-like, and make the man who, for comparison, is standing by poor Jumbo's shoulder, look a mere dwarf. An elephant never lies down when living, or we should perhaps better appreciate its colossal proportions.

Patent Intelligence.

Applications for Letters Patent.

12,621. James Sturrock and Marion and Co., 53, Chancery Lane, London, for "Improvements in photographic cameras."—21st October, 1885.

12,646. Edward Marlow, 4 and 5, Arcade Chambers, Corporation Street, Birmingham, for "Improvements in attaching the lenses to the 'instantaneous shutters' of photographic cameras."—22nd October, 1885.

13,748. Warwick Brookes, 4, St. Ann's Square, Manchester, for "Improved apparatus to be employed in printing photographic vignettes."—24th October, 1885.

12,806. James McGhie, 47, West Nile Street, Glasgow, for "Photographic washing apparatus."—26th October, 1885.

12,809. William Henry Tuck, Clune Vale, Stockwell, London, for "Improvements in mounts for photographs."—26th October, 1885.

Specifications Published during the Week.

16,087. Charles Sands and John James Hunter, both of 20 Cranbourn Street, Leicester Square, in the county of Middlesex, Manufacturers of Photographic Apparatus for "Improvements in photographic cameras."—Dated September 1st, 1885.

Our improvements in photographic cameras relate first to a compound rack motion which affords a greater range of motion and a more rapid adjustment than the ordinary simple rack motion, and enables the adjustment for focussing, either for a long or a short focus lens, to be quickly performed without change of gear, and without an undue projection of the tail board, when the front and back of the camera are brought close together for a very short focus lens.

It relates secondly to the mode of folding the camera for transport. The claim is—

1. A photographic camera wherein the body and front are both mounted on slides working past one another, and are moved in opposite directions at the same time by the focussing motion.

2. A photographic camera wherein the body and front are mounted on separate sets of slides working past one another side by side in the base board, and moved in opposite directions at once by rack and pinion gear.

3. A photographic camera, wherein the body is pivotted removably in its cradle or other support, and is arranged to swing on radius links and fold down on the base board with the focussing screen downwards.

17,002. Alexander Melville Clark, of the firm of A. M. and Wm. Clark, of 53, Chancery Lane, in the County of Middlesex, Fellow of the Institute of Patent Agents, for "Improvements in photographic apparatus" (a communication to him from abroad by Henry Correja, a citizen of the United States of America, at present residing at 25, Avenue de Villiers, Paris, France, Artist.—Dated 7th September, 1885.

This invention is designed to be used in connection with a photographic camera for taking instantaneous views, and has for its purpose the placing of the object to be taken with unerring certainty in the centre of the sensitive plate, and by it I am enabled to take, with increased facility, pictures of objects while holding the camera in the hand or even in the act of walking, and by a camera fitted with it, and with a drop shutter, pictures of moving animals, and groups of people in crowded cities may readily be taken without causing any obstruction and without even attracting attention, so that groups thus unconsciously photographed are true to life and free from stiffness or pose, which are very desirable artistic qualities.

The invention mainly consists in a laterally arranged and adjustable independent tubular attachment to the camera, having its forward end near the lens of the instrument, and fitted internally at or near said end with horizontal and vertical strips or cross hairs, arranged to cross each other at right angles in the centre of the tube, so as to divide the field in the tube into four equal parts, and provided at or near its rear end with two similar cross-strips or cross-hairs, arranged diagonally relatively to the cross-hairs at the forward end of the tube. This device, which is intended for sighting by the operator, I term a "finder," inasmuch as by it I find, by sighting through it, the exact period at which the drop-shutter should be operated to place the object in the centre of the sensitive plate without any focussing of the camera when taking the picture. In connection with this attachment, or for use in concert therewith, the ground glass of the camera has pencilled or marked upon it lines corresponding, as regards arrangement, with the horizontal, vertical, and diagonal cross-hairs of the attachment.

The claim is—

1. The combination with a camera for rapid or instantaneous photographing, an attached sighting tube arranged outside of the instrument, provided with cross-hairs or strips dividing the field within it, and adjustable relatively to the camera, to properly place the object on the sensitive plate of the camera as it appears in corresponding position on the field within said tube.

2. The finder or tubular attachment, constructed with vertical and horizontal cross-hairs or strips at or near its one end, and diagonal cross-hairs or strips at or near its opposite end, for use in connection with a camera adapted to produce rapid or instantaneous photographing.

3. The ground glass of the camera, having vertical, horizontal, and diagonal pencil or other marks upon it, in combination with the tube adjustably connected with the camera on its outside, and provided at or near its one end with vertical and horizontal cross-hairs or strips, and at or near its other end with diagonal cross-hairs or strips.

4. In combination with the camera the tube, with its vertical, horizontal, and diagonal cross-hairs or strips, arranged as described, and the adjusting slotted bars.

16,334. Samuel Dunseith McKellan, of 18, Brown Street, Manchester, in the County of Lancaster, Jeweller and Watch Manufacturer, for "Improvements in photographic cameras."—Dated September 11th, 1885.

My invention relates to improvements in the method of attaching the camera body to the base board, and is for the purpose of affording greater facilities in the adjustment of the camera body on the base board when in use, and its position relatively with the camera front and lens.

In applying my invention for the purpose as above described, I attach, to each side of the base board, a side plate. Each one of these side plates is constructed with a wing, to which is fixed a pin, and upon these pins the camera body is pivoted. One of these side plates may be firmly secured to one side of the base board by wood screws or other suitable means. The other, or opposite side plate, is made longer, and is formed with slotted holes running horizontally; I attach this side plate to the side of the base board in any suitable manner—preferably by means of screws passed through the said slots and screwed into the base board. These screws have milled or other suitable heads to enable them to be tightened at discretion, and the backward and forward position of this side plate can, by these means, be determined according to the will of the operator; the stretcher supporting the camera body on this side is attached to this side plate and moves with it; thus, the camera body being pivotted between these two side plates—one of which remains stationary, and the other is moveable in a horizontal direction—the camera body can, by these means, be placed out of a parallel position, one side being either nearer to, or further from, the front board and lens as may be desired. If preferred, in lieu of one of the side plates being fixed by wood screws to the base board, both side plates may be formed with slotted holes working in adjustable screws.

The claim is:

In a photographic camera, the use of side plates suitably attached to the base board, and between which the camera body is pivoted, one or both of such side plates being arranged to move forward or backward for the purpose of placing one side of the camera body nearer to, or further from, the front board.

Patents Granted in America.

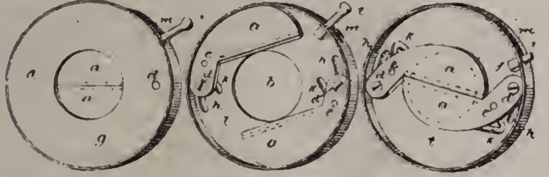
327,980. David O. Adams. "Camera Shutter." Columbus, Ind. —Filed January 5th, 1885. (No model).

Claim.—1. In a camera-shutter, the flat case having a central opening, the curved slides pivoted to said case on opposite sides of and arranged to cover said opening, and the curved bar pivoted to said slides.

2. In a camera-shutter, the combination, with the case, the curved slides pivoted thereto, and the bar pivoted to said slides, and having the arm of the pneumatic cylinder, the piston and piston-rod moving in said cylinder and connected with said bar.

328,033. David S. Hitchcock, Cleveland, Ohio. "Camera-Shutter." Assignor to the Hitchcock Shutter Manufacturing Company, same place.—Filed September 11th, 1884. (No model).

Claim.—1. In a camera or other optical instrument, the combination of the shutter-valves *a a'*, the movable plate *l*, the lever *i*, the slots *k k'* and *h h'*, and the case *g*, with its cover, or their equivalents.



2. The shutter-valves *a a'*, plate *l*, lever *i*, slots *k k'* and *h h'*, and case *g* with its cover, and the attachment-band *p p'*, the cap *c*, the arm *r*, the bar *s*, the spring *z*, the spring *o*, the screw *v*, the nuts *t t'*, or their equivalent, all combined with the tube of a camera or other optical instrument.

3. The movable circular plate *l*, of any size required, made of thin metal, or other suitable metal, having a central opening of any required size, a lever or other device to move the plate; and slots *h h' k k'*.

4. The diaphragm-plates E E' F F' with collars, the pinions G G G G, the plate D with ratchet-teeth I I' H H', the lever A, the case C, and its cover.

5. The diaphragm-plates E E' F F', of any required size, made of thin metal or other suitable material, having a raised collar and pinion on the under or upper face of each, as may be required, to allow said plates to pass each other when revolved.

6. Two or more diaphragm-plates, each having a raised collar and pinion, combined with a movable circular ratchet-plate of suitable size and material, with circular opening, ratchet-teeth, and lever.

7. The combination of one or more diaphragm-plates with pinions and a movable ratchet-plate.

8. In a camera or other optical instrument, the shutter-valves, the movable plate with its lever and slots, combined with the diaphragm-plates, the pinions, the movable ratchet-plate, the lever, and case.

328,431. Thomas C. Roche, Brooklyn, assignor to E. and H. T. Anthony and Co., New York. "Photographic sensitive paper." —Filed December 24th, 1884. (No model).

Claim.—1. As an improved article of manufacture, a prepared sensitive photographic paper or other flexible support, made as herein described, with two separate sensitive faces of gelatine-silver-emulsion.

2. In photographic papers, the combination, with the body of the paper of the two separate films of gelatine-silver emulsion.

3. A photographic sensitive paper constructed with the body of the paper, inclosed between two sensitive films of gelatine-silver emulsion.

4. In a photographic paper, two separate sensitive films of gelatine-silver emulsion, supported and carried upon a single sheet of paper.

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PHOTOGRAPHY IN A HOUSE-BOAT.

(Being the Record of a Day's Experience.)

They were a party of amateur photographers on board a house-boat up the river. "Come down," said Jones, the instigator of the party, "and see us at work. It may amuse you."

I went, and it did amuse me.

The party was four in number. Of these, Jones only knew anything of photography practically—he had, it seems, had half a dozen lessons, and he gave himself airs on this account. The others were assiduous students of all the manuals published, but had not derived so much benefit as might have been expected, since they did not agree on a single point. They also differed from Jones, the practical. This made things lively, but I fancy rather impeded their advancement.

In the first place, they quarrelled over the dark-room. Brown was bitten with the idea of green glass; Jones would hear of nothing but cherry fabric; Smith was wedded to canary medium; while Bagshaw hotly declared in favour of the old-fashioned ruby glass. They compromised the matter by using all four. The dark-room was consequently as dark "as they make 'em," but then it was so safe.

They had the same difficulty about the developer. When the question was first mooted, Jones attempted to settle it by exclaiming, in an off-hand manner, "Why pyro and ammonia, of course. I've never used anything else."

"Then how can you give an opinion on the others?" retorted Smith. "All the manuals recommend the ferrous oxalate. It keeps no end of a time, and there's no bother with it."

Brown's weakness was a craze for new discoveries, and he suggested "hydroxylamine."

"I don't believe in new-fangled notions. I never heard that a developer could be made out of any of the aniline colours," said Bagshaw.

"I didn't say hydroxaniline. It's a pity, Bagshaw, you don't keep yourself posted up in the latest improvements. You wouldn't then be so lamentably ignorant. *You've* heard of the hydroxylamine developer, of course, Jones."

"Oh, of course; I've tried the hydra-thingamy, but I don't care much for it," said Jones, hastily.

Jones' manner was painfully suggestive of the suspicion that he knew nothing of the new developer, but the others could scarcely tell him so.

"Anyhow, I shall go in for that which gives the least trouble. Shall buy the developer ready mixed," said Bagshaw.

Bagshaw's method was denounced as "awfully unscientific," and Jones and Brown deluged him with formulæ, but all to no purpose.

Finally, it was decided that each man use his own developer, and they consequently had bottles labelled with their respective names.

But the worst discussion was over the dry plates, and as it was found impossible to determine whose make was the best, they put the names of the manufacturers into a hat and fixed upon the first one taken out.

Their "kits," or "apparati" as Brown, with absurd pretence, would persist in calling the cameras and appurtenances, were various and peculiar. Jones, as became a man who had had lessons, had gone in for a brand new camera of diminutive size and of extraordinary cheapness. Brown had also a new one, but with several additional improvements of his own invention; Smith had borrowed one from a friend, and Bagshaw had a large "universal" capable of taking pictures from 15 by 12 to quarter plates, which he had picked up somewhere at a sale.

I discovered, when I arrived on board, that as they were going in for mutual improvement, they had agreed to start a sort of competition—that is to say, they were to see who could take the best picture of a given subject; and as they happened to be moored near Hampton Court, the Palace was first chosen as being an easy thing to commence upon.

The dark room, being necessarily of limited size, one person only could enter at a time. It was built out of string and brown paper, and looked about as big as a sentry box. They accordingly tossed for precedence; and Jones, winning the toss, entered and proceeded to put a plate in the dark slide.

Jones comes out looking rather hot and excited after being absent quite a quarter of an hour.

"Beastly nuisance. Plate just the least bit too big for the slide. I've forced it in, but goodness knows how I'm to get it out."

"I told you so," remarks Brown, complacently; "you *would* buy the cheapest apparati you could find, and it serves you right."

Jones does not reply, but goes outside, where he finds the entire available portion of the house-boat deck occupied by Bagshaw's universal camera, the legs of which are of abnormal length.

"You'll have to move this, Bagshaw, you know."

"Can't you put your little quarter-plate camera in between the legs of mine?" asks Bagshaw from beneath the focussing cloth.

"Quite impossible. Don't I want to move about so as to get the best view?"

"But this camera of mine is so confoundedly heavy."

"Well, you shouldn't have bought such a clumsy affair. It's not fitted for out-door work at all. Why, it hasn't got a bellows body, even."

Bagshaw points out that it's all right when once it is fixed, and that was why he thought he would utilise the time while Jones was in the dark room. However, as Jones positively declares that he can do nothing unless it is removed, he does remove it under protest and with much labour.

Jones now commences to select his point of view, which he does by planting his camera at intervals all over the very small deck of the house-boat. Apparently he is not satisfied, for he glances at the roof, but evidently "funks" the conspicuous position. As it is, he has been insulted by an offer of sixpence from a river 'Arry, who wants him to take a "photo" for this paltry sum. However, he finds it necessary to make up his mind, as Brown, Smith, and Bagshaw are anxious to have their turn, and are urging him to "look sharp."

He focusses and prepares to make the exposure. As he is about to do so, two pretty girls in ravishing boating costume approach. The temptation to pose as a past-master of the art is irresistible. He throws the weight of his body on one leg, places his left hand at his hip, with his right seizes the cap, snatches it off, gives it a graceful flourish in the air, and replaces it. It is very much as if he had said, "Ladies and gentlemen, there is no deception; I have nothing up my sleeve, I have no confederates. This is how it is done."

"You'll have hard work to beat the view I've got," he remarks triumphantly, as he passes Brown, Smith, and Bagshaw, on his way to the dark-room.

He disappears, and Brown, Smith, and Bagshaw, wait patiently for the result. He is away five, ten, fifteen, twenty minutes; and Bagshaw, who has next turn, raps impatiently at the door of the dark-room.

"Can't come out just yet," Bagshaw hears a stifled voice reply. "This is a slow plate."

"A slow plate," retorts Bagshaw; "I thought you used only rapid instantaneous ones."

"I mean one that is slow in developing. Do go away, please. You only bother and confuse me; I'll open the door as soon as ever I see the detail well out."

Five-and-twenty, thirty, thirty-five minutes pass, and Jones is still secreted in the dark-room. Brown, Smith, and Bagshaw are debating the propriety of bursting open the door.

"We made a great mistake," Bagshaw declares; "each of us ought to have put our plates in the slides first of all. As it is, we have to wait until Jones chooses to finish developing."

"He's been an hour all but five minutes over it," says Brown, consulting his watch. "I never heard of a plate taking so long."

Just as they begin to think Jones has been asphyxiated by ammonia fumes, the door opens, and he comes out. He has a very dissatisfied look on his face, and apparently no picture on the glass he holds in his hand.

"I can't make it out," he says; "I gave plenty of exposure, yet there isn't a ghost of an image. It must be the fault of the plate. I told you Biddlecombe's plates were no good."

Up to the present I have held aloof from the discussion, but I now venture to put in a word.

"Excuse me, Jones," I say apologetically, "but I do not think the plate is in fault. I was watching you the whole time, and in your anxiety to strike an effective pose for the admiration of the two young ladies, you forgot to draw out the shutter."

(*To be continued.*)

THEORY AND PRACTICE OF PHOTOMICROGRAPHY.

BY MAURICE N. MILLER, M.D.*

Now we may place our object upon the microscope stage. The heliostat has been steadily following the sun, and our light requires no adjustment save an occasional touch of the secondary mirror. The light passes through our first cell, and the water absorbs the heat and renders it safe to our valuable objects and objectives. Remove the eye-piece, and, bringing the camera-frame into position, proceed to make your adjustments. We find that, standing by the microscope, the ground-glass frame perhaps two feet away, the image appears very weak and faint. This is because the light is absorbed by or passes through the ground glass. Inasmuch as preparatory, yes, final adjustments are made while we are at the microscope and not at the camera, we place a piece of white cardboard in front of the ground glass, and projecting the image upon that, it is seen clear and distinct. We can remove our blue cell, as we do not require it just now, and proceed with the mechanical stage to find the portion of the object we wish to reproduce. Let me here observe that a good slide of dried human blood makes a splendid object to begin upon, as it will quickly show faults of lighting. This is the time to look out for internal reflections: remove the draw tubes and varnish the inside of the tube with good negative varnish. When it becomes tacky, allow the smoke of a kerosene lamp with the wick terned up, and the chimney removed, to coat the varnish surface; or line the tube with paper so varnished and smoked. So cover every surface that you regard as liable to prove troublesome.

Well, everything about the image on the paper screen appears as it should, and we are now prepared to complete the focussing, yet hardly so, for after having replaced our blue cell, shut the microscope in, and move our position to the ground glass. We find we cannot reach the milled head to the fine adjustment of the microscope. So we require to fix a little grooved pulley to our shelf which shall carry a light gum-elastic belt over the milled head of the fine adjustment. The latter should also be grooved to receive the belt. To the axle of our grooved pulley is attached a light rod which passes back to the camera. Now we can assume our photographic position and finish the focussing.

The question will be asked, "How far distant should the ground glass or sensitive plate be from the microscope?" To this question only a general answer can be given. The only thing gained by distance is amplification. And just here you must appreciate the difference between amplification and magnification.

If you desire increased detail in your picture you can only secure it by using higher power in the objective. Do not attempt to make great blurred images by removing the sensitive plate to a great distance. With your screen at a distance of two feet from the microscopic stage, employing a first-class one-eighth inch objective, you may get from 800 to 1,000 diameters, ample for your twelve months' work. Indeed, I would advise beginning with a good quarter-inch objective and about eighteen inches distance.

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* Continued from page 623

In ordering our steps, you may have noticed that I removed the eye-piece, and I mean to keep it so removed. I have never seen an instance where the introduction of the eye-piece was desirable; and I have seen a great many errors and imperfections introduced by the employment of it. If, however, you will insist on using the eye-piece, let me caution you—see to it that no speck of dirt, however small, remains on either lens, for the slightest fleck of dust is sufficient to make an ugly mark on the negative. This precaution should prevail with the mirror surfaces as well. Let them be thoroughly cleaned before commencing your day's work.

Now, how long shall I expose? No earthly intelligence can answer this question for you. You will, after a time, be able to look at the image on the ground glass, and judge with a considerable accuracy as to the length of exposure; and it is just this experience alone which will enable you to so judge. With our present facilities, and with moderate amplification, the drop-shutter can be used—although it is better to diaphragm down the light and expose longer. The best exposer is a little flap of velvet hanging over the eye-piece end of the microscope tube, as it may be lifted and the exposure made without danger of disturbing the adjustments. When it is not required it is turned aside, and so held by a hook-and eye.

Now, in what way can we modify our apparatus, and lessen the expense without materially affecting the final result?

I am perfectly assured of one thing: for results that will prove satisfactory to the conscientious amateur, I believe that the darkened room cannot be dispensed with. Anything short of this is shaky and unreliable, besides tedious, in consequence of the endless running to and fro, from the stage of the microscope to the screen of the camera.

With our gelatine plates, for a very large range of work, the heliostat can be dispensed with. It is a luxury, and indispensable if very long exposures are necessary. But a great deal of work can be done with the secondary mirror alone, although the constant adjustments are tiresome.

The next absolute luxury—and this is purely so—is the expensive mechanical stage. If the student is prepared to draw liberally on a very large stock of patience, the mechanical stage may be omitted. The modern glass stages, moving, as they do, easily, and with ready control, answer fairly well for the more expensive attachment.

The centering sub-stage for first-class work cannot be spared. Much low-power work can be fairly done with a plain sub-stage, however. (*To be continued.*)

Correspondence.

A GOOD SODA DEVELOPER.

Dear Sir,—Does Mr. Wilkinson mean *bi*carbonate ($NaHCO_3$) of soda? as he says *Howard's* make. He calls it *carbonate* ($Na_2CO_3 10H_2O$); I never heard of this as Howard's.—Yours faithfully, An Old Amateur.

Proceedings of Societies.

Photographic Society of Great Britain.

A technical meeting of this Society was held in the Gallery, 5a, Pall Mall East, on Tuesday last, the 27th inst., Captain Abney, F.R.S., in the chair.

The Chairman having stated that improvements in apparatus exhibited on the tables would be explained, called upon the following gentlemen, or their representatives, for short descriptions of the novelties claimed.

H. and E. J. Dale showed the action of their "patent adjustable shutter," with pneumatic regulation for timing exposure. Either one of a series of holes, situated at the top of a metallic tube, permitted an escapement of air—the larger the hole the quicker the action of shutter. The multiplex back and camera previously described were then shown, as well as an adaptation of the electric light for dark-room and developing purposes. A couple of five Volt lamps were used, one white and the other ruby, 3-candle power being obtained. The battery was said to be capable of running three months; it was a form of potassium dichromate in which the second liquid employed was ammonium or other chloride.

The Chairman enquired how long the battery would work without polarisation, and he was informed that something like twenty hours' work might be expected from the cells, and that amount of energy could be extended over three months.

Lieut.-Col. C. D. Durnford's printing-frame was then shown. It resembled the back of an ordinary printing-frame, the springs being arranged to clip over the edges and secure a negative firmly on the inside.

W. J. Stillman explained the action of the Eastman-Walker roller slide and film-carrier, a detailed description of which will be found on page 324 *ante.*

E. Cocking spoke of the desirability of an indicator other than the present, which causes four distinct clicks to be the signal; and, in reply, he was informed that the Eastman Company are now adding a visible signal to their roll-holders.

T. Samuels remarked that he had noticed certain marks in negatives made by means of the roller slide which did not appear when cut films were used, and he thought that they arose from the great tension put upon the rollers.

The Chairman had seen similar marks in some negatives shown him by S. G. B. Wollaston.

Twenty-four negatives, 8 by 6, the result of as many exposures on one band of paper, were then shown, and these Mr. Stillman said had been made by himself without a failure. He doubted whether he could have done so well with glass plates.

The Assistant Secretary next explained a new actinometer, in which the illumination was reduced to the deepest shadows in the camera.

T. Furnell showed a new instantaneous shutter, the advantages being that the exposure to the foreground could be increased and the sky diminished at will; long or short exposures could also be given.

The "New Simplex Camera" of Hopkins Bros. was next called attention to. In this instrument the dark-slide fits on the top of camera, and the plate is pushed down into position by means of a rod. There is a convenient plan of disposing of the focussing screen when out of use, and the camera possesses all the swing movements, while a half-plate specimen shown ranges from about two and a-half to sixteen inches in focus.

Mathew Whiting's "Patent Lantern Slide Holder" followed. In this ingenious contrivance, most readers will remember, Mr. Whiting has two boxes or hoppers attached to the carrier proper. The slides are pressed into the carrier by means of a spiral spring, and after passing through the lantern are safely packed into the second box.

The Patent Combined Camera Back of H. Mader, for use with a metallic plate envelope instead of slides, was next shown; the envelopes seemed very handy, and were said to be quite safe as regards light.

Marion and Co.'s exhibits were described by E. C. Spickernell. They comprised a new shutter, by Cadett, for various exposures, which was set by winding up a spring. The Middlemiss patent camera, the focus of which extends from 5 to 30 inches, followed, the short focus being obtained by an ingenious plan of bringing the back portion forward. Then came an explanation of their print-washer, with porcelain trough, which was said to wash prints perfectly in half an hour. The compacta camera and envelopes for the same followed. These latter were exceedingly light, and will, no doubt, find favour with tourists. The camera is reversible, and has both a side and back swing.

Wollaston's diaphragmatic shutter was then shown by the inventor, and he stated that he could regulate the speed to anything between $\frac{1}{150}$th of a second to upwards of eleven minutes. In twenty trials the variation had not been $\frac{1}{10}$th of a second.

The Chairman enquired if it would be necessary to have more than one shutter for a series of lenses; and, in reply, it was said that most of the usual rectilinear type of lenses, especially Ross' working up to 8 by 10 plates, would answer for the shutter he was showing.

Urie's automatic exposing apparatus was next described by Marion and Co. The "Alpha" paper passes from one spool to another, and in so doing is mechanically clamped under a negative for the space of ten seconds. At the same moment that clamping takes place two gas jets are turned up, and the light passes through a glass dish, containing water, to the negative beneath. At the expiration of exposure that portion of paper is wound on to the spool of exposed paper, and a fresh surface takes its place.

W. W. Rouch showed his new square camera, in which one striking novelty was observable, namely, the front and back being reversible. By a kind of folding-up movement, the lens can be raised or lowered to any portion of the plate.

The Chairman said he could not help admiring the great ingenuity displayed in the production of cameras.

T. Samuels drew attention to a camera which contained four screws including that of the tripod, and it was also made suitable for paper work should it be so required. The dark-slides were of the solid box pattern fitted with draw-out shutters, and the grooves were sufficiently wide to admit of the slide being placed in front of the focussing screen. This gentleman also showed the action of his changing-box, and several other novelties.

Fox Shew explained the construction and working of a new shutter possessing certain advantages. He also showed a very compact 8 by 6 camera which contained some very neat movements. A plan of utilizing portions of a large plate was also much admired.

J. Copeland and Co. also showed several of their exhibits, among them a valise arranged for changing plates, developing, &c.; a very compact camera containing several movements; a new burnisher, in which the tool was somewhat rounded; two forms of pneumatic shutters, which were not novel; and a convenient box for carrying a two-cell dichromate battery with incandescent lamps attached.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 22nd inst., J. Traill Taylor in the chair.

A. Cowan showed a gelatino-citro chloride positive, made in February 1883, and referred to at the previous meeting. It had been fixed without toning, and he thought disproved the statement of H. S. Starnes concerning black images.

The Chairman said that the transparency in question was unmistakeably warm brown in colour.

A short discussion followed, in which W. E. Debenham pointed out that the colour of the image after the action of the fixing salt upon silver citrate was the real question at issue; and A. L. Henderson was of opinion that any image formed with silver citrate would be of a foxy colour when fixed, unless previously toned with gold.

A. L. Henderson then passed round the sixty-seconds exposed negative, taken on the last occasion in the Society's room, by means of the ordinary gaslight. The lens used was one of Suter's for 9 by 7 plates, open aperture.

The Chairman characterised the result as wonderful, and one which led him to think the time was fast approaching when pictures could be regularly made by ordinary gaslight.

W. E. Debenham thought it remarkable that even so much as was seen upon the plate could be obtained under the conditions as they existed. What he thought more remarkable was that a transparency showing so much detail could be obtained from such a negative.

Transparencies in wet collodion, and by the exhibitor's formula on page 398, were also shown.

The Chairman then announced that Messrs. Burton and Henderson being present, they would test whether or not supplementary exposures would increase the sensitometer reading of gelatine plates.

The Hon. Secretary having provided these gentlemen with two packets of a well-known commercial plate, A. Cowan and A. Pringle were by general consent invited to act as umpires. Two preliminary plates were exposed to a very weak light (the ordinary night-light), situated about fifteen feet away, and portions of each plate were acted upon for periods of 5, 10, 15, 25, and 30 seconds respectively. Some disappointment was caused owing to no provision having been made for development, and these interesting experiments had to be deferred until the next meeting.

The Chairman observed that many years ago the importance of this subject was recognized by Winstanley, who took out a patent for giving a preliminary exposure of wet plates to a standard candle.

A. L. Henderson replied that Winstanley's agent called upon him to sell a licence, and they exposed plate for plate, with the result that the agent admitted he was beaten.

W. E. Debenham then referred to the "Scotellari cap," which was intended to apply the principle of auxiliary exposures to camera work. He however did not and had not recommended auxiliary exposure to be actually employed, but had spoken of its effect in giving a higher sensitometer number without giving a corresponding increase of sensitiveness in the camera.

A. L. Henderson again drew attention to the packing of plates, eight of which were shown separated by two clips of tinfoil. He suggested pieces of foil wafers for attachment to the corners of the plates; and in reply to Mr. Burton, said that sheet lead would be more difficult to handle.

J. Barker, referring to auxiliary exposure, was of opinion that any light which reached the plate would produce an image if it could be developed, and he hoped three or more forms of development would be used in the experiments next week.

W. H. Prestwich spoke of a mixture which was said to accelerate, and he promised to try it before the next meeting.

A. L. Henderson had already tested it, but did not find any advantage. He had pitted another commercial mixture against one of his own, and it was impossible to distinguish between the two negatives, which were of splendid quality. He took about 30 minims each of a forty grain solution of sodium carbonate, potassium carbonate, and saturated sodium sulphite. These were added, with two grains of pyrogallol, to one ounce of water.

The Chairman remarked that J. Stuart, of Glasgow, recommended a similar developer, and his negatives were of a remarkably fine colour. In reply to a query, he said the favourite developer in America was a mixture of sodium and potassium carbonates, with sulphite and pyrogallol, very little or no bromide in a general way being required.

Iron development then became the subject of conversation, owing to Mr. Henderson mentioning the solubility of its oxide in the strong alkali, caustic potash.

A. Mackie referred to Dr. Eder's communication, page 659, and several members gave their experiences in this method of reducing; upon the whole, Farmer's plan with potassium ferridcyanide was preferred.

Manchester Photographic Society.

The thirtieth annual meeting of the above Society was held at the Memorial Hall, Albert Square, on Thursday evening, the 8th inst., the President, Mr. J. S. Pollit, in the chair.

The minutes of the previous meeting were read and confirmed.

The Secretary read the thirtieth annual report, of which the following is an abstract:—

"In point of numbers, the position of the Society is considerably in advance of any previous year; no fewer than twenty-seven new members have been added to the roll, while twelve have resigned, and two have been removed from among us by death, making the total number of names now in the list 138 against 130 at the close of last year. The financial position of the Society, notwithstanding some heavy calls upon the funds, is still satisfactory. The average attendance at our monthly meetings has been nearly stationary, being fifty-four against fifty-one last year. As usual, your Council have to regret the scarcity of papers, demonstrations, and other interesting matter at the ordinary meetings. The pictures shown, although not so numerous as had been expected, showed a considerable improvement in the quality of the work done by many of the exhibitors, not only in manipulatory details, but in artistic qualities also, and the Exhibition, as a whole, gave great satisfaction to a large number of visitors, as well as to the members. Among other matters of interest brought before the meetings, Mr. Cheetham showed a dark-room lamp constructed to hang from the ceiling, throwing the light downwards, and having a very simple method of changing the colour of the light. Mr. A. Brothers, F.R.A.S., showed a photograph (taken by Mr. White) of a group of young persons, taken by means of the Ethoxo limelight, assisted by magnesium light. Mr. A. Garnet showed a number of continental views taken during holiday tours, and Mr. Greatorex exhibited a somewhat similar series. At the December meeting, Mr. Charles Harris, F.R.G.S., gave the members an opportunity of inspecting a collection of large photographs of the Yosemite Valley, California, collected by him during his tour round the world, and, with the aid of a number of lantern slides, gave a recital of his experiences, and a description of the magnificent scenery of this remarkable valley. The subject of paper negatives has had the attention of members, several of whom contributed specimens of their experiments in this direction. The lantern has had rather less than the usual amount of attention, but has been duly appreciated whenever used. Undoubtedly the most important event of the session has been the organization of monthly meetings specially devoted to the lantern and appliances connected therewith, and the formation of a special committee for arranging the necessary details. During the summer recess the usual number of outdoor meetings have been held, which, we are pleased to record, have been more than usually successful. Last, though by no means least, your Council congratulate you on the Society's removal to more commodious premises."

The Treasurer's report and balance sheet was placed before the members, and the accounts passed.

The following gentlemen were elected members of the Society :—W. Lancaster, S. Okell, S. Moorhouse, R. B. Wilson, J. C. Milner, and A. Day.

The election of officers for the current year was then proceeded with, resulting as follows :—

President—A. Coventry.

Vice-Presidents—Dr. C. P. Bahin, S. D. McKellen, Abel Heywood, jun., J. S. Pollitt, and John Schofield.

Council—A. Brothers, F.R.A.S., Canon Beechey, M.A., W. Broughton, Thomas Chilton, J. F. Chapman, S. F. Flower, John Dale, L. E. Morgan, Otto Muth, and W. Wright.

Hon. Treasurer—W. G. Coote.

Hon. Secretary—W. I. Chadwick, Prince's Bridge Ironworks, Manchester.

Lantern Committee—W. I. Chadwick (Chairman), John Schofield, W. Watts, Otto Muth, J. R. Greatorex (Secretary).

The first meeting of the lantern section will take place at the Memorial Hall on Wednesday, October 28th, when the chair will be taken by Mr. W. I. Chadwick.

Hyde Amateur Photographic Society.

The above Society held its annual meeting on Wednesday evening, the 21st inst., which was well attended.

The Secretary's report was read, and showed that a very successful and interesting session had passed, and the fact that eight new members were elected at the meeting gave good hopes of a still more successful session to come.

The Society held its first meeting on the 12th of November, 1884, when eight members were enrolled ; since that time the Society has continued to flourish, and now numbers twenty-seven members.

The views taken by members during the season have been very numerous, and it is expected that some good results will be shown at the Society's Soiree to be held shortly in the Mechanics' Institution.

The principal business of the evening was the election of new officers, and the following were elected for the season 1885-6:—

President—F. W. Cheetham.

Vice-President—Dr. G. W. Sidebotham.

Treasurer—George Batty.

Secretary—John Pennington, Great Norbury Street, Hyde.

Committee—Messrs. J. T. Cartwright, John Chorton, Edward McClean, and Herbert Statford.

Short addresses were delivered by the newly-elected officers, and the usual votes of thanks closed the meeting.

The Bury Photographic and Arts Club.

The annual meeting of the above Club was held at the Temperance Hall, on Thursday, October 22nd, Alexander Taylor in the chair.

The minutes of the last meeting having been approved, and the roll of the members read, the following officers were elected :—

President—W. S. Barlow (this being his second year of office).

Vice-Presidents—Alexander Taylor and H. Dearden.

Council—J. Shaw, W. Booth, E. W. Mellor, R. Grundy, and F. Cooper.

Treasurer—John Nelson.

Auditors—R. Grundy and Mr. Copenshaw.

Honorary Secretary—F. W. Livesey.

The accounts having been read and confirmed, the various Committees were then appointed for carrying out the forthcoming Exhibition, which it is intended to hold the first week in December.

Amateur Photographic Association.

The adjourned annual meeting of the Council of this Society was held October 19th, at 25, Old Bond Street, James Glaisher, F.R.S., in the chair.

The minutes of the last meeting having been read and confirmed, the following members were elected :—The Viscountess Milton, Sir William Anderson, K.C.B., L. Ashburner, and Alfred Deed.

The Council having decided that a medal shall be given in future, together with and in addition to each prize awarded, the Secretary submitted Mr. Bassano's design for the same, which was approved by the meeting ; and as the jubilee year of Her Majesty's reign falls next year, Mr. Bassano requested that he might be allowed to present to the recipient of the first prize a gold medal, and his offer was accepted by the Council.

The Secretary then laid before the meeting the pictures for the current year, and Mr. Glaisher submitted his report, of which the following is an abstract :—

The contributions for this year, though not quite so numerous as last year, comprise no less than 164 pictures in the first class, many of which are of special interest ; class 2 contains 120 pictures ; class 3 contains 127 pictures ; the remainder of the pictures are comprised in classes 4, 5, and 6.

Amongst the pictures some merit especial notice. "A flock of Birds," by Mr. Schwabe, is, perhaps, the most remarkable picture ever sent to the Society ; Professor Butler's Alpine pictures are perfect gems ; and Mrs. Hobson, a new member, has at once taken the first rank. Mr. Murray, always good, and this year as good as ever, seems, however, to make no advance ; his old dry process must give way to the more sensitive gelatine plates.

A noticeable fact is the large number of first class pictures that have been contributed by members of the Council, those by Lord de Ros, Mr. Stephens, and Mr. Hobson being especially worthy of notice.

The following prizes were awarded :—1st prize, R. Leventhorpe, a silver medal and silver goblet (121, 130, 134, and 137) ; 2nd prize, Professor Butler, M.A., a bronze medal and silver goblet (2, 5, and A) ; the Right Hon. the Lord de Ros, a bronze medal and silver goblet (1, 3, and 9) ; Mrs. Hobson, a bronze medal and an elegant photographic stand in the form of a fan (9, 11, 15, and 22) ; R. O. Milne, a bronze medal and an elegant cabinet album (7 and 14) ; W. Muller, a bronze medal and an etching after Munkacsy's celebrated picture entitled "Les deux Familles" (4, 5, and 9*a*) ; W. S. Hobson, a bronze medal (313, 316, and 318) ; J. E. Dumont, a bronze medal and silver goblet (168, 195, and 196) ; F. S. Schwabe, a bronze medal and a pierced metal photograph frame (1, 5*a*, and 10) ; A. Tagliaferro, a bronze medal and cabinet album (1, 1*a*, and 7) ; the Right Hon. the Earl of Rosse (a bronze medal and silver goblet (3 and 6) ; Gen. Sladen, a bronze medal and photographic album (3 and 4) ; the Right Hon Viscount Emlyn, a bronze medal and a pierced metal photographic frame (064) ; J. G. Brook, a bronze medal and etching from Munkacsy's celebrated picture "Avant la Fete du Papa" (3, 4, and 6) ; H. R. Moiser, a bronze medal and a photogravure from James Webb's picture entitled "Good Luck" (2, 4, and 5).

Certificates of honourable mention were awarded to Charles Stephens, H. E. White, P. H. Emerson, Col. Nicholl, R. Murray, Arthur Hill, S. Norman, T. Brownrigg, and Col. Biggs.

A vote of thanks was passed to Mr. Glaisher for the time and attention he had devoted to the examination and classification of the pictures.

The prize pictures and the prizes awarded for the same are now on view at the offices of the Association, and may be seen by the members, and their friends upon presentation of a member's card.

Postal Photographic Society.

A committee meeting of the above Society was held at the Hon. Secretary's address, 4, Middle Temple Lane, E.C., on the 26th inst.

After the preliminary business had been disposed of, the following candidates were duly elected :—H. D. Taylor, Wm.-a-Beckett Turner, Miss A. Dryden, Ernest Clover, and Wm. Stewart.

The voting-in albums, having recently finished their rounds, were examined, and, in album 23, the Rev. H. Ash was found to be entitled to the 1st prize, and J. C. Cohen to the 2nd. In album 24, G. Bankart took the 1st, and W. Gaddum the 2nd prize. The same result was seen in album 26, Mr. Bankart being 1st, and Mr. Gaddum 2nd.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

A MEETING of the above Society was held on Thursday, October 22nd, in the Technical School, Bridge Street, W. J. HARRISON, F.G.S., in the chair. Mr. Jones was elected a member.

The paper of the evening was given by Mr. NOCK, on "Emulsion Making." In the course of his remarks Mr. Nock urged upon amateurs who have leisure time to make their own plates, not that there was any gain in a pecuniary point of view, but that it made them thoroughly acquainted with what a plate ought to be; and how could they think of criticising the work of others when they knew nothing, practically, of the process themselves? After reading his introductory paper, Mr. Nock proceeded to give a practical demonstration of the process, showing the most minute detail from the dissolving of the haloids to the coating of the plate. The Lecturer reminded his hearers that there would be a fair amount of failures which it was almost impossible to avoid, but told them not to be disheartened, as there was often more learned from a failure than a success.

Talk in the Studio.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The annual Technical Exhibition Meeting will be held in the large room of the Society of Arts, John Street, Adelphi, on Thursday evening, November 5th, at 8 p.m. The Eastman Dry Plate and Film Company will give a demonstration of making "Film Negatives," and several other valuable contributions are already promised.

ABSTRACT OF CHAPMAN JONES'S LECTURE AT THE BERKBECK INSTITUTE, OCTOBER 28th.—There are about sixty-five elements known, but only some twenty concern the photographer. Elements, when acting chemically, can only combine, but compounds can act in a great variety of ways. The properties of the elements are lost when they form a compound, which is in no way the average of its constituents; thus compounds differ essentially from mixtures. Compounds are definite, but the composition of mixtures may be varied at will. Emulsions and solutions are mixtures. The air, though invisible, is a very real something. Its oxygen is exhausted by respiration and combustion, hence need for ventilation. The products of combustion and respiration are noxious, and, being warm, rise; therefore sensitive plates, &c., should not be stored near the ceiling. All developers absorb oxygen and deteriorate when exposed to the air; and for this reason much more of the developing agent must be employed than would otherwise be necessary. A developer loses its developing power as it absorbs oxygen.

SUNLIGHT UNDER WATER.—MM. Fol and Sarasin found that at 380 metres under the water of the Mediterranean, shortly before 11 a.m., the impression on a dry plate was less than that which would have been produced if exposed to the air on a clear night without the moon. In Geneva Lake the water was less clear, and the light all filtered out at 200 m.—*Science Monthly.*

THE LATE MR. JOHN HARTNUP, F.R.A.S.—In an obituary notice of this gentleman, Mr. J. A. Forrest observes that the British Association at their meeting in 1853, offered £30 for a photograph of the moon. The Council of the Photographic Society were anxious to stimulate this desirable result, and Mr. Hartnup was asked if he would join them in taking views of the moon with his telescope, and he agreed at once. The work was commenced on the 12th February, and extended to the 26th September, 1854. It was found that the instruments had to be adjusted, as the visual and chemical foci of the lens of the telescope were not coincident. Mr. Hartnup placed very fine wire over the lens of the eye-piece or finder, and on its cross sections, keeping some portion of the moon's surface on this point, whilst a collodion plate was exposed to the image, the telescope being previously drawn out $\frac{7}{8}$ of an inch, that being the point of the correct chemical focus. At the end of September of that year, the British Association met Prof. Phillips, of Cambridge, who, when he saw the results, offered to lecture upon them. if enlarged upon a screen, in St. George's Hall. The screen was made at Manchester, and measured 56 feet. This was a great triumph, and no one enjoyed it more than Mr. Talbot, the eminent photographic discoverer on paper. The object being accomplished, it fell into the hands of Mr. De la Rue, Kew Observatory, and Mr. Rutherfurd, of New York, both having possession of Government instruments.

PHOTOGRAPHIC CLUB.—The Annual General Meeting will be held on Wednesday, November 4th.

To Correspondents.

*** We cannot undertake to return rejected communications.

TEN YEARS' SUBSCRIBER.—Drain your emulsion very thoroughly in a sieve before putting it to melt. After draining, and before warming, stir in a little of Nelson's No. 1 gelatine—say five grains to each ounce of finished emulsion. Do not heat too strongly whilst coating.

A. T. D. BERRINGTON.—The advantage of having a single lens of larger diameter than that of the stop is, that different portions of the lens are brought into use for different parts of the plate. You can try what the effect of cutting down the lens would be, by placing an opaque paper stop in contact with it; you will then find the definition at the margin very bad, and the field much curved.

R. LAIDLAW.—Carbon printing would prove too expensive for your purpose. The Stannotype might do, but you must not expect the results to be quite equal to silver printing. We should think it might be worth your while to set up the plant for working the Woodburytype. We have not seen any English translation of Vidal's "Photoglyptie."

E. ROBERTS.—To mount silver prints in optical contact with glass, make a strong solution of clear white gelatine, and add a little glycerine and alcohol. Soak the print in the solution, and lay it down upon the glass, letting the middle touch first, and lowering the ends by degrees to avoid air-bubbles. Then apply a squeezee to the back of the print, and dry without artificial heat.

P. C. WATT.—India-rubber solution is, or was, made by several photographic stock houses. We have used that supplied by Thomas, and by Mawson and Swan. If too thick for your purpose, it may be diluted with pure benzole. The india-rubber shops generally keep a thick solution in tins, which may also be thinned to the required consistency with benzole.

C. AND E. HILL.—You do not state whether you require an artificial light for portraiture, or for making enlargements or copies. The electric light is far the best; but, failing that, you can use some of the pyrotechnic compounds; but in this case you make provision for the escape of the fumes into a chimney or the open air.

PHOTO.—The Autotype Company publish a manual or book of instructions on carbon printing. There is a good work on the subject by Liesegang, of Dusseldorf—Der Kohle-Druck—but we are not aware of any English translation of the book. Woodburytype may be gathered from the back volumes of the PHOTOGRAPHIC NEWS.

G. DAVISON.—Almost any toning bath will yield a grey tone if its action be continued long enough. If the prints are but slightly washed previous to toning, a grey colour is more easily obtained. Try the formula with chloride of lime given in the YEAR-BOOK.

J. H. WHITE.—The question of where to obtain particular goods at a moderate price is one to which we cannot reply in these columns. If quantity sufficient to make it worth while is wanted, doubtless an advertisement would procure you the required information.

F. HEGGER.—Perry, of Sandgate, has made a speciality of the manufacture and supply of cloud negatives. We cannot tell you whether he still does so.

W. MATHEW.—We cannot insert any further correspondence on the questions at issue between Mr. F. H. Carter and yourself, with regard to the identity of the Tichborne Claimant. We will point out, however, that you are in error in stating that your reference to the identiscope was only made early in your article.

H. MELLOR.—The Woodburytype patent expired some years since. The Stannotype is a more recent invention, intended to produce a result approximately equal, without involving the expense of a hydraulic press.

FRED. WIDMER.—Atkinson, of Liverpool, is agent for most American goods in any large demand, and he may be prepared to supply what you require.

G. W. PRICE.—Albumen prints are sometimes prepared for oil-colour by being covered with a solution of gelatine; but if this is done, the solution should be hot, and not thick. We have known the gelatine to shell off, and perhaps it is better to paint, as many do, direct upon the surface. Barnard, Oxford Street, and Newman, Soho Square, publish works on colouring.

The Photographic News.

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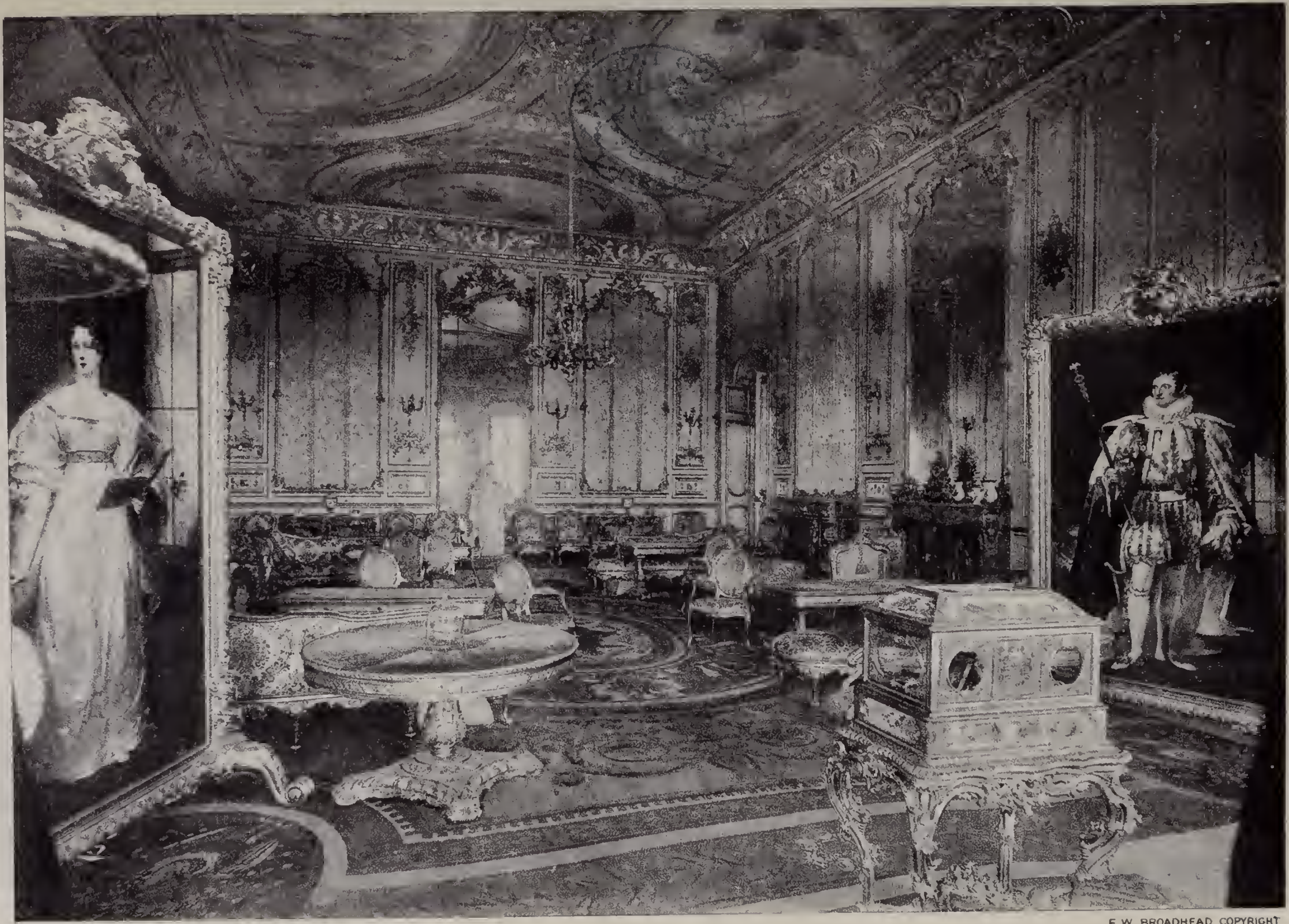

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1418.—*November* 6, 1885.

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AUXILIARY EXPOSURES.

The question of "auxiliary exposures" has again come before photographers. It was recently brought up at a certain photographic society. It is now some three or four years since we discussed the matter in connection with dry plates, not recommending supplementary exposure as a means of getting more detail with short exposures in the camera, but pointing out that such auxiliary exposures might, in a great measure, vitiate the correctness of estimations of sensitiveness when using the sensitometer. All sensitometers of which we know anything are instruments for measuring the smallest amount of light which will produce a developable impression on a plate—the assumption being that the sensitiveness of a plate is inversely proportional to the amount of white light necessary to produce such impression. As to whether or not this assumption is correct, we shall not at present venture an opinion. What we pointed out before is that it is impossible to measure this amount of light in the case of a plate put into our hands, unless we know whether or not the plate has been impressed by any light before we have received it.

It is quite possible that the plate has received, for example, half the quantity of light necessary to produce a developable image, has received three-quarters, or, indeed, has received any conceivable fraction of it. In any such case we are merely measuring, by the sensitometer, a residuum representing an unknown fraction of the least amount of light which will produce a developable image, and our measurements can be of no practical value.

Some doubt was recently thrown on the statement that an auxiliary exposure short of what would produce fog might increase the sensitometer number given on a plate, and this in spite of the fact that the question had been gone into very thoroughly by independent experimenters three years ago, one of whom, W. E. Debenham, exhibited his results at a meeting of the Photographic Club. The London and Provincial Photographic Association recently took the matter in hand, determined to put it to a practical test at their place of meeting. The test was set about with all due elaborateness, but, unfortunately, came to an untimely end.

A member rose, and, at somewhat undue length, explained his views on the matter; pointed out that every square of the sensitometer lets through a certain amount of light, and that if, by preliminary exposure, the difference between this amount of light, let through by any square, and that necessary to produce a developable image, were given, that square would show up on development; and further, that to get the greatest possible increase of numbers by preliminary exposure, it was necessary to give such an exposure to diffused light as would just be short of producing visible fog on development.

All this having been explained, Alexander Cowan and Andrew Pringle were deputed by the meeting to carry out the necessary experiments, the dark-room recently fitted up by the Association being put at their disposal. It is well-known that an exceedingly feeble light is all that is necessary to produce fog on a gelatine plate, and therefore that, to strike accurately the "fog point," it was necessary to have some constant but very small source of light. A night-light was suggested, and was procured. This was put in the bottom of a glass at one end of the long room in which the Association meets, all other light was extinguished, and Mr. Cowan prepared to give various exposures at the end of the room, remote from the night-light, so as to strike as nearly as could be the fog point with the particular plate to be used. The members congregated around the dismal source of illumination at the head of the table, and there sat in a solemn silence broken only by the "Now!" of Mr. Pringle, who was indicating the expiration of every five seconds. This somewhat lugubrious entertainment had gone on for perhaps half-an-hour when Mr. Cowan declared that he was ready to make the first development. The lights were re-lighted, and then the question arose, "Where is the developer?" "Why So-and-So was to bring it," was said by someone. "No, the other fellow was to fetch it," exclaimed So-and-So! As a finale of the affair, there were some five or six members who were particularly interested in the experiment, each accusing another of being the defaulter in the matter of developers. Finally, the determination of the question has to be postponed for a week.

At the next meeting, Mr. Pringle explained that he had performed the experiments privately; that he was satisfied that the result of auxiliary exposure; might be to enable a higher sensitometer number to be got than could be got without such auxiliary exposure, that he himself had, with a certain commercial make of rapid plates, got "not less than three nor more than four" additional numbers, but that he considered the conditions under which the experiment could be performed in the room wherein he spoke to be insufficiently accurate, and that, in fact, he refused to perform the experiments there. He added that he had got no effect in the camera by auxiliary exposure. Mr. Cowan had also performed the experiment independently of Mr. Pringle, and corroborated what the latter stated, and eventually the matter was taken as settled.

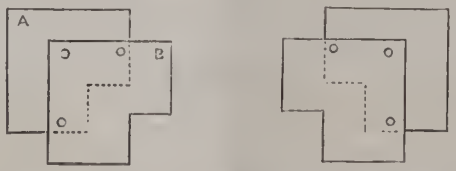
Now, we wish photographers not to misunderstand this matter, which is in reality of considerable importance. The statement made is not that auxiliary exposure will make a plate more sensitive in the camera. It is true that Mr. Debenham, on the occasion already referred to, showed results of such auxiliary exposure in which he had got a better negative in the camera than he otherwise would have got; but the conditions could scarcely, if we recollect rightly, be considered normal, and certainly Mr. Debenham did not recommend auxiliary exposures as a method to be generally adopted for increasing the sensitiveness of a plate.

The importance of the matter to photographers is simply this. The readings of a sensitometer cannot be relied upon unless it is known that the plates to be tested have received no appreciable amount of light impression before the exposure under the sensitometer is made.

◆

AID TO CORRECT MOUNTING.

An appliance calculated to be useful, especially to amateurs, when mounting photographs upon cards to show a definite margin, was brought forward by Mr. H. S. Starnes, at the last meeting of the London and Provincial Photographic Association. Two pieces of card, A and B, are fixed by three tacks upon a drawing board, in the position shown. The corner of the mount is pushed under the card B, until it butts against the edges—shown by dotted lines—of the card A. The print is then laid down with its corner fitting the angle cut in B, and thus, any number can be mounted upon the cards without the necessity for measuring and marking each mount. It was suggested by a member, that if two corner-fittings (as shown in our sketch) were used instead of one, the direction of the print upon the mount would be truer; and that if the photographs themselves were not cut exactly of one length, it would be seen, and could be allowed for, keeping the same amount of margin at each end. The top or bottom of the mount should be placed in this double fitting, rather than one of the sides, as a little difference in the height of a print upon the card is permissible, but it must be central as regards the sides.



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THE PHOTOGRAPHIC EXHIBITION.

[Fifth Notice.]

In G. Selwyn Edwards' "A Regatta on Oulton Broad" (No. 194), one of the pictures is a little black, and intense in the water; the other is very good. No. 195, "By the Cherwell, Oxford," also contains two pictures; one of them is a view in which some tree trunks come a little hard. In No. 525, "Surrey Woods," one of the pictures, in which a quantity of bracken is seen, is very pleasing.

"Yucca Wet Collodion" (No. 196), by Edward Fox, is a photograph of a plant hung rather too high to be seen to advantage, but it appears to be good, although printed a little dark. No. 299, "Foliage Study," also a wet collodion, is truly described by its title, and contains much beautiful delineation of plant life. No. 606, "Repose," a photograph of a lady sitting alone in a room, is one of those productions to which a great variety of titles—such as "Bored," "The Convalescent." "Waiting for dinner for somebody's return," &c.—might be given, each about as descriptive as another. The lighting is somewhat harsh, and the lady has moved, or is out of focus.

We now come to a set of exhibits (No. 199 to 204) by J. Gale that call for special recognition. In some of those qualities which go to make photographs of the highest class, these pictures are unsurpassed, and stand out distinctly above far the greater number of the exhibits. Brilliancy without harshness is obtained by a full gradation both in high-lights and deep shadows. This is strongly marked in No. 199, the first of the series, where a white-washed wall, in virtue of crisp touches of light and shade, ceases to be the unmeaning chalky blank that so commonly has to do duty for such a subject.

H. S. Mendelsohn has three portraits of ladies (Nos. 209, 210, and 211) which possess that softness characteristic of his work. They are powerfully lighted in what is called "Rembrandt" style, and the posing of Nos. 209 and 11, a lady with a guitar, is fresh and natural. He also shows several groups, of which No. 216 strikes us as bright in effect, but rather more like two separate groups of two, than a harmonious group of four. In this picture, also, retouching has been carried very far, and some stems of plants which form the background are too powerful and prominent, and interfere with the main subject of the picture.

No. 217, "Crossing the Stile," by R. B. Gilson, is mainly a mass of heavy, under-exposed foliage; the figures, also, are under-exposed, and their outline in consequence much lost in the background. The same exhibitor shows "The Lake in Alexandra Park, Hastings" (No. 486), which is picturesque, and has good sky, and two other views (Nos. 543 and 544). The Rev. Malcolm Powell's "Bisham Abbey" (No. 218) is very harsh; on the other hand, his "Portrait of a Little Girl" (No. 228) has good tone over the flesh, and possesses softness as well as force. Nos. 236, 237, and 238 are illustrations, by Captain G. S. Clark, of the employment of photography in recording military experiences.

"Studies of Breaking Waves," by W. F. Marsh (No. 250) have not been taken with sufficient rapidity to obtain the sharpness looked for in modern gelatine work; one, however, in the left-hand lower corner of the frame, is good. A frame of platinotypes (No. 251) by E. H. Goold contains some good views, others are spoilt by the sky being printed-in too dark, and in a few the uprights of the buildings included are not true. No. 252, a frame of views by J. W. Kenworthy, is hung too high for them to be judged critically, but one or two of the scenes inspire a wish to look at them more closely. No. 257, "Scenes in Surrey," by G. Tyser, is a frame containing two pictures. The farm buildings in one, and haystacks in the other, come out with good gradation, but some trees in both are rather harsh and under-exposed. In No. 338 one of the pictures is good, the other is rather spoilt by want of uprightness in the buildings. In 582, "Blackberrying—Platinotype," the bramble and broken ground form a fine study in their way, but some long straight lines of a fence across the photograph, and the disposition of the figures, rather spoil it as a picture.

Of three large half-length figure studies by J. Thompson, No. 262 is bold but harsh. No. 307 is better, and No. 330 is best. It is, indeed, remarkably good—one of the best posed portraits in the Exhibition.

E. C. Simson is unfortunate in having his "Views in Switzerland" (No. 264) hung close to the very fine set of Swiss views by F. Beasley, Jun., which well earned a medal. Seen by themselves, they would attract attention without incurring the odium of a comparison. No. 413 is a frame of groups, the figures in which have not been able to conceal their consciousness of the photographer. No. 608 is a well lighted interior. No. 266, "Early Morning on the Derwent (*Platinotype*)," by A. C. Farnworth, is picturesque. In No. 267 the artistic effect is marred by the formal lines of a gate and fence near the middle of the front plane of the picture.

No. 270, "On the River Mole, Surrey," by Major Verney, is a frame containing pictures with bold effects of trees and water, but several of them have been spoilt by the bad skies that have been printed-in. The same remarks will apply to other works by this exhibitor.

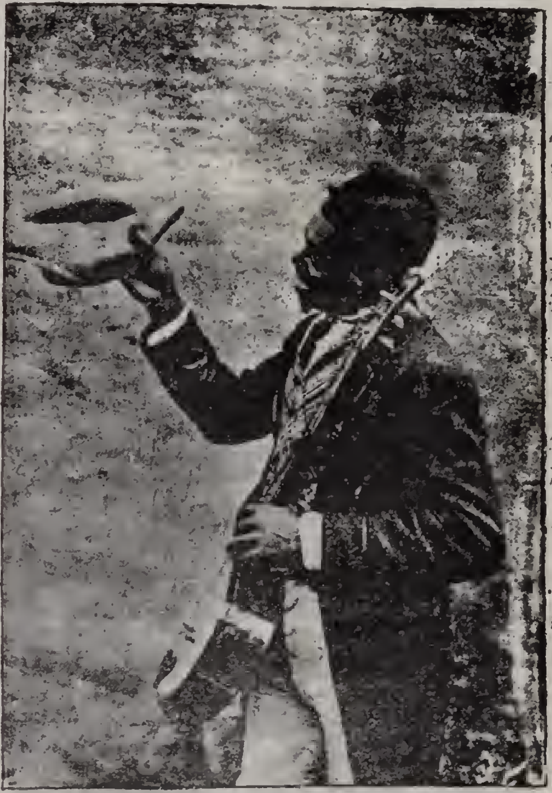
Nos. 271 to 280 are a set of views taken in New Zealand. They are catalogued to J. M. Copeland, who is, however, a London stock dealer, and the photographs bear, in one corner, the imprint "Bartlett, Auckland," who must, therefore, be assumed to be the photographer. These photographs are interesting as showing the character of the scenery at the Antipodes, and, as a whole, are a good set of photographs, and without meretricious dodging. "Mitre Peak, Milford Sound," shows grand scenery, and has fine clouds harmonizing with the picture—probably taken at one exposure. One picture, simply catalogued as "Landscape," shows water, with small light clouds here and there upon the surface, perhaps explosions of steam from a hot spring. "Wairoa Waterfall" is, perhaps, the least successful of the set; the conditions, probably, did not admit of such a rapid exposure as was given to others, and the water wants detail: No. 618, "The Bush at Henderson," showing varieties of that fern vegetation so characteristic of the country.

J. G. Horsey exhibits "On the Coming Elections," a photograph which, with other figures than those selected to give the name, might have made a very good picture. The cottage court-yard with its crumbling wall is picturesque, and well rendered. The two female figures, one of whom has an upraised arm which has moved a good deal, give an artificiality to the production that is to be regretted. Other works by the same hand are Nos. 346, the "Ferryman's Home," which is good, and 347, 375, 376, 377, and 378, of which 376, a landscape with cattle, is the best.

Lulu Farini has a large number of pictures taken in South Africa. The scenery of the "Hundred Falls" which many of them represent is awe inspiring; and the idea suggests itself that the photographer must possess unusual nerve and sure-footedness to pursue his art in such a region. No. 423 is a frame of scenes at Cape Town. In one of these pictures some spots in the sky are manifest blemishes; and this suggests that among the cloudy appearances on the side of the mountain, some may also be due to accident.

Three exhibits are contributed by W. E. Debenham, all being portrait studies; but they differ from the bulk of analogous exhibits in this line, insomuch as they have not been spoiled by too-lavish retouching. They may be regarded as being among the best examples of legitimate portrait work shown.

J. B. Best shows some pretty views (Nos. 302, 305), but some of them suffer from bad vignetting. In one case the picture looks something like a medallion with an uncertain edge. T. C. Whaite has several frames, from one of which, "Studies in Black and White," we give a couple of illustrations; unfortunately these blocks have not come out very well, and do not do justice to the originals. The figures in these exhibits are well and naturally posed. A girl blowing bubbles in No. 327, is among the best. John E. Dumont sends several frames of pictures (Nos. 304, 324, 349) mounted in optical contact with glass.



Frank M. Sutcliffe exhibits (No. 306) "A Grey Morning," which owes its charm to the well marked gradation of brightness shown in the varying distances. No. 315 is a figure subject, both of the models in which are looking direct into the camera. In No. 316 the top of the picture is apparently artificially darkened, and is very heavy. No. 576, "Contentment," representing a female figure sitting on a dark mass, with a light background, is very telling, and is by far the best of this series.

Nos. 324, 433, 553, are scenes in "School-Boy Life" by C. Wyrall. These instantaneous pictures are naturally caught, and good as studies, but are mostly under-exposed. No. 553 suffers the least from this failing. No. 332, "Under the Cliffs by the Sea," by B. Francis Cobb, is a frame of seven pictures hung too high for close examination, which one or two of them would, we fancy, repay. No. 353, another frame with several pictures, suggests pleasant reminiscences of a holiday tour.

No. 333, "Five Studies," by A. Miller, is perhaps entitled to that designation in consideration of the unusual dress and loud curtain in most of them. One of the studies, however, a figure reclining on a divan, is really powerful and striking. F. H. Morton sends "Snowdon" (No. 336) and two others, of which No. 521, "Fairies' Glen," shows a very curious effect in the sky and tree tops that looks like a combination of halation and reversal of image. J. Bowen's "Portraits" (No. 337) are large heads, rather wanting in detail and softness. His other frame (No. 647) shows better work.

"Marine Studies" (No. 342), by A. Hamilton Clarke, is a set of flying shots, of which some would be improved by more careful vignetting. No. 344, "Lowestoft Pier," by H. W. Beven, would be better if the sky had not been printed so dark. No. 668, "The Burning Pier," makes a striking picture of a kind that it does not often fall to the lot of a photographer to secure. "On the Clyde" (No. 345), by J. Hyslop, is a good set of five pictures of vessels. Of H. H. Stole Bailey's five exhibits, we prefer "Castle Hill, from the Harbour, Scarborough" (No. 357).

C. A. Ferneley has three small views (Nos. 361, 362, and 363), of which 362, "Low Tide," shows a vessel with the fault of having the artificial sky outside the rigging, and the natural sky within it, disagreeing. Of this exhibitor's other works (Nos. 522, 523, and 547) the last named is the best.

James Crichton's frame (No. 369) contains a number of groups of fisherfolk—mostly taken on the shore—which show much power in inspiring the models with the ideas of the artist. The people appear to be engaged in their natural occupations, and unconscious of the camera. One of these groups, "The Washing Day," is here reproduced.

J. G. B. Wollaston's "At Shoreham (No. 371) represents a pretty view of trees and a pathway. Another is a rural scene with water. No. 455 and 456 are from paper negatives. The former represents a group, and is harsh; the latter, a photograph of a bridge, is good. No. 411, a picture of a quiet church and churchyard, is pleasing and restful. Nos. 573 and 581 are pictures in which there is some nice foliage, not much improved by the figures that have been introduced. No. 583 is a pretty picture including trees and a garden path. No. 614 is an interior, very dark at the lower part. Nos. 791 and 796 are paper negatives mounted between glass to be examined by transmitted light. We notice lines in some of these, as if the paper had been creased.

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PRACTICAL CHEMISTRY FOR PHOTOGRAPHERS

BY RALPH W. ROBINSON.

II.—Soda, and How to Test It.

In this article it is proposed to treat of the quantitative estimation of the chloride of sodium in a sample of carbonate of soda, it being an important point that the alkali used to prepare a developer should not contain much of this salt, as it acts as a restrainer.

The apparatus required is the same as was used for estimating the actual carbonate of soda in our sample. The principle on which the estimation of a chloride depends is, that in neutral solutions containing a chloride and a chromate, a known quantity of nitrate of silver will first precipitate all the chlorine in the form of white, or whitish chloride of silver, and as soon as all the chloride is precipited, red chromate of silver. We require, then, a solution of nitrate of silver, a known volume of which will precipitate a known quantity of chloride. The most convenient strength for our solution, we shall find, is that which contains one grain equivalent (170 grs.) of nitrate of silver to 1 litre (1,000 c.c.) of water. Nitrate of silver is represented by the formula $AgNO_3$, which means that it is composed of 1 atom of silver, 1 atom of nitrogen, and 3 atoms of oxygen, and its equivalent weight is made up thus:—

$$(Ag=108, N=14, O_3=48)=170.$$

Now, as it is desired to make 1 litre of standard solution, we weigh out 190 grs. of nitrate of silver and dissolve in 1,100 c.c. of distilled water, which will provide enough to leave sufficient solution to test the strength of what has been made, and will also be a little too strong, so that when we have estimated the actual amount of silver contained in it, it can be diluted with water to the required strength.

Having dissolved the nitrate of silver and mixed thoroughly, we weigh out 585 grs. of pure chloride of sodium, which has been thoroughly dried by heating in the porcelain crucible, and then powdered. Dissolve this in distilled water, and make up to 500 c.c., and mix thoroughly. Now measure out three portions of this solution (say 25 c c. each) into basins or small flasks, and make up to about four ounces with distilled water. Add to each about five drops of a saturated solution of pure yellow chromate of potash. Now one equivalent of nitrate of silver will precipitate the chlorine from exactly one equivalent of chloride of sodium (58·5 grs.) in the form of chloride of silver, which is represented by the equation:—

$$\overset{\substack{\text{Nitrate of}\\ \text{Silver.}}}{AgNO_3} + \overset{\substack{\text{Chloride of}\\ \text{Sodium.}}}{NaCe} = \overset{\substack{\text{Chloride of}\\ \text{Silver.}}}{AgCl} + \overset{\substack{\text{Nitrate of}\\ \text{Sodium.}}}{NaNO_3}$$

We fill the burette with the solution of silver up to the top mark, and then run some carefully into the first basin or flask containing chloride of sodium, with continual stirring. A precipitate is immediately produced, chiefly white chloride of silver, but, where the silver first comes in contact with the solution, slightly red. This red colour is formed by the precipitation of chromate of silver on the part of the liquid when the silver has precipitated all the chloride, but, as long as any chloride is left in the solution, the red chromate on stirring is re-decomposed. When the whole of the chloride has been precipitated, this red chromate will not be decomposed, but will impart a red colouration to the precipitate, and this marks the point where we have added sufficient silver. The amount of solution used is now read off from the burette, and the same operations repeated with the other quantities of salt solution, care being taken in each case to stop the addition of silver when the precipitate has reached the same tint, as with the preceding quantity of chloride of sodium.

It is obvious that as we dissolved 58·5 grs. of chloride of sodium in 500 c.c., that each 25 cc. of this solution contains 2·925 grs. Suppose for the first test we used 40 cc., the second 40 1 cc., and the third 39·9 cc. Taking the average of the three tests we find that 40 cc. of our solution are equal to 2·925 grs. of salt, or 800 cc. = 58·5 grs., an equivalent of sodium chloride. Therefore, if 800 cc. of the solution be taken, and made up with distilled water to 1,000 cc., we shall obtain the standard solution we require. We again test this with the salt solution to make sure that we have conducted all the operations with accuracy; 50 cc. of the silver solution should be equal to 25 cc. of the salt solution.

Having thus completed the standard silver solution, we are in a position to test the sample quantitatively for chloride in a very short time, and with very little trouble. For example, suppose we require to find the chloride of sodium in a sample of carbonate of soda. We know by the qualitative test whether to expect much or little chloride in a sample, and weigh out a quantity of the substance, which will require somewhere about the same quantity of silver solution as was used in making up the standard solution. Suppose, in the sample, we expect to find under 6 per cent. of chloride of sodium, weigh out between 50 and 100 grs. —say 70 grs.

Dissolve in about 4 ounces distilled water, and neutralize by adding pure nitric acid gradually, and boiling, testing from time to time with a piece of litmus paper. When the neutral point is reached, add a few drops of the chromate of potash solution, and run in standard silver from the burette till the same red tint is reached as in preparing the standard.

Suppose 70 cc. are required. Then the equation —

$$100 : 5·85 = 70 : 3·595$$

gives the quantity of chloride of sodium in the solution; and the following equation gives the percentage of chloride of sodium in the sample:—

$$70 : 3·595 = 100 : 5·137$$

When estimating small percentages of a substance, it is best to use comparatively large quantities of the sample, for if this is done small losses and inaccuracy from other causes do not make so much difference as if smaller quantities of the material is used. It is for a similar reason that we weighed out the chloride of sodium used in testing the standard silver, and dissolved it in a large quantity of water. Besides, in this way we save the time and trouble of weighing out separately several small quantities of the salt.

This method may be used for estimating the chlorine in any substance containing this body in the form of chloride, provided it contains no other compound which will precipitate silver in a neutral solution, such, for instance, as bromides and iodide.

Bearing in mind that 100 c.c. of the silver solution are equivalent to $\frac{35·5}{10}$ grs. of chlorine in the form of chloride, it is a simple matter to find the weight of the chloride we wish to estimate. Suppose, for instance, we wish to find the weight of calcium chloride equal to 50 c.c. of the silver solution. Calcium chloride is represented by the formula $CaCl_2$, of which the equivalent weight is (40+35·5+35·5) =111. There being two atoms of chlorine in calcium chloride, one equivalent of it requires twice as much silver solution as an equivalent of sodium chloride. Therefore our proportion will be :—

$$100 : \frac{111}{2\times 10} = \text{c.c. of silver solution} : x$$

It may be useful to mention here, that there is now in the market a comparatively pure form of carbonate of soda, containing only 1 molecule of water, Na_2CO_3,H_2O, known by the name of "crystal carbonate," which will be found better for photographic purposes than the ordinary commercial article.

METEOROLOGY FOR PHOTOGRAPHERS.

BY J. VINCENT ELSDEN, B.SC. (LOND.), F.C.S.

Chapter VI.—Atmospheric Moisture (*continued.*)—Dew, Mist, and Cloud—Forms of Clouds.

In the last chapter it was stated that the amount of aqueous vapour which a given quantity of air can retain depends chiefly upon its temperature, and that when cooled below the point of saturation, some of the invisible vapour assumes the visible form of cloud, mist, dew, or rain. This fact may be readily proved by the simple experiment of exhausting the air from the receiver of an air pump. In this way an artificial cloud may be formed, owing to the cooling of the rarefied air by its sudden expansion. A similar expansion takes place when a current of air ascends into the upper regions of the atmosphere; and if it is cooled sufficiently, there will be a similar condensation of the aqueous vapour which it contains. Chilling of air may also result from its contact with cold mountain tops, or from the meeting of warm and cold currents in the atmosphere. Now this condensation of aqueous vapour is a true change from an invisible gas into visible particles of water, and these particles may either remain suspended in the air as cloud, mist, or fog; or they may be deposited upon the surface of the earth as dew, hoar-frost, or rain.

Let us consider, first, the formation of dew. In the evening, the heat derived from the sun no longer balances that which is radiated by the earth into space. The surface of the earth, therefore, grows cooler in proportion to the rapidity with which radiation proceeds. The air in contact with the cold earth is cooled also, and, if the limit of saturation is passed—that is to say, if the temperature falls below that which corresponds to the maximum vapour-tension of the vapour present in the air—dew will be deposited; and if this temperature is below freezing-point, the dew will take the form of hoar-frost. Hence dew will be most plentiful on the coldest objects—that is, on the best radiators—and any cause which tends to check radiation of heat from the earth, will tend also to prevent the formation of dew.

Fogs, mist, and clouds are formed by a similar process, but the particles of water remain suspended in the atmosphere. Fogs are generally caused by the mixture of masses of air which differ so much in temperature that the resulting temperature is too low to retain in the form of vapour the moisture which is present. In this case it is thought that foreign bodies, such as dust and soot, play an important part by acting as a nucleus of condensation; and Mr. Aitken has attempted to show that the formation of mist is impossible in the absence of any such particles. The manner in which the particles of water constituting mist and fog remain suspended in the atmosphere is a question which cannot be looked upon as decided. Some maintain that these particles are hollow vesicles; but it seems more probable that their buoyancy is simply owing to their extremely minute subdivision, so that Tyndall has applied the term "water-dust" to express the nature of mist and cloud.

Let us now take a few of the more familiar examples of the formation of fogs and mists. Over running streams there is often a bank of fog, whether the water is warmer or colder than the overlying air. In time of frost, the water is usually warmer than the air, and consequently gives off more vapour than the cold air can retain. When the air is warmer than the water, fog may still be produced by its temperature being lowered below the point of saturation by contact with the water In a similar way fogs are often produced in valleys and over damp meadows in the evening. In this case the stratum of air next to the ground deposits its superfluous moisture as dew, and remains saturated, and at a lower temperature than the strata of air immediately above it. If, now, cold air from higher levels flow down, and mix with the saturated stratum below, fog will be produced, extending to a certain height, and often having a perfectly level surface. Herschell calls these "radiation fogs," as their formation depends upon the air close to the earth being brought to the limit of saturation by the cooling of the earth's surface in the evening. The sea-fog which often extends inland along the coast for a few miles, in summer, is produced by the mixture of a cold wind with the warmer air, saturated with moisture, lying over the sea. In short, whenever there is from any cause a mixture of cold air with a warm and damp atmosphere, fog or mist will generally be formed. The disappearance of fog after sunrise is owing to the increase of temperature, enabling the air to take up again the vapour which it was before compelled to part with. The frequent fogs of our great towns are owing partly to the large amount of moisture supplied to the atmosphere by combustion and other domestic processes prevailing in densely crowded localities; but their dark colour and persistent nature is due almost entirely to the excessive quantity of smoky and tarry matter present in the air. The particles of water become coated with a thin film of tar, which not only prevents the evaporation of the fog when the air becomes warmer, but also renders extremely difficult the aggregation of the particles into drops of rain.

Mist differs from fog chiefly in consisting of larger particles, and in being distinctly wetter. Clouds, when they consist of water, are nothing but masses of mist or fog suspended at a considerable elevation in the air; but it is probable that many of the higher clouds consist of needles of ice. The lowest level at which clouds float varies in different localities. In our own islands one-third of the total observations of cloud-levels were below 2,500 feet. The causes of the formation of clouds are similar to those which produce fog and mist. Whenever the temperature of a warm and moist mass of air is reduced below the limit of saturation, clouds are the result. Now, since warm, moist air is specifically lighter than cold, dry air, it will ascend, and as the upper part of the ascending column reaches the colder regions above, the vapour will begin to condense, forming what Tyndall calls a "capital" of cloud supported upon an invisible column of warm air below. Hence ascending clouds grow continually larger, and on a fine day in summer one may often watch the small white clouds growing into huge masses as the heated air-columns rise higher and higher into the atmosphere. In the evening, when these ascending currents cease, the clouds slowly descend, and gradually melt away into a clear sky. A similar clearing up of the sky may be produced by the influx of warm air, causing evaporation of the clouds. A most instructive case of cloud formation is the cloud-banner which is sometimes seen persistently clinging to the summit of a hill, even although a wind is blowing of sufficient strength to drag out the cloud into a long streamer, and even to detach pieces from it and carry them away. Now, although, in this case, the cloud seems stationary, the particles of which it consists are continually changing. As the wind blows over the mountain top its vapour is condensed, but on passing it the cloud evaporates again. Thus the cloud melts away on the leeward side of the mountain as fast as it is formed on the windward side.

Clouds near the horizon are often very deceptive in their greater apparent density than those overhead. In many cases it would appear to a person setting out upon a photographic expedition, that the region to which he is travelling is packed so closely with dark clouds that sunlight will be totally absent. Even although the sky overhead may be of such a nature as to encourage the best hopes of a good light, the dark, cloudy horizon often gives quite a despondent prospect, especially if the locality is such that a large extent of sky is visible. Often, however, this is quite an illusion; owing to foreshortening, and perspective effects, a sky with only a few cloud-bands, and wide spaces between them, may appear completely cloud-covered when viewed near the horizon. Even when there are no clouds at all, and the air overhead appears quite clear, the horizon may appear enveloped in a thick haze, although, in fact, it is as clear there as it is overhead. The reason for this is easily explained. When we look towards the horizon the eye traverses a thicker layer of atmosphere than when we look vertically upwards; and, however thin and imperceptible the haze may seem overhead, when the thickness of the atmosphere is many times increased, as is the case when looking horizontally, the obstructive effect of the haze becomes very considerable.

With respect to the different forms of clouds, Luke Howard's classification, now nearly a century old, has become universally adopted. There are three primary types of cloud: the *cirrus* (Lat. cirrus, a curl), or mare's-tail cloud; *stratus*, in which the streaks of the cirrus become amalgamated into a continuous stratum; and *cumulus*, or the wool-pack cloud. The cirrus cloud always forms at a great height in the atmosphere. Kœmitz never saw it as low as the summit of the Finisteraarhorn, 14,000 feet high. It generally moves in the opposite direction to the wind at the surface of the earth, and probably it always consists of ice or snow in extremely delicate needles. The stratus cloud, according to Howard, is a "widely-extended continuous horizontal sheet, increasing from below upward," but the name should not be applied to all thin horizontal layers. It belongs to the lower regions of the atmosphere, and was called by Howard "ground fog," since it resembles a piece of lifted fog, without any definite form. The cumulus is perhaps the most common of all forms, and is the cloud of summer.

By combinations of these primary types many other varieties of cloud are produced. Thus the *cirro-stratus* or thread-cloud consists of thin layers thinning away towards the edges, sometimes assuming the grained appearance of polished wood, and occasionally looking in the distance like shoals of fish. The ribs of cirro-stratus clouds sometimes stretch right across the sky, converging at each end towards the horizon in the shape of a boat, when it is often called "Noah's Ark." *Cirro-cumulus* is a high cloud, although lower than the cirrus. It gives a mottled appearance to the sky; the stratification of the cirro-stratus being broken up into detached masses, causing the appearance known as the "mackerel sky." *Cumulo-stratus* represents an intermediate stage between the cumulus and the dark storm cloud or *nimbus.* It is crossed by horizontal lines of dark cloud, and often covers the whole sky. The base, when visible, is usually flat, denoting the line of separation of a lower stratum of air at a higher temperature, so that the base is dissolved away to a certain level by evaporation into the warmer layer.

The *cumulo-cirro-stratus*, or rain cloud, is described as a confused intermingling of heap-cloud, streak-cloud, and sheet-cloud, and, unless its front is visible as it advances from the horizon, its form is usually unable to be distinguished. This cloud is also called *nimbus.* Professor Poey has suggested the term *pallium*, or cloud cloak, for the uniformly grey veil which often covers the whole sky during rain. He has also proposed the term *fracto-cumulus*, or wind cloud, for the torn fragments, broken away by the wind from a disintegrating rain-cloud. They are easily distinguished from cumulus by their torn, shred-like appearance.

Respecting the motion of clouds, those belonging to the lower strata of the atmosphere—viz., stratus, cumulus, cumulo-stratus, and nimbus—usually move in the same direction as the wind at the surface of the earth, except in mountainous districts, where local eddies are produced. The higher cirrus clouds almost always move at an angle to the direction of the wind below. The rate of motion of clouds on a breezy spring day has been proved to exceed at times eighty or ninety miles an hour.

(*To be continued.*)

SUB-AQUEOUS PHOTOGRAPHY.

BY E. G. CAREY, A.K.C.,
Assistant Engineer Forth Bridge Works.

The interest attached to recent attempts to obtain photographs in the caissons of the Forth Bridge is due rather to the novel conditions under which the experiments were conducted, than to any degree of success which has hitherto been achieved. Before, however, proceeding with an account of the difficulties encountered, and the results obtained, it will be well to describe in brief outline the construction and working of a caisson, so that the peculiar nature of the surroundings under which the work was performed may be the more readily understood.

No better definition of the word "caisson" can perhaps be given than its literal translation from the French, signifying "a box" or "coffer." The caissons of the Forth Bridge are constructed of iron, are circular in plan, with a diameter of 70 feet, and in appearance are not at all unlike gasometers. The caisson, having been built on shore, is launched, floated out to the position of the pier, and sunk, the upper edge being slightly above high water level. Seven feet above its lower edge is placed an iron floor, which divides the caisson into an upper and a lower compartment. The lower compartment is charged with compressed air, forced in through piping by machinery on the surface, and forms, in fact, a huge diving bell. The compressed air excludes the superincumbent water, and enables workmen to descend into the lower compartment, or air-chamber, through airlocks, similar in principle to the locks on a canal, and excavate the bottom on which the caisson rests. The "spoil" is drawn up in skips, and the caisson gradually descends of its own weight, until a firm bottom is reached. The whole caisson, both upper and lower compartments, is then filled up with concrete, and on this base the pier is constructed.

Such, then, were the conditions under which it was desired to obtain a photograph, in the air-chamber of a caisson, a huge diving bell, 70 feet in diameter, 7 feet high, sunk some 50 to 60 feet below high water, and charged with air, whose pressure was from 10 to 30 pounds per square inch higher than that of the atmosphere. The air-chamber was lighted by arc lamps suspended from the roof, the dynamos and motive power being placed on the surface.

During the first attempts, three arc lamps were employed, subsequently two more were added to overcome as much as possible the pernicious haze—of which more hereafter—in the air-chamber. Each lamp was equivalent to 1,200 candles, so that eventually a total power of 6,000 candles was requisitioned. The roof and sides of the air-chamber were whitewashed to render them more conspicuous in the negative, and to diffuse the light thrown on them more effectively.

Before proceeding into the air-chamber, a trial was made on shore to obtain some data as to the probable length of exposure required. A group, lighted on either side by an arc lamp, similar to those employed in the caisson, was taken on an instantaneous plate of the same rapidity as those subsequently exposed in the air-chamber; the lamps being carefully shaded by screens. An exposure of ten seconds with the largest stop gave fair results, and this period was assumed as the basis of operations in the caisson.

The first difficulty that presented itself inside the air-chamber was the formation of moisture on the lenses. After a few minutes, however, the glasses became warmed, and being carefully wiped, no further trouble was experienced on this score. The author had provided himself with glycerine, intending to rub a film over the lens to check the formation of moisture on the glass;* but this was not required.

The first exposures were 12, 20, 25, and 30 seconds respectively, with the largest stop; instantaneous plates of average rapidity being used. Three arc lamps lighted the caisson, but one only shone directly on the objects focussed. The whole of the plates were found, on development, to be considerably under-exposed. It was decided to considerably increase the length of exposure, and ten days later a second attempt was made under similar conditions of lighting and plates. Exposures of 5, 10, and 15 minutes were given; but the results were very poor, indistinct, and blurred, and particularly disappointing. Increased lighting power was obviously required; and for the next attempt 5 arc lamps were fitted in the air-chamber, being suspended from the ceiling.

Augmentation in lighting power was followed by an immediate improvement in the negatives obtained; and two groups, exposure 7 and 8 minutes, instantaneous plates, and largest stop, gave results of a more encouraging nature than any yet obtained. A lamp was placed on either side of the group, another immediately behind it, whilst the two remaining lamps illuminated the rest of the caisson.

In the final experiments made, it was decided to try the effect of plates of exceptional rapidity, and in this last attempt xxxxx plates, similar to those in use for the most rapid yacht work, were employed. A further improvement resulted: a considerable gain in definition and sharpness was secured, due, no doubt, in part to the shortened exposure (1½ to 2 minutes being found sufficient), a great desideratum when figures are embodied in the subject. In this instance, the whole of the arc lights were arranged in rows parallel to a straight line drawn from the camera to the centre of group in front, and sufficiently far away from that line to avoid shining directly into the lens, whilst throwing as much light as possible on the objects.

There can be, in conclusion, but little doubt that the haze in the air-chamber must always render the highest results unattainable. All that can be done is to seize the most favourable moment, when the haze is at its minimum, for the range of clearness of the atmosphere inside the air-chamber is very considerable. The air-compressing machinery should run slowly and steadily during the experiments, for any sudden inflow of fresh air will at once tend to raise the haze. Similarly, any sudden expansion of the air, such as that due to its escape, when the excavated material is drawn up through the lock provided for that purpose, at once produces a marked accession of fogginess.

If figures are introduced into the photograph, they should wear as light-coloured clothing as possible, for an inspection of the results obtained indicate at once with what greatly increased clearness all white objects stand out; whilst it will be noticed with interest that the human eye, presumably from its glistening properties, has caught the light, and gleams out of the picture with an unnatural glare, hardly calculated to reassure the timorous visitor, scanning the records of what he will encounter below, whilst endeavouring to brace his mind for a descent.

Owing to the hazy atmosphere it will be found advantageous to keep the camera as close as convenient to the subject, thereby reducing the length of supervening fog as much as possible. So far as could be ascertained, no injury resulted to the plates, either from the moisture below, or from the heavy atmospheric pressure to which they were subjected.

The lens used in the above experiments was by Dallmeyer, 2½ aperture and 18 inch focal length, the plates being 12 by 15.

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* A method due to W. D. Valentine, of Dundee, and employed by him when engaged on sub-marine photographic experiments in connection with the ruins of the Old Tay Bridge.

Another caisson remains to be founded, when it is hoped further efforts may be made in this direction to secure photographs under conditions as novel as difficult, and with more success than has hitherto attended the attempts here briefly sketched.

The best thanks of the author are due to W. D. Valentine, of Dundee, who accompanied him on two occasions into the air-chamber, for much valuable advice and assistance, kindly afforded to him in this matter.

Notes.

Our supplement this week, "Preparing for a Rainy Day," by George Renwick, is a picture of a kind—descriptive rather than imaginative—for which photography is, in the opinion of many people, better suited than for subjects where it is attempted to give form to more poetic aspirations. The pose of the umbrella-mender is unstudied and natural, and the accessories such as properly belong to the figure. As to absolute beauty, there is even yet no universally recognised standard. If, however, as has recently been stated on authority, there is perfection of a certain kind of beauty—resulting from adaptation to utility—in a plough and a wheelbarrow, surely something may be said in favour of a step-ladder, an umbrella, and a knife-grinder's wheel.

The subject of Mr. Renwick's picture is one which obviously justifies its title. Except for the taste of those who profess æstheticism of the highest cult, there has probably being enough, both in picture galleries and in photography, of a mawkish looking female figure which might certainly as well be labelled "Vacuity," as with any of the titles supposed to be expressive of some mood or emotion which it has pleased the artist to fix upon.

The idea embodied in the "detective camera" is being worked—and worked well, too—on the other side of the Atlantic. The October Number of *Anthony's Bulletin* is illustrated with a couple of "shots" on quarter-plates, headed "Taken by an Amateur." One is a picture of black sheep, the grass and background to which come out with evidence of ample exposure. The other picture is a street scene, and this also shows good exposure throughout, whilst the moving figures are well caught, and the houses in good focus; altogether a capital little picture. Now that gelatine plates have advanced to such a degree of rapidity and perfection, "detective cameras" of one kind or another will doubtless come more and more into favour with amateurs.

The art of advertising is one in which the Americans are by no means behind. We have been accustomed to see attractive faces used on hoardings to advertise things—such as cigarettes, for instance—with which they have no obvious connection. In an advertisement of a roller-slide camera that reaches us from the States, the operator is represented by a charming girl of apparently about 14 years of age, who, with daintily-gloved hand, is manipulating the apparatus. "How easy it must be to work!" is the thought suggested simultaneously with admiration of the fair face and comely attire.

That enterprising young society, the London and Provincial Photographic Association, has been much exercised at its last two meetings on the subject of "Auxiliary Exposures." The effect of these exposures in causing a higher sensitometer number to be registered upon the plate than would be obtained without it, was pointed out by W. K. Burton and others some three years since, and has been generally recognized; but being denied by one member of the L. and P. P. A., the Society determined to repeat the original experiments, and ordered its Secretary to procure the necessary plates, appliances, &c. However, two gentlemen having brought up a report confirming the original statement, the incredulous member confessed himself satisfied, and the facts were considered as established.

Next Friday, the 13th inst., will be the annual "benefit night" of the Photographic Benevolent Association at the Exhibition Rooms. We hope that the evening, which is always more or less of a social gathering, will be well attended.

Permission is generally required to photograph in places of special interest on the Continent, and the following experiences may embody a useful hint as to how to go to work to get the permission. Two tourists wished for permission to photograph in the Forum and Coliseum at Rome. One of these went to the central office of works, and asked formally for permission to photograph. His passport having been inspected and he himself catechised, he was sent from department to department, and at last received a letter which, after having been signed by his hotel keeper, would be exchanged for a permit at the office of the superintendent of antiquities. The other went direct to the office of the superintendent of antiquities, and holding out his small camera—which, by-the-bye, was compressed to the utmost, and the legs shortened to the extreme possible—simply asked for an authority to take this small photographic apparatus into the Forum and Coliseum. It was granted instantly, the only pause in the preparation of the document being when the official came to the place where the name should be filled in, and paused to ask—What name?

The practical lesson is, that when the tourist merely wishes to expose a few dry plates in a place of interest, he should take care to let the official know that he will neither set up a tent nor otherwise cause inconvenience.

Photographers' posing chairs continue to be patented in America. Of one of the most recent we learn by its title that it is intended for "photographers' or dentists' use. The title and a reference to "easily operated levers," described as part of the invention, recall an illustration—also American—of a "too much rested sitter" which was reproduced in the last YEAR-BOOK. Mention of a "dentist's chair" must bring to the mind of the portrait photographer the times out of number that a sitter has entered the studio with the observation that he (or more generally she) would as soon have a tooth out as be photographed. Possibly the remark had some piquancy, if not truth, the first time that it was uttered, but by too frequent repetition has become so stale and irritating that the portraitist wishes it had never been invented, or that he might be allowed to assess the punishment to be inflicted upon its originator.

Another American invention is a child's photographic chair, and is described as provided with a back support, adjustable head-rest, and clasps or arms so arranged as to clasp the waist, "thus providing a secure and comfortable support for a child whilst being photographed." We fancy that children so young as to require a clasp round the waist do not easily submit to the use of a head-rest, and that the mere endeavour to apply the "clasp round the waist" would not unfrequently cause them to straighten themselves out with a yell, and endeavour to throw themselves off the chair. Once upset in such a way, the little ones are not readily restored to the necessary composure. The photographer who succeeds best with children is one who gains their confidence, and does not rely upon machinery.

The approaching election, should the weather be favourable, ought to be taken advantage of by photographers to obtain some very characteristic pictures. The example has already been set by a Paris photographer. On the recent famous election Sunday he set up his camera opposite one of the voting offices, and whenever an excited group was found, he took an instantaneous photograph. At such a time when even the most serious of persons grow animated, and lively persons lash themselves into a state of semi-madness, some exceedingly curious pictures ought to be obtained.

A correspondent of the *English Mechanic* lately wrote to enquire if anybody could tell him of a town where there was no dealer in photographic materials, as he contemplated starting in the line, and did not want to oppose any established man. In reply, he gets the information that in Stockton-on-Tees, a town of 60,000 inhabitants, there is no thorough dealer, two chemists only keeping a little of the prepared paper and a few of the chemicals required. In addition to Stockton, there is South Stockton, Middlesborough, with another 60,000 inhabitants, four miles away, and the Hartlepools, twelve miles away, and of these, Stockton forms the market centre. This district should certainly suit the speculative correspondent of our contemporary. It is to be hoped, however, for his sake, that the two chemists will not take the hint, and show a little more enterprise.

The *Standard*, in an article on "Suburban Architecture," remarks that the peripatetic photographer justifiably regards the "villa" as made for him. He can put up quietly and politely with the refusal of the ordinary house to be taken, but that an inhabitant of a villa should not require views of it from all the thirty-two points of the compass is a thing he can never understand. His astonished look asks you, "What else did you build it for? Its manifest destiny is to be photographed." There is a little truth in this, but, so far as our experience has gone, the peripatetic photographer does not confine his surprise to a refusal to be allowed to photograph a villa. He is equally astounded when, after telling you that "the light is just right," you do not immediately pose and ask to be taken. Bicyclists, from their speed, do not give him much chance; but the tricyclist is invariably looked upon as a likely customer. Strolling couples on the sands or on Blackheath or Clapham Common he at once pounces upon, and Epping Forest excursionists have hard work to escape being "took." In brief, to the peripatetic photographer, the whole world's mission is to be "photo'ed," and from his point of view he is quite right.

A fashion journal says: "Such a burst of *facsimile* counterfeit presentments of the Royal Family has not been seen in West End windows for years." The Duke of Connaught, it informs us, has had a new carte taken, and so has the Queen; while the demand for copies of the portraits of Princess Beatrice and Prince Henry of Battenberg is "enormous," and the writer quite expects the two "cabinets" will be the photographic rage of the season. This is very satisfactory from the dealer's point of view, but is no consolation to the photographer. It is a lamentable fact that few persons—especially men—have their photographs taken now-a-days. If proof were wanting, it would be found in the experience of the editor of a well-known paper, who has for some time past been collecting the biographies and the portraits of the innumerable candidates for the new metropolitan constituencies. Out of some thirty gentlemen who were applied to for their photographs, only two were able to supply them. The remaining twenty-eight had to sit on purpose!

It is a sign of the times when we find newly-appointed bishops enlisting the aid of photography to "make things pleasant" with the clergymen of their diocese. We are told by the *World* that the new Bishop of Lincoln is indefatigable in preaching at harvest and other festivals in the various village churches, and that he is generally accompanied by a considerable amount of luggage containing all manner of strange garments and headgear which, however, he kindly refrains from donning if the startled incumbents exhibit any alarm or scruple upon the subject. It would seem from this that the Bishop is rather "high," for the *World* goes on to say, that to familiarize the country parsons with the cope and mitre, photographs of his Lordship in his robes are being circulated throughout the country. This, no doubt, is a very excellent idea, but it is to be hoped that it won't be pushed too far and produce an effect opposite to that intended. There is such a thing as familiarity breeding contempt.

If what a correspondent writes be true, photographers who make a living out of photographing the "hatched, matched, and dispatched" column of the *Times*, and sending a copy to the persons interested must—to describe them tenderly—be exceedingly thrifty. Our correspondent writes:—"I had occasion this week to go to the advertisement office of the *Times* to put in a notice of a death. Being a little uncertain as to the conventional wording of the notice, I turned to the file which is kept for reference and can be clipped, provided you do not cut the brown paper on which the file is pasted. Judge of my surprise when, on looking through the "paste up," from top to bottom, I found the column I was in search of cut bodily away in every instance. There was a man whom I took to be a *Times* employé standing by, and I asked him the reason. "Oh," said he, "it's them advertisers. Sometimes it's baby-bottle makers, other times furniture-hire people (for the young couples a beginning 'ouse keeping), occasionally tomb-stone merchants, and very often photographers. You can always tell *them*, because they cuts out the whole blessed lot." We hope our correspondent has been imposed upon, and that the man who gave him this information was only "chaffing" him. We do not like to believe that any photographer cannot afford to buy a copy of the *Times*, especially when he means to make money out of it.

Patent Intelligence.

Applications for Letters Patent.

12,870. **William Rawlinson**, 11, Hyde Park Road, Leeds, for "Improvements in photographic cameras."—27th October, 1885.

12,881. **Alfred Augustus Hely**, "The Hollies," 94, Stockwell Park Road, S.W., for "Improvements in framing and displaying photographic and other pictures, plaques, and mirrors."—27th October, 1885.

12,955. **Robert James Bell**, c/o London Stereoscopic and Photographic Company, 54, Cheapside, E.C., for "Internally fitting travelling-bag with complete set of photographic apparatus for the production of finished negatives, each article, or set of articles, being in a separate sheath; combining with the aforesaid, and in the same bag, and in a separate compartment thereof, an expanding dark-chamber for changing sensitive plates, with the accommodation for clothes and other travelling requisites to be found in the bag commonly called the Gladstone bag."—28th October, 1885.

12,972. **Alfred Julius Boult**, 323, High Holborn, Middlesex, for "Improvements in or relating to holders for photographic films."—(*George Eastman*, United States.)—28th October, 1885.

13,105. **Ernest Daniel Adcock**, 53, Chancery Lane, London, for "An improved vignetter for photographic printing frames."—30th October, 1885.

Patents Granted in America.

328,512. **Oscar M. Pausch**, Newark, Ohio. "Photographic plate-holder."—Filed February 26th, 1885. (No model).

Claim.—The herein-described photographic plate-holder, consisting of a frame, lid, reversible plate-slide, provided with spring and rod, arranged to engage with one of the springs upon a plate-slide, and a securing-spring, the whole combined, arranged, and adapted to permit the shifting of the plate for double exposures.

328,664. **Matthias Flammang**, Newark, N. J. "Photographic camera."—Filed February 24th, 1885. (No model).

Claim.—1. The combination, with a camera and a frame arranged beneath the same, having a fixed section and a swinging section, of a securing-piece unconnected with the rear portion of the camera, and grooves or slideways in the frame in which said securing-piece may slide, substantially as described, whereby by a relative rectilinear movement between the securing-piece and the frame, the swinging section may be locked in line with the fixed section, or unlocked therefrom without affecting the position of the camera relatively to the frame.

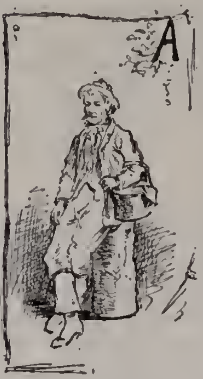
2. The combination, with a camera, of a frame arranged beneath the camera, having a fixed section and a swinging section, a securing-piece for locking the swinging section and fixed section together, and a tripod fastened to the securing-piece.

3. The combination, with a camera, of a frame arranged beneath the camera, having a fixed section and a swinging section, a securing-piece unconnected to the rear portion of the camera, fitted into the frame, and capable of a rectilinear movement for locking the swinging section and fixed section together, and a stop or stops for limiting the movement of the camera and frame upon the sliding-piece, or the sliding-piece upon the frame, substantially as specified.

4. The combination, with the camera, of a frame having sections, provided with grooves, tripod, and securing-piece, secured to the tripod.

THE PHOTOGRAPHIC EXHIBITION.—No. III.

BY A. H. WALL.

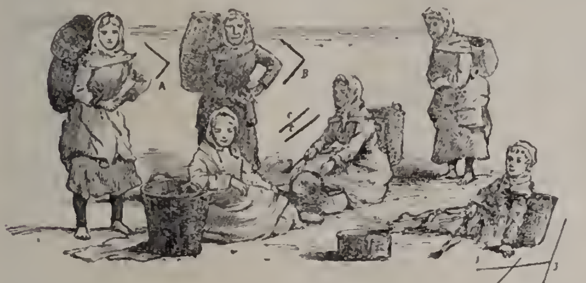


A MISTAKE which crops up very frequently in this collection of photographs is that of regarding a picturesque model as forming the picture. The artist has not done all his work when the model is selected; he has only got part of his material, and by no means the chief part. The model has, in the first place, to tell some story in keeping with his or her character and appearance; and in the selecting of that story, the artist's imaginative and perceptive powers are necessarily exercised. If he has no such powers, his chance of making a picture is a very slight one. When the model says, "Here I am, look at me!" as so many of the models here photographed do, more than half the charm and all the interest of a picturesque exterior are simply wasted. It may be a study, it is not a picture.

In the next place, a model being selected, and story conceived, come the questions, how can my story be most effectually or forcibly told? What is its prevailing sentiment or feeling? Upon the answers you give to these questions depends the artistic treatment to be decided upon. The model is therefore, you see, only one link in the chain of our requirements for constructing a picture—an important one, but not the dominant one; that one is the story. "Let us not flatter ourselves," wrote a former President of the Royal Academy, "that we imitate nature when we merely take a model from the streets to tamely copy his peculiarities."

My initial sketch from one of the exhibited photographs is a case in point. Here the model was picturesque, and suggestive of many an interesting incident of homely life; but the photograph is no more a picture than would be any ordinary portrait photograph of the most commonplace model, such as might be "taken" without more exercise of the imaginative or intellectual faculties than a machine would display. Imagination to create the story, and judgment to select the model, are doubly essential when all that nature supplies us to work with is a model. Of course, nature will often do more than this, for many of the finest pictures ever painted have been the result of some incident of which the artist was merely the quick and attentive observer, not the creator.

Suppose a case. I go down to the sea, and there find picturesque material in rich abundance—sea and sky, and cavernous cliffs, nets, and fishing-boats, &c.; and for models, a delightful assortment of those most picturesque and interesting people, the fisher folk. I find them full of quaint ideas, with their individuality strongly marked, their curious customs tinged with a prevalent old-time colouring; their work, their homes, their manners, and their social peculiarities, all deeply interesting and novel. There are touches of heroism to warm the heart, suggestions of boldness, and of brave endurance in facing terrible hardships, and the pathos of partings, any one of which—as they only too well feel and know—may well be for ever. But instead of being watchful of these folk, I take them, as it were, out of themselves, and convert them into so many unmeaning and uninteresting lay figures, telling them how to stand, and where to look, and solemnly impressing upon them the awful necessity of not moving. I naturally get some such result as I indicate here in a hurried sketch from No. 233.



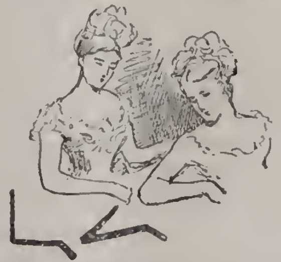
I do not say it is easy to get what the photographic artist wants; on the contrary, it is exceedingly difficult. But the photographer has a very fair chance of getting it if he is watchful and observant, and, above all, artistic. At the least, he ought to get something very much better than this little sketch indicates, in which even the ordinary rules of posing and grouping are almost altogether ignored. It is true that the boy lying down breaks the otherwise awkward and formal tit-tat-toc all-in-a-row arrangement of the famous "three jolly butcher boys." But why is he stretched out so uncomfortably? and what is there in action or story to give meaning or interest to these isolated figures? No one of them appears to have any necessary connection with another. Note, too, what poverty of invention the posings suggest. Surely it could not be so very difficult to find more positions, that one—and that the worst—should be repeated twice over in securing a poor half-dozen, if the photographer had began with some story or incident that would, in itself, have suggested to him and the models a greater variety of positions—even, say, if they had merely been engaged in gossiping, one or more talking and the others listening.

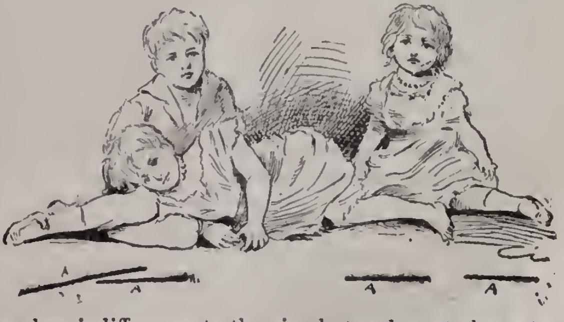
An artist commonly makes a rough, hasty jotting of some actual incident, and then arranges his models, to leisurely reproduce it with accessories and models of a suitable kind, trusting largely to a trained and practical memory. The photographer who, like Mr. H. P. Robinson and others, or myself, can use the pencil, may do this; but those who cannot may expose a dry plate, and if they do not get a good photograph, may get much more than a slight pencil-jotting—such as I illustrate these papers with—can give. Indeed, it is now becoming quite a common thing amongst artists to carry with them a small camera when they are on a sketching excursion, trusting to it for the mere forms, details, and outlines, while devoting their own anxious study and precious time entirely to effects of colour, atmosphere, relative tones, proportions, &c.

I fancy my next subject (No. 200 in the catalogue) may have been something of this kind. The girl is giving a draught of water to a tired wayfarer. I wish she had done it with a kindly smile, and he (the thirsty and tired wanderer) had seated himself a little more comfortably, as he readily could have done without spoiling the composition, and naturally would have done. To tell a story naturally is, as I pointed out in my last paper, quite as important as to tell it artistically or forcibly.

I notice, in several of the photographs, an artificial brilliancy and forced effect of light, resulting from under-exposure and over-development. This is as great an error artistically as it is photographically. The result of such partial development is, in some cases, that of making a light object mar the source of light, darker than one farther removed from it, and this I need hardly point out as glaringly untrue. In one case I imagined this must be due to over printing; but I have since been told by the photographer himself that the effect in the print is identical with that in the negative.

It is a little irritating to find what excellent material for a picture is sometimes spoilt by thoughtlessness or careless indifference to the simplest and most elementary rules of art. What, for instance, could be more ungraceful





or ugly than the way in which the ladies' arms are placed in this example from frame —? or that in which the legs of these children are placed in my sketch from exhibit No. —? all, in the same way, forming a formal line, and making the principal light fall, not on the principal part, but on the raised knee of the boy.

Sir Martin Archer Shee, P.R.A.'s, remarks on the difference between imitation and invention in painting may very well be applied to the difference between a mere mechanically produced photograph, and one in which invention or imagination is displayed. He says: "Though, in a general sense, painting may be said to be imitation, yet that imitation consists of different kinds, more or less mental or mechanical; as, imitation of arrangement or composition, of form, of character, of expression, of light and shade, &c.;" and he adds, "As every art claims our esteem in proportion to the degree of intellectual power which it displays, it follows that the inventor is superior to the imitator. The conception of a subject, story, or plot, the discovery or connection of such events or circumstances as are best calculated to convey whatever moral the poet and painter design to express, must be considered the first and highest effort of invention, as requiring the purest exercise of the mental faculties." He goes on to say, "The subject may be well conceived, the scene well arranged, and the objects properly placed, without any particular grace, energy, or animation in the action of the figures represented. Picturesque, appropriate, and elegant action, therefore, may be considered the third part of invention, and the second of the higher kind of imitation."

"It is obvious that all the foregoing merits may exist, in a considerable degree, without conspicuous beauty or symmetry in the forms, just adaptation in the characters, or due discrimination in the attempt to be expressed; and it is equally obvious that the several parts of art which come under the description of subject, composition, action, form, character, and expression may be acquired in great perfection without any superior skill in chiaroscuro and colouring. *The most essential and intellectual parts of art are therefore comparatively independent of the two last qualities;* and he who displays the former in the greatest perfection must always be esteemed the greatest artist, although he may be surpassed in those subordinate and more mechanical accomplishments."

Without quite endorsing the great artist-president's estimation of light, shade, and colour—to the importance of which, in connection with expression, feeling, and sentiment, he hardly perhaps does justice—I quite agree with him, and this applies to photography, in regarding invention or imagination, and observation, as the highest qualities of a work of art—and as being, if not independent of colour and chiaroscuro, certainly of higher rank intellectually than their excellences; inasmuch as they are qualities ranking above the aid of rules and technical acquirements, and resulting from a loftier degree of mental culture. At any rate, it will encourage photographic art-students to find one of the most learned of the Presidents of the Royal Academy did not consider either good colour or correct light and shade as deserving to take rank with the higher art qualities of "composition, action, form, character, and expression," upon all of which I have touched critically in application to available specimens on the above comments and remarks. I have emphasised the ungainly lines of the above compositions by actual lines indicated by letters. These tell their own story, being evidently wanting in either grace or variety.

BUTTER FOR RENDERING PAPER TRANSPARENT.

BY JEAN VILLE.

It may be of interest to the readers of the News to know of a clean way of rendering negative paper free from grain. I have tried vaseline without satisfactory results, and the castor oil method requires space and facilities for washing up afterwards, not easily obtainable while away from home. The following is the method employed.

Take a negative on the paper and pin it, paper side up, on a board. Apply butter (cold) all over it, with the fingers; put on plenty. Then hold the negative over a paraffin stove, with the flame turned low. The butter will at once begin to melt. While it is melting, hold it in the left hand, and with the fingers of the right keep the melting butter moving over the less greased portions, and with the left hand move the negative about. Continue till an even surface is obtained, which will be in about five minutes or less, depending on the size of the negative. Then lay, paper-side still up, on a board or cloth, and, while warm, rub off the surplus butter with tufts of cotton wool; it will probably be necessary to re-warm the negative several times during this operation. Should any butter, by chance, get on the film side of the negative, warm it and rub it with cotton-wool, and it will at once come off. Give a final rub with cotton-wool dipped in alcohol, and the negative is ready to print from, and has a fine ground-glass appearance.

PHOTOGRAPHIC APPARATUS AT THE ENGLISH PATENT OFFICE.

BY CHAPMAN JONES.*

Changing-Boxes.

Any apparatus that holds a number of detached plates or films, and allows of their exposure, is included in this section. There are certain distinct principles available for this purpose, and each subsequent paragraph gives a group of inventions similar to each other, and differing more or less from the other groups. In many changing-boxes the individual plates are carried in frames to prevent injury by friction, and generally to facilitate the movements; but the use of such frames is not subsequently mentioned.

The first changing-box recorded is by T. E. Merritt (August 1, 1854), who carries "any required number of prepared papers or glasses" in a box that takes the place of the camera-back. The sensitized papers are each mounted between two glasses. The plates are pushed forward by a screw, so that the front one is in correct position for exposure, and a slide under the front plate being withdrawn, the exposed plate falls into a box below. The plates are pushed forward till the next one is ready for exposure, and so on. The receiving box has a separate compartment for each plate, and slides so that any compartment may be brought under the opening through which the plate falls. The same method, among others, is described by H. du Mont (June 8, 1861); but the box containing the plates, and the box below to receive them, are mechanically connected, so as to move in opposite directions. Both boxes are grooved, and the movement of the upper box brings the plates successively into position for exposure. This apparatus is arranged for the purpose of taking rapidly a series of pictures of a moving object. W. Donisthorpe (November 9, 1876), for the same purpose, avails himself of the same principle.

Instead of keeping the store of plates attached to the camera, and removing them as they are exposed, the changing-box may supply one plate at a time to the camera, or to a dark slide constructed for the purpose, and receive the plate back again after exposure. J. B. Dancer (September 5, 1856) has the box of plates sliding against the camera by a rack-and-pinion, so that any plate may be brought opposite a hole, and by means of a rod drawn into proper position in the camera for exposure. The plate is returned to the box, and then the rod detached from it. This method may be modified, or the dark slide may receive the required plate from the box, and return it after exposure. The opera-glass camera, described by W. E. Newton for H. Cook (May 22, 1867), has a box to hold, perhaps, fifty plates, which brings its plates alternately against its door by turning it over. This is fitted to the camera, the openings in both uncovered to allow the plate to fall into place, and, after exposure. the plate is allowed to fall back again, the openings are closed, and the box removed. G. Hare (May 7, 1875) and C. Sands (October 5, 1881) both describe a changing-box with dark slide so constructed that both open automatically when they are fitted together, and close when separated, that the accidental admission of light to the plates, by reason of the changing, may be scarcely possible. T. H. Blair (February 4, 1880) has a changing-box that is carried inside the back part of the camera. For use, a sliding cover is withdrawn from an opening in the back part of the camera, and the changing-box lifted out, and slid, lid downwards, into the vacant grooves. By now removing the sliding lid of the changing-box, any plate is able to fall into the camera when it is released from the spring-catch that supports it. After focussing, the plate-carrier is brought under the required plate to receive it, and then, by means of a rack-and-pinion, moved into position for exposure, the position being indicated by a bar projecting outside the camera from the plate-holder, which is marked when focussing. The plate is returned to the box by bringing it under its place, and inverting the whole apparatus. One other modification must be included with this group, although it merits a position, perhaps, between the inventions under consideration and those referred to in the previous paragraph. A. M. Clark, for E. Enjalbert (November 12, 1881), describes a changing-box that fits to the back of the camera like a dark slide, with all the plates facing the lens. The box with the plates may be drawn to one side, and any plate that is previously secured by a screw or otherwise, remains alone at the back of the camera for exposure. There are grooves for the focussing screen corresponding to each plate; but a sliding scale enables one to get the focus on any plate after focussing for any other.

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* Continued from page 683

Two plate-boxes, or one box with two compartments, so that the plates may pass from one to the other, is the arrangement adopted by W. Cook (June 10, 1869). The upper compartment is open to the camera, and has a sliding shutter. When this shutter is drawn out, the front plate takes its position for exposure by means of a spring behind, and the act of closing the shutter drives the exposed plate before it down into the lower compartment. A new plate is thus ready for exposure, but it is necessary at each operation to draw up the back plate of the lower compartment, for which purpose there is a sliding arrangement. T. Samuels (February 15, 1883) has a similar apparatus, but working horizontally rather than vertically, and he does not limit himself to two boxes of plates, nor does he move the exposed plates out of the box that receives them. The plates pass into an empty box till it is filled, its lid is pushed on, and it is removed; the emptied box is now made the receiver, and a new box of plates is attached. This plan appears to offer unparalleled advantages where one wishes to expose many dozen plates in one day. J. H. Hare and H. J. Dale (February 24, 1883) describe a changing-box that resembles Cook's, where Samuel's differs from it. They have two tiers of plates; the front plate of the lower tier may be exposed in the camera by withdrawing a slide, and the plates circulate round the apparatus as necessary, but by simple rotation of the box. A screw behind each tier of plates presses them together to keep them in place when the changing is not taking place.

An arrangement for automatic exposures is described by W. R. Lake for E. J. Molera and J. C. Cebrian (March 20, 1880), in which the plates pass from a box on the top of the camera down into the dark slide for exposure, and then down into a receiver below the camera. The necessary movements are made by machinery.

Films or plates are changed by hand by A. Pumphrey (November 12, 1881). This dark slide is merely a case with an open front, and holds a pile of films. An opaque screen is over the top film, and for exposure this screen is placed below the first film to protect the second. The exposed film is then placed at the bottom of the pile; and finally, for removal, the screen is left on the top again. The change takes place in a chamber partly glazed with non-actinic glass, formed by extending the camera behind the focussing screen, a hole and sleeve being provided for the introduction of the hand. W. Lawley and H. S. Starnes (December 21, 1881) have a similar changing-chamber, but their slide carries only one plate, and there are two boxes with spring sliding tops, opening into the chamber through its floor, one to hold the new, and the other the exposed plates. The plates are separated from each other by sheets of paper only.

The changing-boxes that have been considered so far are all good, inasmuch as they protect the plates both before and after exposure, from dust, &c.; but they all, except the two last inventions, are likely to be more or less troublesome on account of the turning about that is necessary, disturbing the dust that has settled. It is practically impossible to keep such things free from dust of some sort or another, and the attrition of parts, sliding of plates, &c., is certain to add its quota to the nuisance. In the rotating arrangements that follow, the disturbing effect is probably far less, but the sensitive surfaces are poorly protected when the apparatus is at rest.

In one method that H. du Mont (June 8, 1861) describes of getting rapidly succeeding photographs of moving objects, he arranges his sensitive surfaces on a drum, by the revolution of which each surface is brought into position as required. E. Hodgson (June 16, 1873) also has a drum to revolve vertically or horizontally, with an exterior dial to indicate the plate that is being exposed. A far more cumbrous method by A. Pumphrey (April 9, 1881) consists of two horizontal rollers with an endless band over them. The films are firmly attached by the edges of their frames to this band, and the upper roller is immediately below where the plate-holder would be in an ordinary camera, so that by turning the rollers, as the band passes round, each plate stands up ready for exposure, and passes on as the next rises. There are stops to ensure the correct position of the plate for exposure, and these are withdrawn to allow it to pass on. The case that contains this arrangement occupies about five times the bulk of the actual camera.

THE CAMERA IN THE CORAL ISLANDS.

A Photographer's Diary of the "Wairarapa's" Second Trip to the South Seas.

BY A. H. BURTON (BURTON BROS.).*

Saturday, July 26th.—A day spent in the orange groves—for Neiafu is literally built amongst the oranges. Both houses and people presented a marked difference from Samoan houses and people. Whereas the houses in Samoa are just a roof on pillars, with a series of Venetian-like screens, which can be let down or raised so as to exclude or admit light or air at will, the Tongan dwellings are similar to the Fijian, and have permanent walls, with two or perhaps three doors. The characteristic of the people which strikes the stranger at once as varying from that of the other two groups is the greater prudery or perhaps modesty of the women. While the Fijian and Samoan women, for the most part, seemed to look upon the upper garment as one to be either worn or thrown off—especially when the latter course was suggested for æsthetic reasons—the Tongan women seemed to regard a wish that they should do likewise as somewhat as a liberty. After taking a view of the Wesleyan Church, was persuaded to try one of the interior. It shows to advantage the greatest charm of all native buildings—the roof. However large the edifice may be, the roof is put together without screw or nail; it is, in fact, just held together with fibre. The next subject was a picture of the venerable King George, who is now eighty-six years old, taken in front of his palace. Then followed a group of Tongan notabilities, viz.:—Rev. Shirley W. Baker,

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* Continued from page 622.

Premier; Prince Wellington, grandson of the King and heir-apparent to the crown (native name and title—"W. G. Tubou Malohi, Governor of Vavau"); Junia, Minister of Finance; Fotofili, Governor of Niuafoou; Rev. J. B. Watkins, Superintendent of Vavau Circuit; and J. Afu, Chief Clerk in th Department of Finance. Several sweet pictures from th Cemetery—from the top of Olopeka, looking towards Talan ("The Pudding")—a set of "stereos," and some groups of Tongan girls, complete the tale of thirty-seven plates, the heaviest day's work in either trip.

Dinner this evening was noteworthy for a really capital display of post-prandial eloquence. We were honoured by the presence of several distinguished guests; among them Prince Wellington and the Premier. Mr. Crossman, in a very happily-worded speech, proposed the health of the Prince, who, after a few prefatory words in well-chosen English, requested Mr. Baker to translate while he continued his speech in Tongan. The health of the Rev. S. W. Baker, proposed by Mr. Wheeler, gave the Premier the opportunity of setting before us in a few words the present condition of Tonga, in contrast with its state a very few years ago. "When the government was first formed the King had not an income of twelve pence; now he has twelve hundred pounds a year, while the Prince enjoys a handsome salary. The revenue of the country is one hundred thousand dollars, against just nothing at all at the period above referred to. All this," he declared, with pardonable self-assertion, "is my work." As to the calumnies that had been circulated about him, he would be quite prepared to meet them at the proper time: meanwhile he would tell us that he was known among the Tongans by a title of which the English word "Invincible" fairly conveys the meaning. As to the question of annexation, Mr. Baker gave forth no uncertain sound, declaring that his motto was—"Tonga for the Tongans"—averring that the Tongans were perfectly able to maintain their independence, and that he for one would never listen to proposals for annexation to any power; though he trusted that the closest friendly relations would ever be maintained with Great Britain and her Colonies, especially with Auckland. He concluded with a very neat compliment to the Union S.S. Co., and the Prince endorsed this compliment in giving the health of Captain Chatfield.

Sunday, July 27th.—Sailed this morning at seven o'clock for Nukualofa, Tongatabu, our last place of call.

(*To be continued.*)

Correspondence.

DR. MILLER'S PHOTO-MICROGRAPHY.

Sir,—In the last number of the News there appears a portion of Dr. Miller's paper on this subject, in which he states—(1) He uses no eye-piece; (2) the camera-screw being 2 feet from the stage of the microscope, with a first-class one-eighth object-glass, you may get a magnification of from 800 to 1,000 diameters. This statement is so completely at variance with fact, that I took the trouble last evening to measure the magnification with my own apparatus, in the presence of the Physician to the Incurable Hospital here, who has been using it for some time past to photograph slides of sputum. The micrometer used was one of Smith and Beck's, a very good one, purchased from them about twenty-five years ago. The camera-screw was 27 inches from the stage of the microscope, on which lay the micrometer. The object-glass used was one of Powell and Lealand's new formula water-immersion (one-eighth), one which certainly comes under Dr. Miller's designation of first-class. The distance from micrometer to screen was greater, by 3 inches, than the distance referred to by Dr. Miller. Under these conditions we found that four divisions of that part of the scale ruled into thousandths of an inch exactly covered one standard inch. The magnifying power was therefore 250 diameters. This was without the eye-piece, as recommended by Dr. Miller; and yet he says in these circumstances, and at the distance of 24 inches, you may get from 800 to 1,000 diameters. We also measured Zeiss E, stated to be equal to a one-ninth object-glass, and we found this glass give exactly the same power—viz., 250. This E had no correction for cover. On a previous occasion we measured Zeiss' best and newest quarter on the same apparatus, and at the same distance, and found the power to be 125.

What are we to think of the other authoritative statements of Dr. Miller on this subject, if he is so far mistaken in this particuilar? The truth is, that very few who undertake the production of photo-micrographs know much about the subject, and do not take the trouble to enquire. Some recommend for this interesting branch of photography, the use of "French buttons" for lenses, and some are satisfied with an apparatus constructed of old cigar boxes. Nothing of this sort will serve the purpose well. Every defect in the subject is so very largely increased by the power applied, that nothing short of the very finest lenses and apparatus can give good results.—I am, yours, &c., W. Forgan.

A GOOD SODA DEVELOPER.

Dear Sir,—I am sorry that I left a point of uncertainty in my article on "A Good Soda Developer." I should have said bicarbonate of soda (Howard's). I have used the carbonate and the ordinary bicarbonate, but until I got Howard's I could not get the effect I wanted.—Yours faithfully, W. T. Wilkinson.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 29th ultimo, Herbert S. Starnes in the chair.

A. L. Henderson passed round some views of Paris, taken by M. Stebbing; they were examined with interest.

The Chairman then called upon the gentlemen appointed last week to continue the sensitometer experiments.

A. Pringle began by saying that it was possible some might think it presumption on his part to carry out a set of experiments in private, when they should have been performed in the Society's dark-room; but the lighting arrangements were untrustworthy for careful experiment. He therefore took the liberty of carrying on the same in private, and he had brought them forward, as far as they appeared likely to be of utility. Mr. Barker's suggestion at the last meeting was particularly valuable, and in an extended set of experiments might be made use of. In the present instance, however, he had confined himself to ammonia-pyrogallol development throughout. The whole affair, he believed, began with a statement of Mr. Burton's, in which that gentleman stated, in effect, that a certain amount of supplementary exposures, short of fog, produced a higher number on the sensitometer.

W. K. Burton: On some plates.

A. Pringle (continuing) said that he had taken Wratten's plates, and his first object was to find out how much exposure could be given to a plate without producing fog. He used just a peep of gas, and began with 4 seconds' exposure at a fixed distance, then 8, 12, and 16 respectively. These were carried out with perfect accuracy, the result being that the 4 seconds' exposure gave no fog; the next one—viz., 8 seconds—gave just a little; the 12 seconds' plate was unmistakably fogged, and the 16 also. He then exposed another set, 6, 12, 18, and 24 seconds respectively, under precisely similar conditions, and the result showed 7 seconds as the point which gave fog. Having determined the point he dare not pass to be 7 seconds, he exposed a plate for that length of time, and placed it with another not exposed at all into the sensitometer, and exposed them in the usual way. These plates were developed in the same dish, in Mr. Cowan's presence, with a developer unknown to him, and the time occupied was precisely five minutes. Another pair of plates were treated similarly, and afterwards fixed; he would not of his own will have fixed plates in an experiment of this kind, but thought it better to make a pair each way. The pre-exposed plates gave three or four numbers on the sensitometer higher than the others.

A. Cowan made a similar set of experiments to those mentioned by Mr. Pringle, and he had varied the length of exposure, and shortened the time of development to two minutes. He had no hesitation in saying, that under the circumstances in which the experiments were carried out, three or four more numbers on the sensitometer were obtained with pre-exposed plates than with the others.

A. L. Henderson thought the gain was very much like subtracting from one end of a foot-rule, and adding it to the other, with a view to increase the length. If there was any gain in the scale of tones so obtained, that gain was extremely small. He then referred to an experiment with ammonia, made with a view to prove that this agent acted as a restrainer. Two plates received a similar exposure, and upon one ammonia and water was applied for 60 seconds before the application of pyrogallol. The image flashed up rapidly, density being obtained at once, and the shadows remained clear; in the other case the mixed developer started a more regular action.

After some discussion anent the subject of auxiliary exposures, in which Messrs. Pringle, Debenham, and others declared themselves unable to understand the meaning of cutting off one end of the scale,

W. K. Burton said that his question had been clearly put in writing, and had been fairly tested; he now merely wished to state that the members agreed with him.

There was no opposition, and a vote of thanks was passed to Messrs. Cowan and Pringle for conducting the experiments.

A. Cowan then showed a negative and positive image upon the same plate; the former received one minute's exposure to daylight through a negative, and the latter five seconds to gas-light. Mr. Frewin told him that for the zincographic process it was most useful; instead of giving a short exposure, and obtaining a positive, he increased the time, and obtained a more perfect negative, very often, than the original.

A. L. Henderson said it was possible to obtain either a positive or negative from a well-exposed plate with ferrous-oxalate development, the details of which different results have been already reported.

The Chairman alluded to a probable difficulty in mounting landscape prints so as to preserve clean margins. He suggested the employment of a flat board, large enough to take the mount, and to shield the margin with card-board corners cut at right angles.

W. E. Debenham remarked that it was important, in mounting landscape prints, for the edges to be equidistant, and two guiding corners would be found preferable to one.

W. K. Burton preferred to have the corners diagonally opposite.

A. L. Henderson, when cutting large prints, used two parallel rules, which enabled him to see at a glance whether the lines were cut truly or not.

The lantern night was fixed for the 12th inst., when transparencies will be shown by means of the new lantern, made expressly by C. and F. Darker.

Liverpool Amateur Photographic Association.

The usual monthly meeting was held on the 29th October, at the Free Library, William Brown Street, J. H. Day in the chair.

The Secretary acknowledged, with thanks, donations to the library of the English photographic journals for the month from the respective editors, as also other photographic publications.

A communication was read from the Camera Club, London, respecting affiliation therewith, and it was agreed that steps be taken to secure the advantages offered, provided that so doing did not in any way render the funds of the Association liable to any further claim than the annual subscription.

A question was asked by J. H. T. Ellerbeck as to the members' experience of blisters on albumenised paper. He stated that he had suffered seriously of late from this annoyance, and that he found on ceasing to use water direct from the mains, and substituting water from a cistern, the evil ceased; he attributed this cessation to the fact that the water from the cistern was comparatively free from air, while the water supply was excessively aerated, owing to the daily interruption of the Liverpool water supply.

Other members spoke to the same point, A. W. Beer stating that a reduction of the strength of the hypo solution to two ounces to the pint was an effectual remedy.

Mr. Beer gave an interesting account of an excursion to Shrewsbury and Ludlow, accompanied by very choice views taken by himself, Mr. Cornish, and the President, in the autumn.

A paper on "Geological Photography," by Osmund W. Jeffs, was handed in as a donation, accompanied by a lantern slide of a foot-print of the "Cheirotherium" from the sandstone in Storeton quarries.

Two lanterns were then exhibited for the selection of the members, in accordance with the resolution adopted in the spring that a Biunial should be purchased for use at the meetings. After a critical comparison, a Biunial, with the latest improvements, was unanimously chosen, the brilliancy of the illumination, and the perfect definition over the whole area of the disc, eliciting the approval of all the members.

The meeting was one of the largest of the session.

Bristol Amateur Photographic Association.

The annual meeting was held on Wednesday, October 28th, Colonel Playfair in the chair.

Preliminaries having been despatched, Mr. Duffett was elected an ordinary member.

The Hon. Secretary (Mr. H. A. Hood Daniel), then stated that the accounts had been audited and found correct.

The Chairman remarked that he was exceedingly pleased to find the general accounts of the Association to be in a very satisfactory condition.

The month of October being a very awkward one for the annual meeting, it was resolved to alter the annual meeting to the month of January for the future, a balance-sheet being prepared for presentation at the meeting in January, 1886.

The election of officers was then proceeded with, and resulted as follows:—

President—T. Davey.
Vice-Presidents—Colonel Playfair, Rev. H. B. Hare.
Treasurer—E. Brightman.
Honorary Secretary—H. A. Hood Daniel.
Council—Messrs. Boyden, Phillips, and Wright.

In the course of the proceedings the Hon. Secretary paid a graceful tribute to the memory of their late Vice-President, Rev. Walter J. Whiting, of whom he said he was quite sure that every member of the Association who had met their deceased friend would feel that in his death the Association had lost not only an eminent amateur, but one whose presence lent to every meeting he attended an amount of cheeriness, and gave to the discussions a practical turn, the deprivation of which would be greatly felt. No one could possibly have had the good of the Association and success of their exhibitions more at heart than their venerated and much respected deceased friend; and with the approbation of those present he would send to the relatives an expression of such feeling from the Association.

Talk in the Studio.

Photographic Society of Great Britain.—The first ordinary meeting of the session will be held in the Exhibition Gallery, 5a, Pall Mall East, on Tuesday next, November 10th, at 8 p.m., when the medals awarded will be presented, and

J. R. Sawyer will read a paper on his new method of "Photographic Engraving," accompanied by a demonstration of the processes by which the auto-gravure plates are produced.

PHOTOGRAPHIC INSTRUCTION AT THE POLYTECHNIC.—Mr. E. Howard Farmer's winter course of Tuesday evening lectures on photography begins in earnest next week. The introductory lecture was given last Tuesday, and was well attended. To those—especially the young—who wish to acquire an intelligent knowledge of the principles on which our art is based, we cannot give better advice than to take a systematic course of instruction. Such a systematic course is that through which Mr. Farmer takes his hearers, and the soundness of his teaching is attested by the brilliant success of the Polytechnic students at the May examinations.

ROYAL INSTITUTION OF GREAT BRITAIN.—At the general monthly meeting held on Monday, November 2nd, Warren de la Rue, Esq., M.A., D.C.L., F.R.S., Manager, in the chair, Joseph Wilson Swan, Mrs. J. W. Swan, and General J. F. Tennant, R.E., F.R.S., were elected members.

ABSTRACT OF CHAPMAN JONES'S LECTURE AT THE BIRKBECK INSTITUTE, NOVEMBER 4th.—Most of the elements combine directly with oxygen; but chlorine, bromine, iodine, gold, silver, and platinum form oxides by indirect means only. The oxides of non-metals are generally acids, while the oxides of metals are alkaline, or are analogous to the alkalies. When an acid oxide and an alkaline oxide combine, there results a "salt," and some such salts have still an alkaline nature, as carbonate of potash, while others retain an acid character. Hydrogen is by far the lightest and most agile substance known; a leakage in a gas bag that allows an unimportant quantity of oxygen or air to escape may let out a dangerous amount of hydrogen or coal gas, for this latter is by volume about half hydrogen. Water is the cause of colour in some cases; blue vitriol, is white when thoroughly dried. Pure water is not practically attainable, though in all cases a certain degree of purity is essential. The necessary purity varies according to the purpose for which it is to be used.

REMOVING SILVER STAINS.—Dr. H. W. Vogel, in the *Photographische Mittheilungen*, recommends, for removing silver stains from the hands, the same compound that has been used as a reducer, *i.e.* a mixture of ferricyanide of potassium and hyposulphite of soda. A few crystals of the former substance are dissolved in a solution of hypo, or from 10 to 20 per cent. of a 20 per cent. solution of the ferricyanide may be added to the hypo solution, and applied to the stains. Dr. Vogel points out the advantages of this substance over cyanide of potassium; it is not poisonous, and does not destroy the colour of articles of clothing.

PHOTOGRAPHIC ACTION ON EBONITE.—At the back of one of the cases of lecture apparatus, facing a north window in this laboratory, there happens to have been standing for six months or more, an ebonite plate with a framed glass plate in front of it, the glass having a star-pattern, done in little spots of tin-foil all over it. The thickness of the frame, say an eighth of an inch, separated the two plates from each other. On taking them out of the case the other day I noticed the pattern on the glass clearly and sharply imprinted on the ebonite, every little circle well marked. Dust had been plentifully deposited on all parts not screened by the tin-foil spots, and the striking clearness of the impression was mainly due to this local absence of dust; but even on wiping off some of the dust the pattern could still be detected, owing to some difference of surface between the exposed and the shaded portions.—E. E. ROBINSON, in *Nature.*

PHOTOGRAPHIC CLUB.—The subject for discussion on November 11th will be on "The Reversed Action of Light."

To Correspondents.

*** We cannot undertake to return rejected communications.

E. S. LAUDER.—Cases have been known of sore places upon the arms and hands attributed to absorption of pyro into the system. There appears to be a great difference in the susceptibility to poisoning by the skin in different individuals. This is considered to be established in the case of bichromate poisoning, which has sometimes occurred with carbon printers. It is obviously desirable not to allow pyro solution to act upon any portion of the skin that has been abraded.

E.—You can secure the copyright of your photograph at Stationers' Hall: but that will not affect any copyright or want of copyright in the object from which your photograph is made.

F. C.—The prints are examples of imperfect fixation. If a petroleum tub was used for washing the prints previous to toning, a little of the liquid, coming in contact with the paper, would protect the silver compound from the action of the hypo, and so cause the effect seen in the print sent us.

A. D. H.—The shutter you have used is not quite quick enough for instantaneous work. There are several in the market which act much more rapidly, but we cannot make invidious distinctions between them. The same applies to your question as to whose plates to select for the work. Consult our advertising columns. The result you send us is very promising, although not quite up to the mark for rapidity of exposure.

FRED TURNER.—We are afraid that you will not succeed in entirely removing the red silver stain from your unvarnished gelatine negative. Cyanide of potassium solution might do something for it.

NIGHT PHOTO.—Pyrotechnic compounds, suitable for photographic use, can be procured at the firework manufacturers. You had better not try to make it yourself, being, as we infer, entirely unused to such manipulations. Burton's "Modern Photography," published by Piper and Carter, Castle Street, Holborn—a new edition of which has just been published—will prove the best guide for you, as "a new amateur," to follow.

H. GEARY.—Bromide of silver is reduced by direct action of light without a developer, but the action is slow. It is very common to find an impression visible to the eye on a plate after exposure of a portion of it to light. Sometimes—as when there is a light window photographed simultaneously with a dark interior—a visible image is produced in the camera.

B. G. LENNON.—The address you ask for is Poplar Walk, Herne Hill, S.E.

A. K.—We regret that we cannot assist you in the matter. Criticism upon a matter of courtesy is not within our scope.

J. M.—We do not undertake to give legal advice, but we should think that you have a remedy in the County Court. We cannot publish a caution against dealing with any particular house. If the matter came before a judge, and were decided in your favour, a publication of the report of the case would probably be sufficient as a "caution."

W. S. FOTHERGILL.—1. Such excellent transparencies for the lantern have been made, both by superposition from a negative of the same size, and by reduction in the camera from larger plates, that it is impossible to say that either method will give better results than the other. 2. The use of a luminous tablet as the source of light for printing upon gelatine plates is, doubtless, favourable to uniformity of exposure; but this may be attained with sufficient exactness by less troublesome methods. 3. The change which is spoken of in gelatino-chloride plates refers to what takes place by keeping in an atmosphere not perfectly pure, whilst the chloride of silver is in the film. After fixing, the picture has been observed to change when the hypo has not been thoroughly removed. 4. If you varnish your transparencies, you can use a rather dilute lac varnish and dry by heat, as when varnishing a negative.

PERSPECTIVE.—For plates which show weakness and fog under the usual pyro developer, try the following:—

Pyrogallic acid	3 grains
Bromide of potass	6 ,,
Water	2 ounces
Liq. amm. fort	1 minim

As the development progresses, a little more ammonia may be added.

Photographs Registered.

J. BAMFORTH (Holmfirth)—1 Photo. each of Eyam Church (Derbyshire), Eyam Village (Derbyshire), House at Eyam where the plague broke out, The Lovers' Leap (Stony Middleton), Middleton Dale, Eyam Dale, Saxon Cross (Eyam Churchyard), Mompresson's Tomb (Eyam Church), Mompresson's Well (Eyam), Sun Dial (Eyam Church); 2 Photos. Cucket Church (Eyam).

A. DONALD (Dundee)—Photo. entitled "The Ravelled Hank."

F. WHALLEY (Lincoln)—2 Photos. entitled "Fortune Teller and her Victims"; Photo. entitled "Only for my Ears."

The Photographic News.

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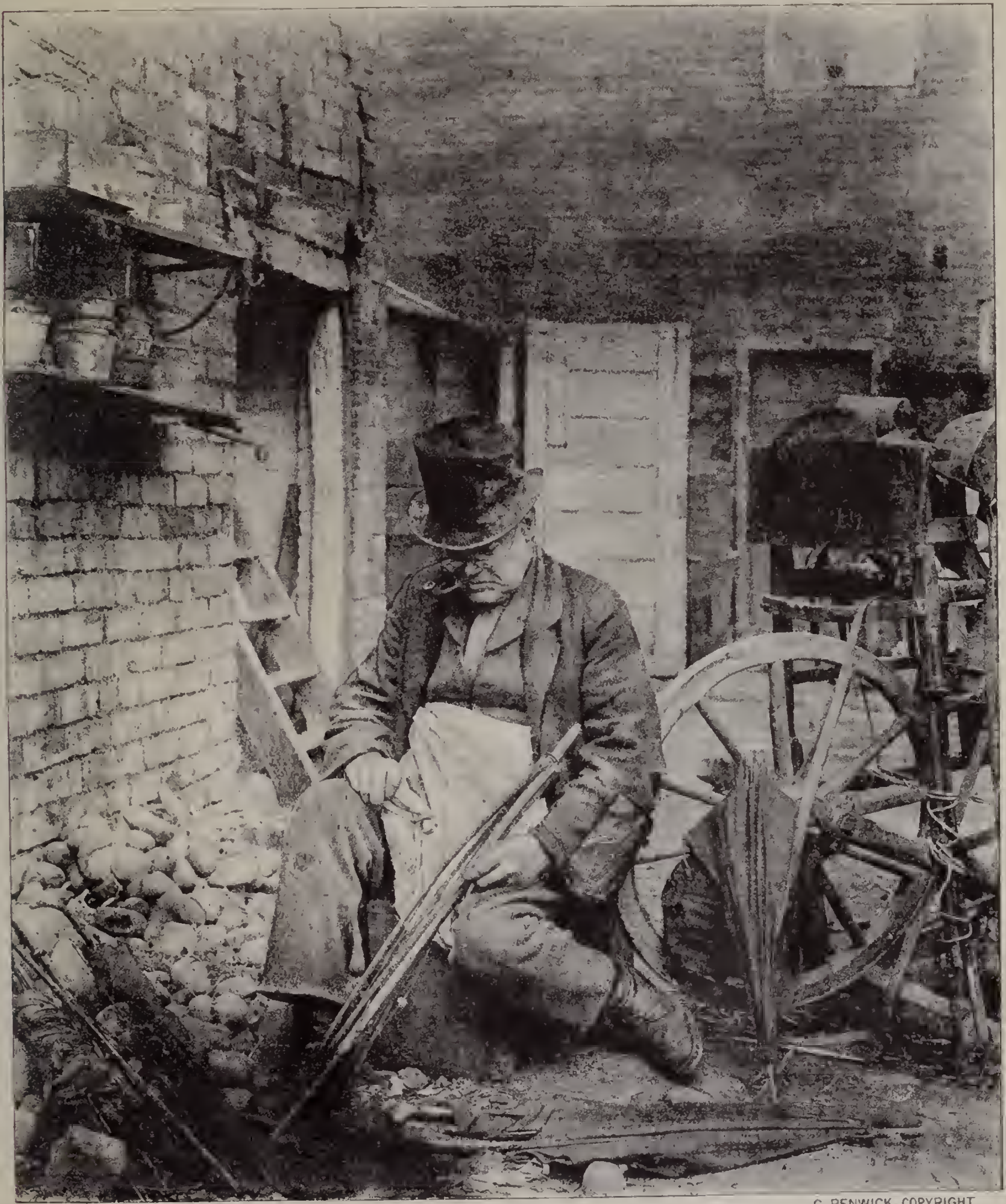
SUPPLEMENT TO "THE PHOTOGRAPHIC NEWS" 6TH NOVEMBER 1885



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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1419.—*November* 13, 1885.

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THE PHOTOGRAPHIC EXHIBITION.

[Sixth Notice.]

J. S. Catford sends several large views. The first, "Rustic Bridge and Falls" (No. 372), would be very good if the exposure could have been as rapid as is required in order to get falling water satisfactorily. Of No. 424 the same may be said. There is, however, less water in the picture to be thus affected; on the other hand, some of the foliage also betrays movement. There is in this picture a fine effect of near trees showing distinctly their position by the force with which they stand out against the more faintly-indicated distant foliage. Nos. 585 and 605 are labelled "Moonlight,"' but we do not infer from this that it is intended as a statement that the scenes were actually photographed at night. The whole of these exhibits are characterised by rich, powerful printing.

"Silent Judges" (No. 379), by The Hon. Mrs. Holden Hambrough, is a picture of a couple of owls who certainly seem to caricature a phase of humanity. The method of enlargement that has been employed, printing out direct upon albumenised paper, is perhaps that which gives the most perfect result of all; it was at one time practised by a few, but scarcely any will now display the patience required, even if they possess the necessary appliances, for carrying out the process. P. A. Frazer's "Boathouse," and "Swans on the Thames" (Nos. 381 and 382), are pleasing pictures with good atmosphere. In "Dead, Good Dog" (No. 557), the composition is not satisfactory; the head of the figure in the foreground comes close to a point of land that juts out into the water. No. 572, "Resting," is rather heavy.

The title of No. 389, "The Master Cocks," Platinotype, by Robert Faulkner, led us to look for a representation of game birds. It is a portrait group of two youths, a little heavy in parts. No. 395, "Instantaneous Portraits of Children," is a frame of portraits of the little ones, executed in the natural style characteristic of this exhibitor, and No. 466 is one of those red chalk child-figures of which he has made such a speciality. The pose is unconventional, and the photography rich. George Renwick's "An Old Blade" (No. 390) is from the same model as that which figures in "Preparing for a Rainy Day," the picture that formed our supplement last week. Clive F. Pritchard's "View in Yorkshire" (No. 392) is a wooded scene with good effect. No. 393 is a frame of views at Windermere, several of which are rather harsh in places.

H. Trueman Wood's No. 394 is a frame of capital views in Switzerland that will be looked upon with pleasure by those who have visited the scenes pourtrayed. In No. 399, by W. E. Halse, the pictures are somewhat damaged by halation and artificial skies; the best of the set is in the left-hand lower corner of the frame. R. Keene's "Matlock Bath Church (Platinotype)" is pretty, but a little heavy in parts. No. 412, "On the Derwent (Platinotype)," is decidedly heavy. "Book Illustrations" (No. 476), also in Platinotype, are much better. A photograph of a cellar shown in this frame is particularly good.

"In Westminster Abbey" (No. 416), by Matthew Whiting, is a frame containing photographs of variousr monuments, many of them in very difficult places for obtaining a satisfactory light. Perhaps the best in the frame is one of Sir Isaac Newton's monument. No. 488 is a frame of similar subjects, of which all are good, and it is difficult to make a selection. S. W. Rouch sends a frame of half-a-dozen 12 by 10 views, of which the two centre ones make the best pictures.

W. Cobb has two frames of "Street Views of Paris" (Nos. 426 and 464), marked "not in competition." The similar set of pictures of London life earned a medal at a recent exhibition, and these, we think, are, if anything, an improvement. It is gratifying to find such an able worker put himself out of competition sometimes, and leave the medals which might have been added to his store, open for others to try for. In this series one or two pictures, although so rapidly taken and of large size, appear so fully exposed that no longer time seems to have been desirable. No. 428, "Gorge, near Bergen," by Frank Salk, is a powerful picture that composes grandly. It is a little harsh, but very good on the whole. No. 431, "Where shall I go?" by J. W. Price, is a large photograph of a bare-footed girl standing on what is presumably a common. The background is too strong for the figure, and there seems to have been an unnecessary quantity of bushy vegetation packed round the spot that she is standing upon, so that it would be a difficulty for her to get out and go anywhere. No. 463, "Homeless and Friendless," is the same figure and foreground—apparently from the same negative—as "Where shall I go?" but the upper part of the background has been printed-in with more sky. No. 609, "At the Waterfall," is the best of this set; it is a very clear, bright photograph, but atmosphere is wanting; the deep shadows are full black in all parts of the picture. No. 658, "The Gamekeeper's Kitchen and Family," wants subordination in parts; it is vigorous all over.

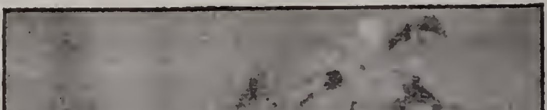
Geruset freres send a "Winter Scene," which is well conceived, and, with one exception, artistically carried out. The landscape is excellent by itself, a snowy road showing bright branches of light glittering in the foreground, and a picturesque background. There is a figure in the foreground well placed, but the strength of the landscape and of the figure are so equal that in places the outline of the model is lost. Somewhat similar remarks will apply to No. 456, "A Summer Scene." "Maiden Meditation" (No. 439), by H. Paget Swain, is a picture in which the girl's figure is natural, and the background of tree trunks effective. The foreground also is good, all but a bit to the left, which is rather too black, and wanting in softness and detail.

J. Starkey Downes sends a frame of three pictures taken in "Manx Land" (No. 440), of which one, the wheel at Great Laxey, is printed rather too dark. No. 539, "I have nothing more to say," is better conceived than most pictures of this character. A lady sits with an unfinished letter before her, part of her face buried in her hand. The picture on the table, presumably a portrait of the person to whom she is writing, is just a little too much in evidence to seem natural.

W. A. Skill's No. 442, catalogued as "Portrait of a Blind Man," is more appropriately labelled "By the Highway Side," and is very well composed. It makes quite a picture, notwithstanding that the man has moved a little. No. 593, "A View of the Choir, Lincoln Cathedral," is a well-lighted interior, but the uprights are a little out. No. 443, "Interior of Temple Church," by John Clark, Q.C., is a fine bold picture, enlarged from one in frame No. 648. The windows in this photograph come out with unusual distinctness and freedom from halation.

R. Tindall sends "Views on the Ober Engadine," of which two are good, and two show a defect so common with subjects of this class, that of being under-exposed, and harsh looking in some places. No. 623 is a frame containing two views, one of which, "Pontresina Bridge," is picturesque and good; in the other, there is too much evidence of the water having moved. H. T. Hale's No. 460 contains two pretty views, but they are a little too intense. In No. 507 neither of the pictures is pleasing; one, however, contains some striking tree forms.

Geo. Hadley's "Grandad's Coming" (No. 465) is a representation of an old man entering a cottage garden, whilst a little girl who stands on the doorstep smiles him a welcome. Both figures are natural, and do not show that they are aware of the presence of the camera. The cottage front is good, and climbing plants form a natural and pleasing arch over the doorway. A long line of palings in front gives some formality to this part of the picture, which, however, as a whole, is more successful than such attempts generally are. In "Portrait Studies" (No. 480) the lights are mostly a little too low in tone. No. 535, "Thinking of Tomorrow's Meal," is not a very satisfactory composition. The old lady who is the subject of the picture is rather crowded in between a chair and a table, the former of which seems to have been placed in position after the model had settled herself. Other exhibits from the same hand are Nos. 627 and 669. "Ford and Ferry" (No. 477) is by H. F. McConnel, a picture consisting of a pleasing bit of landscape with a ferry-boat and a cart crossing a stream; these accessories compose very well, and their occupants appear to be naturally engaged without a suspicion that they are being photographed. The picture is very good as a whole, although the sky has been printed-in a little too dark. Jean Ville exhibits a series of platinotype prints of mountain scenery, of which we prefer No. 484.



J. Renton Dunlop has a frame of photographs of microscopic objects. "Section of the Human Scalp," with its various glands, &c., clearly marked, is probably the most generally interesting. A remarkable photograph is that of a "Nest of Birds," by G. C. Tagliaferro, from which we reproduce a block print. The exposure must have been extremely rapid, and the effect is good as a picture. "The Ravelled Hank," by A. Donald (No. 524), is not of large size, but it is certainly one of the best of its kind in the Exhibition. An old woman sits at her wheel unravelling the thread that gives its name to the picture. The chamber which forms the background is well chosen, and the lighting of it kept in due but not excessive subordination. The furniture and accessories are such as would naturally occur in such a scene, and do not look as if they had been packed round the model to fill up the picture. We are informed that the whole was taken at one exposure.

The "Industry of Age commands the attention of Youth" (No. 534), by W. J. Goodhew, is a composition in which the artist has endeavoured, not without success, to pourtray the ideas which occupied his mind. The old man works steadily on, while the girl, with the curiosity of childhood, watches the method and progress of his work. An overthrown stool is intended to denote the eagerness of youth which does not stay to measure the consequences of each hasty step, or to repair them if untoward. Nesbitt, Tom, or George, according to which portion of the catalogue we rely upon, sends three exhibits (Nos. 536, 537, and 637.) The two first-mentioned frames contain some gems in the way of landscape photography, mounted in optical contact with the glass. Whilst bright and powerful, the shadows have received sufficient exposure to furnish them with luminous detail, which is, however, not too prominent. Of No. 637, "What are you waiting for, Mama?" we cannot speak in such high praise. A woman with a child upon her back is standing in a pool of water. The background, instead of being printed-in from landscape negatives as is usual with subjects of this character, appears to have been a scenic one, not very successfully painted, placed behind the figure; some tree trunks come in that are not sharp, and yet have a harsh effect. "What shall I draw?" (No. 549), and "That's you" (550), are a pair of pictures of a little girl with a slate. The position and expression are natural in both, and they would be really capital if they were not, as they are, under-exposed. This is to be regretted, as there is so much more reality and artistic power displayed than we generally meet with in works of this class. "Christmas at Melbourne, Australia" (No. 557*), by J. Duncan Pierce, is a pretty picture of a water party; some figures in a boat, however, come out rather chalky. "Among the Gum Trees, Victoria, Australia" (No. 634*), shows vegetation characteristic of the region.

"Nydia, a Study for a Greek Slave" (No. 559), is Mr. W. Chubb's sole exhibit, but it is worth more than many a larger contribution. The figure is appropriate and natural, the background is fitting, and the absence of coarse heavy shadows help to make the whole thing recall a fine engraving. T. W. Boord's "Ockendon House, Cuckfield" (No. 562), and "Old Cottages" (No. 580), photographs large in size and strong in character, but with not much atmosphere and blank white skies, are examples of a style less admired now than formerly. J. Machell Smith's "Family Party" (No. 564) are too obviously aware that they are being photographed. "A Fishing Match" (No. 365) is decidedly the best of the series, which contains also No. 586, "Lunch in a Sussex Chalk Pit"; the figures here are under-exposed, and the whole effect of the picture cold.

A. Lugardon's "Instantaneous Studies" (No. 588) are capital pictures of horses in motion. There is nothing in these pictures to suggest those ludicrous positions which have caused it to be said that it would be wrong to paint horses in the attitudes shown in instantaneous photography. No. 599 includes flying shots at athletes, cattle, sheep, and pigs. J. H. Stone sends a frame (No. 596) containing pictures of sky and water, with barges. The water and vessels are rather under-exposed. No. 632 is a dog guarding a pipe. "A Surrey Lane," in No. 661, is pretty, and one other picture in the same frame would form a subject for a study. Nos. 801, 802, and 803, "Specimens of a New Style of Mounting Photographs," are by the same exhibitor. The picture is surrounded by broad bands of pleated silk. It is just possible that this "new style" may please some eccentric taste.

David M. Little shows a couple of pictures of a yacht, "The Puritan." These are amongst the best photographs of vessels in full sail that have been seen. They are well exposed, and sky, yacht, and water consequently make up a harmonious whole, without the excessively heavy shadows that so commonly occur in instantaneous photography. "Quayside, Newcastle on Tyne" (No. 603), by J. Pike, is a bold picture of a busy waterside scene. "The Side," Newcastle (No. 624), is a street view, bold and picturesque. Nos. 616 and 653 are evening scenes on the Tyne. No. 613, "Sydney Harbour," by William Slade, can scarcely be judged, hung where it is. "The Morning Mail" (No. 633) is a large group of two ladies. The expression and pose are natural, and the photography good, although somewhat marred by the strong pattern on a screen which forms the background. No. 634, "The Gold-based Hills of Australia," is a bold picture, but there is a large bit of the foreground that is too dark, and deficient in detail, as if from under-exposure.

T. Brown sends a frame containing mostly representations of ploughing scenes. They are well chosen, and, with the exception of a tendency to under-exposure, well photographed. Theo. Perrot's *pot pourri*, "Studies and Views at the Seaside" (No. 640), contain some charming little bits. G. E. Hall's (No. 644), a set of photographs taken during the Nile Expedition, will prove of general interest. Perhaps the best are two in the centre, native vessels sailing on the Nile, and "Lord Wolseley's Camels." No. 646, "Portraits printed in Platinotype," by R. H. Lord, are the richest set of platinotype portrait prints that we have seen. Many of them are very good photographs; one, a picture of a little girl in a fur hat and cape, is particularly so.

Greenwood Pim's "Alpine Scenes" (Nos. 649 and 660) form an excellent set of pictures. Many photographs of scenery of this character show heaviness and want of detail in the shadows; this exhibit is unusually good in these points. Joseph Paget sends a set of bright, attractive, pictures of scenery in the Yellowstone Park (No. 650) and Canada (No. 651). "The River Montmorency" is especially good. J. F. Knight's "Cleopatra's Needle" is good. No 665, "Machinery," is no doubt of technical interest to engineers. C. J. Taylor's "Gatherings with a Pocket Camera" (No. 663) contains some pretty little bits. H. Bedford Lemere's "South Park, Wadhurst" (No. 664), is a set of large, powerful photographs of an English country seat. We think the interiors are the most striking. C. Pilkington's "Views of London, camera held in hand," are examples of a kind of photography for which we foresee a much extended popularity.

We expect to see in next year's Exhibition many more specimens of work of this kind, and, whilst appreciating the good character of many of this year's pictures, we hope to see more resolute determination to avoid the defects we have had in some instances to refer to, particularly those of halation and bad sky printing.

AMMONIACAL SOLUTION OF EOSINE AS AN OPTICAL SENSITISER.

BY V. SCHUMANN.*

The value of eosine as an optical sensitiser is generally recognised, and scarcely any colouring matter can, in the present state of our knowledge, render such powerful aid in the preparation of orthochromatic plates as eosine, and some of its derivatives.

The sensitising effect of eosine is influenced by the solvent employed. Ammonia gives plates more sensitive to green and yellow than do alcohol and water, although, according to my previous experiments, the governing effect which each has is not very important. To what extent the behaviour of the ammoniacal solution of eosine depends upon the proportion of the dye, I have sufficiently shown in former researches in this direction.

According to Dr. Eder, ammoniacal solution of eosine is now mostly employed for colouring plates. A small quantity of ammoniacal solution of eosine may be added to the liquid emulsion, or the dry plate may be immersed in an aqueous solution of eosine, to which a little ammonia has been added. The former method is generally employed, because the use of the bath often induces defects upon the surface of the film. On this account, in my own practice, I have only used the bath in a few isolated cases. My custom has been to add the colour to the liquid emulsion.

I have hitherto acted upon the assumption that both methods of adding the colouring matter to the film produced a similar colour-sensitiveness, and this view has been generally held; at least, I have nowhere met with any published statement as to the greater value of one or the other plan, of colouring gelatine emulsion plates with eosine.

In the course of preparing gelatine emulsion which should be adapted to photograph the less refrangible half of the spectrum, I find that the two methods give quite different results. The yellow and green bands of the nitrogen spectrum from a Geissler tube, I have obtained with the one plate in ten minutes, whilst four times the exposure with the other failed to show a trace of them. The contrast was too striking for me to let it pass unobserved. I have endeavoured by many experiments to establish the cause of this difference, which has been hitherto unknown, or too little estimated, and if I have not completely succeeded, I can, nevertheless, confirm the truth of my last observation, and add to it that, not only the manner of applying the sensitiser, but also the character of the emulsion, and above all of the developer, appears to influence in a high degree the orthochromatic value of the plate sensitised for colour. Without at present entering into details, I am in a position to state that of the two methods, the immersion of the gelatine plate has the advantage so far as rendering the yellow rays is concerned.

By sensitizing liquid emulsion, I have in no wise succeeded in preparing plates that approached the bath plates for sensitiveness to the yellow and green rays of my spark or gas-spectre. It is to be expected, therefore, that in photographing coloured objects, the bath-plates will maintain their superiority.

These bath-plates certainly frequently have a great inclination to fog; not always, however. Professor Eder's emulsion with silver oxide in ammonium appears to be an exception. I presume that all emulsion of medium sensitiveness may be used with like good results.

My observations at present only extend to emulsion containing bromide and iodide of silver simultaneously formed. Since I could not succeed when using iron developer, and only obtained the best result with pyro and potash—and the last-mentioned works more brilliantly when iodide of silver is present—it is possible that pure bromide of silver plates will not yield the higher sensitiveness with eosine.

As especially valuable, I would point out the equal intensity with which the whole spectrum from D (the beginning of the yellow) comes out, provided the eosine bath is properly adjusted. The proportion of ammonia in the bath has great influence, but I could not discover any in the colour of the emulsion. Plates treated with the eosine bath, and exposed whilst wet, showed less sensitiveness to yellow, and that to an uncertain degree. This, however, is not important, as I cannot in any case recommend the use of gelatine plates whilst wet, least of all for spectrum photography.

I propose to carry on these experiments, and will send further communications thereon.

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PHOTOGRAPHY IN A HOUSE-BOAT.*

(Being the Record of a Day's Experience.)

After Jones's failure, we discuss the question whether he shall be allowed to expose another plate before the others. Bagshaw and Brown are strenuous in their opposition, contending that Jones having, to use the language of the circus, "missed his tip," must wait till his turn comes round again. You see it is all a matter of the dark-room, its circumscribed area absolutely refusing to accommodate more than one at a time. At last the point is settled by a suggestion from me that each man should put a plate in the slide, and while one is developing, the other should be exposing.

Bagshaw claims to have first turn, and armed with his "universal" slide, 15 by 12, squeezes himself through the narrow door-way. Bagshaw, it may be as well to mention, is short and very stout.

"Bagshaw is rather a butter-fingers," remarks Brown the scientific, confidentially to Jones. "There's plenty of time to make a cigarette while we're waiting for him." We step out to the forward deck and light up.

"I never knew anything more ridiculous than the "universal" for out-door work," observes Jones, who, as proprietor of the Liliputian compact arrrangement, naturally scorns Bagshaw's Brobdingnagian apparatus. "Just fancy using a fifteen twelve slide for a wretched little quarter-plate."

"Yes, and that long-focus single lens of his stopped down within an inch of its life. Why, the exposure, even with rapid plates, won't be less than five or six seconds."

"Oh, but he prides himself on the lens; it covers a field of twelve by ten; but as he only uses the centre portion, he thinks he'll get a much more perfect picture than either you or I. And then—

Crash!—from the interior of the dark-room, followed by imprecatory mutters, and a bump against the paper wall.

"Hallo, what's the matter?" calls out Jones.

"Oh, nothing," we hear a muffled voice answer. "Plate's slipped from the slide into the sink. Room's so beastly dark. I told you that green glass was a mistake."

More mutters; a moving about of bottles; finally a little snap indicating that Bagshaw has succeeded in putting in the back of the dark-slide. Presently he emerges, carrying the slide as gingerly as though it were red hot. The perspiration stands in beads on his forehead, and he is puffing and blowing in grampus-like fashion.

"Phew!" he ejaculates, putting down the slide in order to mop his forehead. "That place is like the Black Hole of Calcutta. We must really do something to ventilate it."

"What nonsense," retorts Brown; "with a camera of reasonable size there's no occasion to be more than a minute in putting a plate in. Just you notice, I shall be out before you've begun to focus with that lumbering machine of yours."

Bagshaw says nothing, but refreshes himself with a shandygaff before proceeding to the serious work of selecting a view and focussing. Brown, meanwhile, has gone into the dark-room.

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* *Photographische Wochenblatt.*

* Continued from p. 700.

After much exertion the "universal" is got into position, and Bagshaw commences to focus.

"Extraordinary thing," we hear him say from under the focussing cloth, "that I can't get an image. Not a ghost of anything on the screen."

"Let me have a look," says Jones.

Jones does look, and begins to laugh.

"Can't you see what's the matter? The camera's too high. All that you can photograph is the open sky. You must put the camera lower."

"Perhaps you'll tell me how it's to be done. I've stretched the legs out as far as the deck will allow."

This is a fact! Bagshaw's six-feet tripod-stand would be admirable for taking views over hedges or brick walls, and with an unlimited surface on which to plant it, but on a limited area of 3½ feet square is somewhat unmanageable. However, by dint of drawing up the hind leg almost vertically, Bagshaw manages to get a bit of Hampton Court Palace on to the screen. As a view of a building in the position of the leaning tower of Pisa, the picture is everything to be desired.

"But hang it!" exclaims Jones; "you don't want to take the place as if it were about to fall on you. Where's your swing-back?"

Bagshaw has to admit that his "universal," being of an ancient date, is not provided with a swing-back.

There is an anxious consultation how the difficulty is to be got over. Finally the paraffin stove is brought and planted on the top of a box used for various stores, and the "universal" is placed on the stove. The erection is just completed as Brown issues from the dark-room. He has been much longer than he anticipated, but then, as he afterwards explained, something went wrong with one of his "improvements," and he couldn't get the plate in.

Brown is inexpressibly disgusted at Bagshaw's makeshift camera stand.

"For heaven's sake, look sharp!" he exclaims; "you're making the whole thing ridiculous. It's awfully bad form."

"Can't help it," returns Bagshaw obstinately. "Just pass me out your Inverness cape, will you?"

"What do you want that for?"

"Never mind, pass it out!"

Brown's Inverness cape *is* passed out, and Bagshaw swaddles the forepart of the "universal" in it, placing the focussing cloth over the dark slide.

"I have my doubts as to whether the camera is light-tight. It's best to be on the safe side."

So it may be, but we all think Bagshaw is going too far in the way of eccentricity. A man who despises the proprieties of photography in this way is extremely trying. Bagshaw's camera looks exactly like a November "Guy," and we retire inside the House-Boat while he makes his exposure.

This is accomplished. Bagshaw removes the "universal," and Brown goes to work; Jones, meanwhile, putting a second plate in his slide.

All the exposures have been effected, and Bagshaw, as first man, commences the development. Result—fog, hopeless and unutterable.

"I knew that camera let in the light somewhere," he exclaims.

Brown starts developing. Result—a broken negative (another "improvement" would persist in not working), and a fog a little worse than Bagshaw's.

"Can't make it out; I'm certain *my* camera's all right."

"How do you know? Those new-fangled things are not to be depended upon," says Bagshaw, priding himself on the possession of an instrument of which the last thing one would think of saying would be, that it was new.

Jones develops. Result—fog worse than ever. A "London particular" nothing to it.

"Dash it all. I'll swear *my* camera is in perfect condition; and besides, my first plate, though it had no image, had no fog."

"That's true," observes Bagshaw. "But then the sun has shifted since then, and I dare say has found out a weak place in your camera. Those cheap things are bound to be defective."

They fall to examining their cameras, but fail to discover any defect.

"Perhaps it's the dark-room," I suggest. "Those brown paper constructions are very risky."

Bagshaw remarks that he shouldn't wonder, and further opines that our dark-room is a "beast;" he had no hand in the building of it, you know. Jones examines the "beast," and shouts, in a voice of triumph, that he has "found it out."

"Look here, old man," says he to Bagshaw, "this is *your* work."

He points to a fracture in the brown paper.

"It was when you were floundering with your confounded 'universal.'"

Bagshaw protests, but at last confesses that he did knock the wall with the corner of the slide. This, then, was the meaning of the bump we heard.

They repair the fracture with the aid of a friendly gum-pot, and start again. It is growing late, the light is fading, and they have to hurry.

(To be continued.)

THE PHOTOGRAPHIC EXHIBITION.—No. IV.

BY A. H. WALL.

As these bits of technical criticism were to run only while the Exhibition of the Photographic Society remained open, and this is its last week, I am constrained to put aside my fat little note-book, with the pencil sketches I have not yet used—for there is not, I find, time enough for the photo-engraver to prepare any of them for this number—and wind up with a few general remarks.

Earl Granville, at one of the Royal Academy banquets, said that once when he was a young man, and in Rome, remembering how he had received lessons in drawing at school, producing with his teacher delightful results, of which he and his friends were immensely proud, but which he was utterly unable to produce without him, he sought a certain eminent painter, and asked if he was not too old to study art in serious earnest. The eminent one replied that he had known older persons do it with great success. Arrangements were accordingly made, but, before they parted, the artist requested the proposed pupil to make a slight pencil sketch there and then, something out of his own head.

"I immediately," said the Earl, "produced and handed to him, with much self-satisfaction, a pretty little composition. It represented a cottage, a silver fir, and a bush, with which the eminent gentleman was so completely satisfied that he at once declined to give me the proposed lessons."

There are several such "compositions" in this collection—photographs more than sufficing to instantly demonstrate the utter uselessness of art teaching or art criticism with their particular producers. They may not be too old to learn something about art—nobody is, and everybody would be the better for doing so—and they may be perfectly serious and earnest in their desire, but, unluckily, they are altogether without capacity. The specimens I have in view while writing this are most satisfactorily demonstrative in their way, mainly because they are artistically ambitious. If their producers had not aimed high, their failures would certainly have been less ludicrously conspicuous, if not less complete. They had much better be content with their position as excellent mechanics than prove themselves, in such very loud language, incapable of being even the very poorest artists.

There can, I think, be no doubt that the highest future of photography lies in the direction of art. Nothing I have seen demonstrates this more clearly than the present year's exhibition does, both in its shortcomings and its achievements, for both are artistic. But art must have no secondary place in the student's heart. It is a jealous mistress, and demands "the lion's share" of our care and study. We must be thoroughly in earnest, or we will surely fail. I see some photographs here which evidently tell us that the operator thought he had done enough for art when he had mastered the simplest A B C of a pyramidal composition, which is as if a literary student should consider himself a master of English composition when he could spell and write correctly words of three syllables.

In nothing is this want of serious earnestness so lamentably conspicuous as it is in what might well have otherwise been a real triumph of artistic photography, and given its clever producer high rank and prominence as the Wilkie of his art. I mean No. 530, "Strengthening the Understanding." So unconsious of the seriously damaging faults and shortcomings of this composition was its producer, Mr. Malby, that he advances them in the description of his picture to a prominent position, as if they were real triumphs. Mr. Malby says, for instance, "to get an old box, some string, and card-board, was the work of two or three minutes," and "the next job was to build a shoemaker's shop, which I did in my printing room." Now the real charm in this picture is the model, upon whose feelings he very ingeniously played, as Rejlander generally did, until he got exactly what he wanted in the way of both action and expression. Everything but that, the patchy and confusing background, the makeshift bit of string, the old packing case, &c., are only so many lamentable confessions. One might imagine, to see the use he has made of these things, that in the whole course of his life Mr. Malby never saw a cobbler at work, or knew anything about the tools he used. So far is the background from keeping its subordinate place, that the disproportionately large kettle on the palpably suppositious fire appears as if it was its spout, and not a pipe which the cobbler had in his mouth. All that was really wanted, behind a figure so nearly filling the entire field, was little more than a rich bit of telling light and shade, sombre, quiet, and retiring throughout (such as Mr. H. P. Robinson would probably have given it), a last or two, and, if political knowledge was to be implied, a well toned-down portrait of, say, Mr. Chamberlain, Mr. Gladstone—or better still, perhaps, the shoemaker's own M.P., Mr. Bradlaugh. The old packing-case stool, on which the famously lighted and well posed model sits at work, is not a bit like the long low stool of a cobbler, and not one of the confusing, over-crowded, practically meaningless accessories, helps either composition, sentiment, or feeling. I write thus quite sorrowfully, because Mr. Malby came so very near making a genuine hit. If I were this gentleman, I should reproduce my gem in a new setting, with greater pains, study, serious thoughtfulness, and, above all, earnestness. It is well worth all the pains and time he can bestow upon it. A capitally grouped study of children is 186, also Mr. Malby's, of which I should like to make a sketch, for it is a very interesting, pretty, and genuine little picture. No. 129 shows excellence of conception, and is very fine in many of its pictorial qualities; so is 128. A little more force in the foreground would have greatly improved 146, which is a capital picture, but I think I should have kept my sky more luminous by toning down the lighter end of the cottage. No. 184 is a richly powerful effect, but the foliage is too dark, and consequently heavy; particularly fine is the specimen in the right hand corner of the frame so numbered. And, by-the-bye, why should not each picture, and not merely each frame, have a number—or better still, perhaps, why should not a rule be made enforcing the separate framing of each specimen? No. 181 deserves high praise; and very meritorious is No. 199. Well grouped figures in 225. In frame 251 are some fine specimens. I think the fragmentary isolated patch of dark foliage, peeping round just where it isn't wanted, in the right-hand bottom corner specimen, would have been better away. Nos. 250 and 260 are fine. The stiff figure of the boy in 369 is so palpably artificial, that it goes far to spoil an otherwise good conception, and some real feeling of treatment and pose. "The Gossips" (369) is decidedly good; they do really appear as if they were gossiping, and not standing for their "fortygraphs." There is good picturesque material in 422. No. 465 is a picture of palings, with an old man and a little child thrown in as subordinate makeweights. Much could be said in praise of 583, 184, 595, 596, 129, 293, and 628.

But, as I must pause somewhere, why not here, leaving many excellent pictures unmentioned, many faulty works uncriticised, much unsaid that I intended to say, and much unsketched that I intended to sketch?

SILVER PRINTING.

BY JOHN STUART.*

It may seem strange that, considering the long term of years photographers have practised this branch of our art, there should be any need of bringing this subject before the Society. Still, there are many who have considerable trouble in getting prints such as they desire, and I am one of those. In the first place, prints are flat and dull, measly, poor in colour, and lack that fine gradation from the highest lights to the deepest shadows. If the photographic stock dealer would unfold all the complaints he received as to the bad quality of the paper supplied, it would rather astonish some of you. Now, I am not so bold as to say that the paper is never at fault, but I believe that, at the present time, in nine cases out of ten, it is not the fault of the paper, but lies at the door of the printer. I have known of a case where reams of paper have been returned to the dealer as quite unworkable; while the same paper, sent to another printer, was pronounced the very best they ever had, and orders given to send all of it that the dealer had in stock. This, at first sight, may appear strange; but to anyone who has studied all the troubles that beset our printing operations, it is quite plain. In the first case I brought before you, the paper did not suit the mode of working adopted by the printer; in the other case it did. Photographers are, as a rule, conservative, so that if one has been taught that it is the right thing to use a seventy-grain bath, with three or four minutes' floating, nothing will persuade him to change it, and the paper must suit such a bath and time of floating, or it is bad. Now there can be no hard and fast line in such matters; your silver bath and paper must be adjusted—and that with great nicety, if the best results are to be obtained.

Every make of albumenized paper now in the market may be made to yield fair results by a haphazard mode of working; but if the very best results are desired, a very careful adjustment between the strength of the silver bath and the time of floating must be observed; and there are also many other factors to be taken into account—such as the state of the paper—*i.e.*, the amount of moisture it contains at the time of floating, and the rapidity with which it is dried after floating. Many photographers jump from one make of paper to another, and they are never out of "hot water"—and serve them right. Find out the paper that suits you best as to price and quality, stick to it, and, by so doing, you will save yourselves a world of trouble. I think you will all agree with me when I say the ends to be aimed at in a good print are, that it should be bright and sparkling (*i.e.*, on the surface of the paper), have fine gradation from the highest lights to the deepest shadows, a rich solid tone, and last, but not least, that it should be as permanent as possible.

Let us see how this is to be obtained. I may say that in my own practice I use three different kinds of paper, or, to be more accurate, paper prepared in three different ways; the first is for negatives of the normal type, the second for thin grey negatives, and the third for very dense negatives that take a long time to print. For negatives of the normal type the bath is as follows:—

Nitrate of silver	400 grains
Water	10 ounces

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* A communication to the Glasgow Photographic Association.

To which is added about 30 grains of carbonate of magnesia. Floating time—one and a half minute from the time it is laid on the bath till it is drawn off.

Having your silver bath now prepared and set aside in the silvering-room ready for the morning, look to your paper; hang it up in a cool, damp cellar, so that by the morning it will be quite damp, and will lie quite flat on the silver bath, giving you no trouble by curling up.

Some of you might like to know the sort of room that I use for preparing my paper. Well, it is a room about twelve feet by eight, with a portion divided off, in which the paper is dried. After coming from the silver bath, this apartment is heated to about 90° Fahrenheit, while the larger apartment, in which are the silvering baths, is kept as cool as possible. Taking the paper from the cellar, a few quires at a time, it is laid between boards so as to keep it still damp. One sheet is withdrawn and laid in the sensitizing bath for a minute and a-half; it is then lifted and drawn slowly over a half-inch glass rod fixed on the edge of the bath, after which it is laid, with its face up, and, with a brush made of blotting-paper, all superfluous silver is mopped off, leaving the paper quite evenly coated; this done, a rod is pushed under it, and it is removed to the drying room, where it remains till bone dry, which takes only a few minutes. When it comes from the drying room it is very hard and curly, and not easily handled; it is allowed to lie in the sensitizing room for a short time, when it rapidly absorbs as much moisture as will allow of its being handled quite easily, it is then folded, passed through the cutting machine, and packed in bundles, when it is ready for the printers.

As it is only at this stage that the difference in treatment of the three kinds of paper which I have already mentioned, occurs, I will treat of them before going further. For thin negatives I use double albumenized paper treated in exactly the same way as that mentioned, with this difference—that it is floated for two minutes instead of one and a-half. The third mode is to make the paper keep white during the time of printing, and paper prepared as I am about to describe is that usually sold as ready-sensitized. Having prepared the paper in the same manner as that of the first or the second, it is, after the mopping with the blotting-paper, floated, face down, on a bath of pure citric acid (forty grains to the ounce of water), drawn over a glass rod as in the silvering, and then hung up in the drying room. Paper thus prepared will, when the sheets are placed face to face, retain its whiteness more than a month. We generally prepare as much as will last for a few weeks.

We will now consider the next stage, viz., the printing. It will assist your printers very much if the negatives are arranged into, say, three classes—thin, ordinary, and dense. Having placed the negatives in the printing-frames, see that the padding and springs are all in good order. The winter time is of all others the most troublesome in which to get good prints; so much moisture prevails at that season, and the nitrates in the paper being so deliquescent, the paper becomes quite spongy, staining the negatives, and causing the paper to expand, giving blunt prints, which no amount of pressure will prevent.

The padding generally used for backing, being made up of folds of blotting-paper, absorbs moisture, which, laid on the dry albumenized paper, causes two things—expansion of the paper, and little dark-brown spots on the negative; for when damp silver paper is laid on the face of a gelatine negative, no varnish that I know of will prevent the spots showing in a short time. The most effectual cure for this is to use a waterproof cover over the silver paper, and the cheapest and handiest I know of is asphalt paper cut to the size of the negative. The prints now being deep enough printed, are placed, one by one, in water about 70°, and well washed in several changes of water; then, one by one, placed in a bath of common salt, five grains to the ounce of water at 70°, moved about for ten minutes or so, and then placed in water again at 70°.

Allow me to say here that all the baths for the prints should be as nearly as possible of one temperature, and the temperature I find to suit best is 70°. I lay great stress on the use of a salt bath; in the first place, it brings all the prints to a nice red tone, and causes them to take a little time longer to tone, and thus they are rendered more permanent by having a larger coating of gold, if I may so speak, on the face of them. Secondly, it converts the nitrate into chloride, which is thoroughly dissolved out in the fixing bath. The prints being now washed are ready for toning.

The toning bath I use, and have used for more than twenty years, is as follows:—

Chloride of gold ... ... 1 grain
Water ... ... 12 ounces
Bicarbonate of soda, sufficient to neutralize the acid in the gold.
Borax ... ... ½ ounce

This bath is ready for use after standing an hour or so, and may be used for some time by strengthening with neutral chloride of gold. One grain is considered the quantity for a sheet of paper, but the ready sensitized will take a little more. After toning, the prints are well washed in two or three changes of water, and are then placed one by one in the fixing-bath, consisting of hyposulphite of soda 2 ounces, water 20 ounces, rubbing the face of each, as it is put into the bath, to expel the water from the surface and allow the soda to act; otherwise the prints may be unevenly fixed, showing yellow stains when they are finished. They are allowed fifteen minutes in the bath after the last one has been put in, after which the soda is poured off, and a solution of common salt (to prevent blistering) poured on, made up of 3 ounces of salt to 20 ounces of water. They are well moved about and pressed in the salt solution ten minutes, when the solution is replaced by water.

Many plans have been proposed for washing prints, and no small number I have used myself; but after many years' experimenting, I do not think there is anything better than careful hand-washing. Let me explain. The prints are well moved about in each change of water, and when the water is changed they are well pressed against the bottom of the dish, the washing and changing being continued for at least thirty minutes. They are left in the water all night, and in the morning the washing is continued for the same time. Being thoroughly washed, they are next placed on clean, dry calico, and another fold placed over them. When they have all been placed between the calico they are taken to the mounting room; those to be mounted are taken out, while those to be dried are left between the calico, and laid on frames till they are dry. This mode of drying prints prevents the curling up of the prints.

Notes.

Burton's photograph of London—taken from the Adelphi—which forms our Supplement this week, speaks for itself. Seldom, indeed, does one meet with a photograph in which the distances are so admirably rendered.

The *Pall Mall* this week, in an article on Burmah, publishes a sketch from a photograph of a Burmese lady contortionist, who, while lying on the ground, was able, without distress, to bend her body backwards till her toes rested on her head. This remarkable lady also possessed the power of moving the muscles of one side of the face and body, while those of the other side remained perfectly quiescent. Medical men would regard a photograph of the contortionist while so engaged with intense interest. Unfortunately, no photograph was taken, and as the lady is now ten years older than when she exhibited her curious elasticity, it is possible that age has deprived her of her singular powers.

Photographic albums have been made to contain many kinds of photographs. A mere collection of ordinary portraits has long been considered played out; and, ever eager for some new thing, Society has in turn gone in for cartes of its friends and neighbours, dogs and cats, hands, and, thanks to Mrs. Langtry's enterprising example, even shoulders. One very æsthetic youth, who himself boasts a Florentine profile, is said to have started an album of his acquaintances' chins; but it was found that a chin, taken *per se*, lacked "intensity" and "preciousness," and this new project was not persevered in.

We cannot help thinking that photographers who go in for figure "studies" commit an error of judgment in exhibiting at the same time pictures supposed to tell different stories, but wherein the same models have been employed. There are several instances of this in the Pall Mall Exhibition, a notable one being that of Ralph Robinson's "'Twixt Cup and Lip," and "Why don't you speak for yourself, John?" The ideas to be conveyed are different, and yet we have the same gentleman in the same wig—a very pronounced variety, by the way; the same lady in the same dress, and nearly the same "properties."

There is now, or rather there will be, a chance—if the authorities of the Paris Observatory do not weary in their labours—of what will be certainly the biggest photographic album on record. It will contain portraits of stars, and the fact that there are to be 20,000,000 of them shows plainly that they are to be, if we may use the expression, stellar stars, and not human ones from the social, the theatrical, and the political firmaments. This voluminous collection of star likenesses is to be contained in no less than 1,500 pages, so that it will evidently be an enormous tome. As, however, only one section of the above pages has yet been produced, and as this means that 5,999 other sections will have to be taken before the photographing of the heavens will be complete, our readers need not begin to prepare shelf room for this new publication yet.

Some curious statistics of the photographic messages sent by pigeon post into Paris during the siege were made public a week or two ago in a lecture before the Balloon Society. It will be remembered that persons who wished to communicate with their friends in the besieged city put notices in the *Times*. These notices were photographed on pellicles, rolled up in quill tubes, and tied to pigeons. The whole number of messages thus sent into the city during the investment was no less than 115,000, and the lot only weighed about two grammes. When received in Paris the messages were enlarged, and copies distributed. Of these copies, so says the authority responsible for the statement, 2,500,000 were made.

The new postal tariff just issued by the United States Post Office puts a duty of 25 per cent. on all books and printed matter other than newspapers and periodicals, however small the value, imported into America through the post. Photographs received in the United States in such small quantities as to suggest that they are intended for personal use and not for sale are, however, exempt. We must be thankful for small mercies.

A "panel" photograph of the Premier, just now exhibited in the shop windows, is the subject of much speculation. The beard of the noble marquis is, as a rule, carefully trimmed, but in the photograph in question its neatness is something phenomenal. The reason, however, is easily seen—*his lordship has just had his beard cut.* His coat-collar and the lappels are bestrewed with the nippings. What an oversight on the part of the photographer to allow them to remain! At the same time, we are grateful to him, for the fragments are most suggestive. Did the Premier, before entering the photographer's, visit a hairdresser's? This is scarcely possible, for surely the assiduous *Figaro* would have used the clothes brush. Was it the photographer who noticed that the stateman's beard was slightly unkempt, or could it have been the Prime Minister himself who made the discovery? One would really like to know.

Photographing the face is, as a general thing, all very well as a means of identification, but it has failed in the far West, where, it seems, that on an average no less than four Chinamen have succeeded in passing the scrutiny of the border guards of California, on the strength of one photograph and certificate of identity.

Those entrusted with the administration of the Californian "Chinese Restriction Law," having found the uselessness of trying to identify the Celestial by his face, have adopted the expedient of making photographic records of the marks on the thumbs of those who are privileged to reside on Western soil, and it is said that this method of identification is an effectual one, the markings on no two thumbs being identical.

This reminds us of a source of trouble that arose in the works of a Transatlantic dry plate company, and of the remedy which proved effectual. Finger-marks were found on the plates—whether from carelessness or malice no one could say—and great was the loss resulting; but a happy inspiration of the manager came to the rescue. Each person employed in the establishment was made to press his or her hands upon a gelatino-bromide film, this being now exposed to a weak light and developed. The negatives thus obtained were printed from, and the album of prints was placed where all could see. There were no more finger-marks on the plates.

Our prison authorities might take a hint, and make a photographic map of the hand-lines and thumb-markings of each convict.

A permanent exhibition of such objects as may illustrate the history of photography has long been talked of, and now bids fair to be established.

The instructive and interesting nature of the historical collection exhibited by the Photographic Society at the "Inventions" has induced the South Kensington authorities to take immediate action for getting together an analogous collection for the South Kensington Museum. Those of our readers who have specimens of interest which they will lend, may communicate with us in the first instance.

W. E. Gladstone has become so identified with railway platform utterances, that photographs of him engaged in delivering an oratorical fragment of this nature ought to sell like wildfire. Two photographers managed to get shots at him during the journey north, but we are not told whether he was in or out of the carriage while the photographs were being taken. To be perfect, the portraits of the great statesman should represent him looking out of the railway carriage window, the frame of which would make an excellent border for the picture. It is to be hoped the fortunate photographers have secured him in this position.

W. Jerome Harrison, of Birmingham, has in preparation a "Bibliography of Photography," which will appear in our pages. He will be pleased to correspond with any persons who may be interested in the subject, or can give information.

The sun is not only the photographer's friend, but it appears that his rays are specially beneficial to the human race, by their deadly effect on those bacterial germs whose agency is now recognised in all contagious diseases. These germs—micrococci and other forms—can bear extremes of heat and cold, and can lie dormant in a dried state for apparently any length of time, yet they are effectually killed by sunlight in a few hours.

M. E. Duclaux—a French physician and microscopist who has given special attention to the subject—declares sunlight the best, most universal, economical, and efficient agent known for public or private sanitation. His reresearches explain why it is so important for river water to be clear, since the sun's rays can then penetrate to the depths, and perform their cleansing work. On the same principle we ought to admit the sun freely to our houses, and not strive to prevent his light from entering by means of curtains and blinds, which we often use too continuously.

The photographic print-dealers of New York are very hard up just now for novelties in the way of female loveliness. In one of the principal Broadway shops a great display has been made by the revival of a number of photographs of Adelaide Neilson. The circumstance stimulating the curiosity of the writer of the New York letter which appears weekly in the *Burlington Hawkeye*, that gentleman waited upon the shop-keeper, and gleaned from him a number of interesting particulars. "The fact is," said the dealer, "last winter did not bring out a single beautiful new face for the footlights to shine on; some of the old ones held over well enough for stage purposes, but for photographic beauty they were played out. That is why I have gone back six years to Neilson, for no other face has ever yielded so much profit to the photographer." We learn, further on, that Miss Neilson was a most assiduous patron of the camera, and that the photographer had only to invite her once to his gallery. She had a collection of over 600 different portraits, and her arrangement with the photographer was not to exact a percentage on the sales, but to stipulate for a free supply in case she liked the picture. These she gave away broadcast, and yet always in a manner to impress the recipient that he was a singularly favoured individual.

Patent Intelligence.

Applications for Letters Patent.

13,320. William Henry Crowther, 4, Lyme Grove, Urmston, Manchester, for "Producing stereoscopic pictorial effects by the use of the magic lantern and screen."—4th November, 1885.

13,463. Arthur Goventry, Carlton Chambers, 18, St. Ann's Street, Manchester, for "Improvements in apparatus for coating and drying plates for use in photography."—6th November, 1885.

Patents Sealed.

15,198. James Ashford, 179, Aston Road, Birmingham, for "Improvements in stands for photographic cameras and other similar purposes."—Dated 19th November, 1884.

15,542. Alfred Julius Boult, 323, High Holborn, Middlesex, for "Improvements in or relating to holders for photographic films." — Communicated by George Eastman and William Hall Walker, United States.—Dated 25th November, 1884.

13,611. Oliver Imray, 28, Southampton Buildings, Chancery Lane, London, for "Media for photographic development."—(*Emil Jacobsen*, Germany.)—9th November, 1885.

Patent on which the Fourth Year's Renewal Fee of £10 has been Paid.

1881—4896. J. Plener. "Photographic emulsions."

Specifications Published during the Week.

16,727. Israel Todd, of North Parade, Otley, in the county of York, Photographer, for "Improvements in double dark slides for use in cameras for photographic purposes."—Dated 20th December, 1884.

The Patentee says—

The object of my invention is to construct dark slides, which are simple in construction, effective, and totally exclude all light. I construct my slide with the edges and ends of the frame, solid or closed, so as not to admit any light whatever; that portion of the frame, admitting the sliding shutters, is on one side smaller than the size of plate to be used; the opposite side is sufficiently large to admit the size of plates, for which the slides are constructed, the plates resting on the inside of the smaller shutter frame, and retained in position by projections or adjustable catches, or other suitable means; both plates are inserted in position in the dark slide, through the larger aperture, which is then closed by the larger shutter. Betwixt the plates of glass is inserted a sheet of an opaque substance, with a spring or springs, to press each plate home in the slide.

14,885. John Robert Sawyer, Director of the Autotype Works, Ealing Dene, London, W., for "Improvements in obtaining photographic printing surfaces."—Dated 31st July, 1885.

The claims are—

1. The introduction of amorphous-graphite, otherwise known as plumbago, into a compound of gelatine, sugar, and water, in the proportions indicated, for the purpose of coating paper and forming a tissue; this, when made sensitive to the action of light, may be printed under a photographic negative, and a picture in relief formed, having by virtue of the graphite employed a grain in proportion to the lights and shades of the negative, and also by virtue of the electrical conducting power of the graphite, be capable of receiving a deposit of copper by means of electrical action.
2. The separating of the graphite into grains of different sizes, which, when introduced into the gelatinous compound, will give the reliefs grain of different sizes to suit the various dimensions and styles of work for which the process may be employed.

10,920. Edward Gardner Colton, of the firm of Popplewell Colton and Co., of Victoria Chambers, Southampton Buildings, in the county of Middlesex, Fellow of the Institute of Patent Agents, for "Improvements in lenses for optical instruments," a communication to him from abroad by Anton Wagner, of Staats Zeitung Building, Tryon Row, in the City, County, and State of New York, Optician.—Dated September 15th, 1885.

This invention has reference to an improved lens for spectacles and other optical instruments, and the invention consists of an optical lens that is ground to a greater degree of curvature at its shorter meridian or axis, and to a lesser degree of curvature at its longer meridian or axis, either to a convex or concave surface according as the lens is intended to magnify or diminish. The lens is ground at one side in such a manner that the radius of the shorter axis or meridian is smaller than the radius of the longer axis or meridian, whereby a greater degree of curvature is produced in the direction of the shorter axis than in the direction of the longer axis. The result is an elliptical lens, the surface of which is ground either convex or concave, but with different radii for the different axis of the lens. The radius of the shorter meridian may be, for instance, twelve feet, while the radius of curvature of the longer meridian is twenty feet. A lens is thereby obtained that magnifies or diminishes to a greater degree at the meridian of the shorter axis than at the meridian of the longer axis. The other surface of the lens may be ground either plane, convex, concave, conical, elliptical, cylindrical, prismatic, or otherwise, according to the combination that is desired to be made with the front surface. A lens is thereby obtained that corresponds in a higher degree than the lenses heretofore in use to the peculiar shape of the eye, and which is thereby better adapted to correct the imperfect vision of the same.

2241. Frederick Woodward Branson, of Leeds, in the County of York, for "Improvements in photographic shutters."—Dated February 18th, 1885.

The Patentee says:—

My improvements refer to that class of shutter which is described in the Specification of a Patent granted to Richard Reynolds and myself dated April 2nd, 1883, No. 1650, such shutter being also employed under the patent granted to me dated 5th February, 1884, No. 2767, such shutter being also employed in my applications for patents dated June 11th, 1884, No. 8852, and December 22nd, 1884, No. 16793 and No. 16794, and the present invention refers to the employment of a second drop which fits so as to move freely in the same slide as the drop used in the hereinbefore mentioned photographic shutter.

This second drop is placed in the slide below the original, and on its upper portion a hinged or solid frame is provided; such frame forms the opening or aperture through which the light passes for photographic purposes.

The aperture in the framework is covered in the first instance by the lower or solid part of the second drop, and both drops are held by a catch; on the catch being released, the lower drop is instantaneously forced downwards by the upper drop actuated through gravity, spring, or other convenient means, the opening therein passing quickly in front of the lens, followed by the upper drop, which shuts off the light by passing in front of the lens.

The slide is so arranged at the bottom part as to allow the second drop to fall entirely out of it, its position being taken up by the first or upper drop. The second drop is attached to the framework of the photographic shutter by an elastic cord or its equivalent. When preferred, the upper and lower drops may be combined.

Patents Granted in America.

329,385. William W. Grant, Brooklyn, N.Y. "Camera." Filed June 28, 1883. No model.

Claim.—1. The method of producing photographic negatives of an object or sitter and surroundings or secondary matter, by impressing on a sensitive plate the image of the object or sitter, by means of the light from the same passing through the lens, and at the same time impressing surroundings or secondary matter upon said sensitive plate by light transmitted through a transparent plate or medium containing the matter to be impressed, the light for which purpose being admitted independently of that passing through the lens at the front of the sensitive plate.

2. The method of producing photographic plates of an object with engraved lines, etch, stipple scenic, or such other secondary and combined effects, showing throughout the image and the border surrounding the image, by juxtaposing a transparent or semi-transparent medium embodying one part of the secondary matter in front of the sensitive plate, and juxtaposing another transparent or semi-transparent medium embodying the further matter, to be combined behind the sensitive plate, and transmitting the light passing from the object through a lens and the said transparent or semi-transparent medium in front to the sensitive plate, and transmitting light (independently of that passing through the front lens) through the said transparent or semi-transparent medium juxtaposed behind to the sensitive plate.

3. The method herein described of producing photographic negatives of an object or sitter and a suitable background by impressing the image of the object or sitter upon the sensitive plate in front by the reflected light from the same passing through the lens of a camera, and printing upon the said plate from the rear, the image of the background by transmitted light passing through a transparent positive.

4. The method herein described of producing photographic negatives embracing the image of an object or sitter and a suitable background, the same consisting in first posing the object or sitter before a non-actinic background in front of the camera, receiving the image on a faint, transparent positive on ground glass or opaline to determine its location, then blocking out the image in non-actinic paint on a transparent masking-plate, and then impressing the respective images from the front and rear by reflected and transmitted light.

5. The combination, in a photographic camera, of the front and rear sections having an intervening recess for the plate-holder, and the plate-holder having sliding covers front and rear, and adapted to receive the sensitive plate and a transparent positive, the camera being provided with translucent windows front and back, for the admission of light in addition to the lens.

6. The combination, with the camera, consisting of front and rear sections having an intervening frame-holding recess, of the sliding block and its operating mechanism located in the rear section, and the standards and nippers adapted to carry a masking-plate.

7. The combination, with the front section of the camera, of the rear section thereof, constructed in two hinged parts, and the mechanism for carrying the masking-plate.

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COMMUNICATIONS FROM THE PHOTO-CHEMICAL LABORATORY OF THE IMPERIAL HIGH SCHOOL OF BERLIN.

BY DR. W. H. VOGEL.

Removal of Silver Stains.—The use of cyanide of potassium for the removal of silver stains has a disagreeable side, especially when there are cuts or abrasions of the skin. Other means for the removal of the stains have been proposed, such as iodine in iodide of potassium, or perchloride of iron.

It has been found that the same preparation which has done such excellent service as a reducing agent for gelatine negatives, can be used with advantage: a solution containing ferricyanide of potassium and hyposulphite of soda. Either dissolve a few crystals of the ferricyanide in the usual hypo solution, or make up a preparation as follows:—5 to 10 cubic centimetres of a solution of the ferricyanide containing 1 to 5, are mixed with about 50 cubic centimetres of hyposulphite solution. This preparation has done good service in freeing our hands from silver stains. Instead of using the mixed solutions, the spots may be treated first with the ferricyanide solution, and then with the hyposulphite. The above method has the advantage of involving the use of no poisons, and not causing injury to the clothes.

The solution containing ferricyanide of potassium and hyposulphite of sodium is not permanent, as the yellow colour soon disappears, and the fluid becomes turbid from the deposition of sulphur, just as if an acid had been added. The fluid then gives the reaction of sulphates with chloride of barium. It is scarcely necessary to say that after the discolouration has taken place the solution is useless, but it can be restored to activity again by an addition of fresh ferrocyanide. Any blue stains resulting from the use of the solution can be easily removed by a dilute solution of caustic soda.

Experiments with Magnesium Torches.—At the suggestion of Herr Meydenbauer, magnesium torches for photographic use have been made by the Schering Chemical Manufacturing Company. They are 50 centimetres long, and in the case of experiments made in this Institution, they burned for from seven and a-half to eight minutes. The action of the light was very notable, as a Vogel's photometer, placed at a distance of one-third of a metre from the burning torch, indicated from 6° to 10°, according to the amount of magnesium contained in the torch. A simultaneous experiment with a photometer—this experiment being made in a half-shaded glass room—showed that in eight minutes the photometer indicated 8°; so that the energy of the light obtained from this particular torch (marked as containing 14 per cent. of magnesium) may be regarded as about equal to that of good bright daylight on the 29th of October at half-past two. By the same daylight six seconds sufficed to produce a group with the full aperture of Steinheil's aplanat. It should be noted that the intensity of the torch light was measured at a distance of one-third of a metre.

(*To be continued.*)

THE CAMERA IN THE CORAL ISLANDS.

A Photographer's Diary of the "Wairarapa's" Second Trip to the South Seas.

BY A. H. BURTON (BURTON BROS.).*

Monday, July 28th.—Reached Nukualofa at nine o'clock, and at once enlisting an auxiliary force, carried the camera up the hill—Zion. Took views in all directions therefrom ; then "shot at" the King's Palace and the new church adjoining. This is a very showy Gothic building in wood, with two towers, now nearly complete. It is to cost £2,500, which will be defrayed out of the King's privy purse. The idea seems to be to make it as European as possible, and even to imitate, in a humble degree, structures of world-wide fame. There is to be a considerable amount of carved work inside. An elaborate throne is to be built for the monarch, and a row of stalls for an order of knights not yet called into existence. It is in reference to this building that a waspish writer in the *Fiji Times* suggests that Mr. Baker's ambition is to become Archbishop of a new church of his own instituting—kindly prognosticating his ultimate death in the odour of sanctity, and his canonization as "St. Barabbas of Tonga!" Surely a genuine Tonga building, with such a roof as described a little above, is worth half-a-dozen grimcrack weather-board "Gothic" imitations. Talk of Tonga for the Tongans, forsooth! "Tongan architecture for the Tongan people" would be more sensible, one would think. The afternoon was spent at Mua, a village about two hours' run along the coast, the chief object of interest being a very large banyan tree. The planting of the camera in front of it was just irresistible, it would seem, for up the tree rushed passengers by the score, where they hung on, reminding a friend at one's elbow of the tree-dwellers in Central Africa. But *the* sight of Tonga is a few miles beyond Mua, just too far to render it possible in the time to get up the photographic traps, greatly to the chagrin of the operator, who herein suffered his only real disappointment in the trip. This is what is conjectured to be a monument or rude building for some religious rite, suggestive at once of Stonehenge. No light can be thrown upon its use now, as no traditions thereanent exist among the natives. Briefly, its description is as follows. Near the village of Kologo, about fifteen miles from Nukualofa, and some eighty yards from the seashore, stands a pile of stones, two being upright, and the third laid across the top, or rather let in, as a groove has been carefully cut in each upright in which the cross stone accurately fits. The perpendicular stones are about fifteen feet high, twelve feet deep, and four feet thick, and they stand ten feet apart. The horizontal one is four feet six inches by two feet deep ; and of course long enough to connect the uprights. Were this writer to indulge in any speculation as to the use of these peculiar remains, he might be landed in as great an absurdity as Mr. Pickwick was in an affair of not very dissimilar character.

Tuesday, July 29th.—This is to be our last day in the Islands. Acceding at once to the request of the photographer, a distinguished "group" was formed in front of the palace—the ladies condescendingly leaving the wash-tub for the purpose. The personages in question were Salote (Charlotte) Mafileo, daughter of the King ; Anazieni (Anna Jane), sister of Prince Wellington ; and Jiaogi (George) Fatafehi, Governor of Hapaï. After this, the Rev. J. E. Moulton's residence was coolly appropriated, followed by the Tubou College with many scores of pupils arranged in front. These same pupils had just astonished our passengers by their proficiency in mental arithmetic, and their mastery of some of the problems in Euclid. Waylaying a bevy of the bonny Tongan girls on their way home from college, they were easily induced to form groups for the insatiable camera. Then, with shouldered instruments, a bee line was struck for the Roman Catholic Mission, to fill up the two hours which now remained. Were most politely received by the priests, and a group of the native brass band was soon formed in front of the residence, followed by a view of the as yet uncompleted coral church, with the nuns and pupils arranged around, and the boss mason on the scaffolding chipping away at the coral carving. Very kindly received as he was by the priests of the mission, this photographer must still have his little fling. It is as to the dress of the pupils. "Confound the fellow!" says some one, perhaps, "can't he let the women's dress alone?" Well, he can't, when he sees the unfortunates dressed all alike in a species of bedgown of a flaring chintz, reaching from the neck to the heels. What is the object in disguising Nature's own children in such a vile and worse than charity-school rig? It is not æsthetic, that is plain, and one appeals confidently to a consensus of opinion of English ladies (surely the ultimate court in such a matter) if it is really any more delicate than the true native costume. Two or three more views on the way to the launch, and then, in the midst of taking the very last, the steamer's whistle sounds, and the "Camera in the Coral Islands" has, for this time at least, done its work, whether successfully or no, "development" only can show. Punctually at three o'clock—the advertised time—the anchor is up, and we are heading for Auckland.

Thursday, July 31st.—By noon this day we have covered just half the distance between Tongatabu and Auckland. Six hundred miles in forty-five hours is capital work, and we are hopeful of reaching Auckland wharf early on Saturday afternoon.

Friday, August 1st.—Everyone busy, either finishing diaries, or taking counsel with stewards as to packing the treasures secured in the islands. Hitherto the cabins have been as gorged with curios as purses have been depleted in their purchase. This evening we had a little more speech-making. The Hon. E. Carnegie proposed the toast of "The Captain, Mr. Wheeler, Mr. Stott, and the officers of the ship," remarking that as there were perils of the sea through which the skill of the Captain had piloted them, so there were dangers and difficulties on land, which it was Mr. Wheeler's province to surmount. That gentleman, in the discharge of his duty, had shown a combination of energy and patience which unhappily fell to the lot of but few. The toast was received with enthusiasm, and was duly responded to by Captain Chatfield and Mr. Wheeler—the latter gentleman announcing that it was the intention of the Company to continue these trips yearly, and perhaps to extend them to groups of islands even more interesting than those we had just visited

Saturday, August 2nd.—At 10 o'clock a.m. Auckland Wharf is reached, and the second "Excursion to the South Seas" is at an end. There is no need to multiply words. The trip has been a success—unequivocal—perfect. It would seem impossible for the veriest cynic to find occasion for a single snarl ; and as to regularity, if punctuality be really the politeness of kings, the officers of the *Wairarapa* may be declared to be just regal in their virtues.

[Messrs. Burton Bros. send us a series of about one hundred excellent whole plate views, illustrative of the above trip. Perhaps some day we may reproduce more of them.]

Correspondence.

THE PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

Dear Sir,—Will you kindly mention to your readers that the date of our Exhibition has been fixed for the week beginning January 11th, 1886. It will be held in the galleries of the Pennsylvania Academy of the Fine Arts, as per circulars, which will be sent you in a few days.

A number of exhibits, which include some very fine work, have already been received from England. It is proposed to make the foreign pictures that may be sent us one of the special features and attractions of the Exhibition, giving, as they will, an opportunity for critical comparison of the quality of American work with that made in other countries.

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* Continued from page 718.

With this end in view, and also that such pictures as may be sent us from England shall, as far as possible, be representative of the best work of your photographers, we would ask you to call special attention to the matter, and to urge a full representation of first-class English work.

I mail with this a few copies of our circular of May 1st, giving rules and classification, and shall be pleased to mail copies direct to any address on application.—Very truly yours, Robert S. Redfield, Secretary.

1601, *Callowhill Street, Philadelphia Road, U.S.A.*

PHOTO-MICROGRAPHS.

Dear Sir,—I notice in your last issue that Mr. Forgan expresses great surprise—I was almost going to say indignation—that any microscopist should use and recommend the use of the eye-piece in conjunction with the objective, when it is desired to take a photo-micrograph. With the admirable enthusiasm of all beginners, he imagines that those who use the eye-piece, or "French buttons," have never tried anything else. Now, as a matter of fact, as many good pictures have been taken with the eye-piece as without it, and there are as many operators, I believe, who use the eye-piece as do not—I mean, of course, among first-class workers. The explanation of this apparent contradiction lies in the fact that in very many objectives, constructed for the purpose of microscopic examination, a certain amount of negative chromatic aberration is purposely produced by the objective to counter-balance the positive chromatic aberration of the eye-piece. To use the words of a great authority on this subject—"Thus it appears that the positive aberration of the eye-glass is exactly equal to the negative aberration of the field-glass and object-glass taken together, so that the one exactly neutralizes the other."

There is another effect produced by the eye-glass: the images, which are slightly concave before reaching it, and after having passed through the field-glass, are rendered straight and flat by the passage of the rays through the eye-glass.

Speaking on this same subject, and quoting from Mr. Shadbolt, another great authority says—"Allowance must be made for the difference between the visual and chemical foci in microscopical objectives, which are always over-corrected. The requisite distance depends on the power of the objective used, and, strange as it may appear, on the mode of illumination." This refers to the use of the objective without the eye-piece, and a great deal of very careful adjustment and a number of delicate trials must be made before even an approximate idea of the correction needed for the variation between the visual and actinic foci can be obtained. Other operators have compassed the same result—*id est*, produced good pictures without the use of the eye-piece—by employing objectives constructed specially for photographic work; and some makers actually supply correctors with their objectives, whereby these said objectives can be used for photo-micrography without the aid of an eye-piece. Very little, or no difference is perceptible in the results obtained by either of the three methods; but there are certain practical advantages accompanying the use of the eye-piece, which render its employment advantageous. In the first place, if we possess an objective which gives a satisfactory view of any given object when used microscopically, we may be sure of obtaining a similar picture, if this objective be used photographically in conjunction with the same eye-piece. Secondly, the use of the eye-piece obviates two glaring defects, which show themselves frequently in photo-micrographs produced by the objective alone—viz. (*a*) inequality in the illumination of the field; and (*b*) reflection from the interior of the tube. S. Bottone.

Proceedings of Societies.

Photographic Society of Great Britain.

The first ordinary meeting of the present session was held in the Exhibition Gallery, 5a, Pall Mall East, on Tuesday last, Nov. 10th, James Glaisher, F.R.S., President, in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected members of the Society:—G. Bankart, H. Bliss, Major J. Boord, H. Bolden, T. Bowker, H. H. Cameron, George P. Cartland, Sidney Castbourne, Arthur Hanult Clarke, J. Montague Copeland, M. B. Copland, Harry Clifford, Richard Benyon Croft, R.N., F.R.M.S., F. W. Edwards, A. C. Farnworth, S. Herbert Fry, J. P. Gibson, D. E. Goddard, W. E. Gray, T. A. Green, W. H. Hislop, Richard T. Irwin, Rev. H. Victor Macdona, M.A., Robert Pinkney, Clive F. Pritchard, E. B. Reeve, J. B. Robinson, H. Abercrombie Room, A. Shuttleworth, W. A. Skill, Ernest G. Spiers, Charles Edward Spurling, W. J. Stillman, A. C. Stock, Henry Symonds, A. Taylor, and W. H. Walker.

The Chairman said it was his pleasing duty to present those medals which had been awarded by the jurors. He felt sure that anyone who looked round the walls would see that any one of the medals must have been well earned; and in a few appropriate and encouraging remarks to each recipient, he handed medals to the following gentlemen, the catalogue number of each success being here given:—Autotype Company, 507; Annan and Swan, 505; F. Beasley, Jun., 259; F. M. Brownrigg, 92; W. J. Byrne, 224; Hector Colard, 354; Seymour Conway. 183; J. Lafayette, 320; W. N. Malby, 530; W. Muller, 161; Wilson Noble, 368; H. P. Robinson, 74; School of Military Engineering (per Capt. Maycock), 254; Rudolph Schuster, 800; Henry Stevens, 47; W. J. Stillman, 339; Mansell J. Swift, 510; W. Symouds, 128; John Terras, 526; W. Wainwright, Jun., 348; W. H. Walker, 706; and Leon Warnerke, 783.

The Chairman, in alluding to pictures of especial merit, said that the non-awarding of medals in some cases may have caused some pain, and it was a painful task for the Jury sometimes. In the present instance, however, when he received the numbers from each Juror he found that their report agreed very closely indeed. Among the pictures he should like to have bestowed medals upon were those of R. Slingsby, E. Smithells (at Rivington), West and Sons (yachts), Copeland's (New Zealand Views), H. Trueman Wood (Alpine studies), R. Faulkner, Thos. G. Whaite, G. Hadley, ("Thinking of To-morrow's Meal"). "The Council Chamber of the Town Hall," &c. (J. Gale) was awarded a medal before it was known that it belonged to a Juror; and W. Cobb's street views of Paris were, unfortunately, labelled not for competition, or he should have liked to have given him a medal. He then spoke of the labours of the Jury—T. Sebastian Davis, J. Paget, J. Spiller, G. L. Addenbrooke, E. Dunmore, J. Gale; and also the Hanging Committee—Capt. Abney, W. Cobb, T. S. Davis, and W. England, all of whom deserved the thanks of the Society, which were duly accorded.

Referring to the success of this year's Exhibition, the Chairman said that notwithstanding the unfortunate state of the weather during the whole term, something over eight thousand persons had been admitted up to date. He then announced as a presentation to the Society from B. B. Turner, a large portfolio of prints by the calotype process, made between the years 1843 and 1848, which was received with applause.

The Chairman then called upon J. R. Sawyer to read a paper on his new method of "Photographic Engraving," which was accompanied by a demonstration of so much as could be practically illustrated of the process by which "Autogravure plates" were produced.

J. R. Sawyer commenced by a brief outline of the plan of Major-General Waterhouse, described some years ago at a meeting of the Photographic Society of Great Britain, wherein he recommends the use of fine sand, crushed glass, or similar substances, to be imbedded in the gelatine for the purpose of obtaining a suitable grain. Upon these lines E. Foxlee and himself (J. R. Sawyer) had been experimenting, with the result that they were able to dispense with powdered glass, fine sand, &c., by incorporating a substance which was a conductor of electricity into the gelatine film. For this purpose they used finely pulverized graphite, and they found that by dusting fine plumbago on the surface of a dried gelatine print so prepared, they could, by gentle rubbing, obtain a perfect surface for electrotyping. Briefly, the process described was as follows:—A pigmented tissue containing finely pulverized graphite, and rendered sensitive to light by means of potassium or ammonium dichromate, is printed in contact with an ordinary negative, as in carbon printing, and the exposed tissue, after a brief soaking in cold water, is developed at a temperature of 110° F., a planished plate of copper being employed for the support. Those parts which have been little or not at all acted upon by light, being more or less soluble in the hot water developer, become in a short time washed nearly free from pigmented gelatine and graphite, while the shadows retain these substances in proportion to the intensity caused by the action of light. When dry, the conductivity of the surface is ensured by rubbing the whole gently with very fine electrotyper's graphite, which allows of a perfect electrotype being made. In order to obtain perfect adhesion, the plate is varnished at the back, except an inch or so round the margins, while a deposit of copper is deposited upon the plate. This usually occupies an hour. The whole of the back is then varnished, and electro deposition carried on for about twelve days, at the end of which time the electrotype has gained sufficient thickness to be stripped and printed from as an ordinary engraved copper plate. Stripping is performed by filing the edges, and inserting a thin blade or other suitable tool, when the copper-electro comes away with a perfect impression of the image. The arrangement for electrotyping shown was an adaptation of the Daniel's copper sulphate form, the copper plate carrying the image (the anode) being placed between two copper sheets (cathodes), and the whole suspended in a fully saturated solution of copper sulphate plus H_2SO_4. The current used by Mr. Sawyer is that which he obtains from a small dynamo, the positive pole of which is connected with the film plate.

A number of prints from a plate produced in this way, from one of G. W. Wilson's negatives of Salisbury Cathedral, were handed round, as well as plates in various stages of preparation, and the manipulation of soaking the tissue, mounting, developing, &c., was demonstrated, together with the plan of suspending the plates in the battery in a manner best calculated to secure equal and constant action. Some further details regarding the process will be found under the head of "Patent Intelligence," in the present number (page 729).

The President then vacated the chair, and J. Spiller, F.C.S., occupied it for the remainder of the evening.

The Chairman called attention to the prints which had been passed round, and said that by putting together various processes, they had a very excellent result. The use of graphite was not new in electrotyping, and the process contained the germs of the Prestch and Waterhouse processes; but where others may have felt dubious, Mr. Sawyer had succeeded. Had any deterioration of the copper taken place in printing, sufficient to induce Mr. Sawyer to turn his attention to a nickel coating or steel facing of the plates, especially when large numbers of prints were required?

W. England inquired if the ordinary bichromate bath was employed for sensitizing?

W. Wainwright, jun., wished to know if any number of prints could be taken from the finished plates shown.

W. Bedford noticed a rounding of shadows, and wished to know if it could be overcome, or was it due to a reproduced negative?

And the Chairman asked if the medalled pictures of the Autotype Company were produced by the process?

J. R. Sawyer, in reply, said he now used steel-faced plates. The ordinary bichromate sensitizer answered well enough for the tissue. As yet they did not know how many impressions could be taken from one plate. The rounding of image about certain shadows was attributable to the negative being a reproduction. All the Company's exhibits mentioned were by this particular process.

A vote of thanks having been passed to Mr. Sawyer,

The Chairman announced that the next Monthly Technical Meeting will be held on Tuesday, the 24th inst., and the next Ordinary Meeting on Tuesday, December 8th. It was also stated that the Exhibition will close for the season on Saturday evening, the 14th inst.

South London Photographic Society.

The annual technical meeting of the above Society was held in the House of the Society of Arts, John Street, Adelphi, W.C., on Thursday evening, the 5th inst., W. Ackland in the chair.

The minutes of the previous meeting having been read and confirmed,

The Chairman announced that it was necessary for the members at that meeting to give in nominations for the election of officers, which would take place in December. He wished to withdraw from his position as President, for he felt that he could not give sufficient time to promote the Society's interests, but he still desired to remain an active member.

The Hon. Secretary (F. A. Bridge) having mentioned the probability of other vacancies, the following nominations were made:—

President—H. Trueman Wood.
Vice-President—E Dunmore.
Committee—W Ackland, H. Compton, J. Downs.

W. M. Ayres then exhibited an adjustable flange for preventing light from entering a lens by means of the diaphragm slit. It was a ring turned in mahogany, and recessed on one side in order to revolve one half a turn after the insertion of the stop; by this means stray light could not possibly enter the tube.

"Urie's Automatic Exposing Apparatus" was next shown by Marion and Co., and the details of its action when in use clearly set forth by E. C. Spickernell, who said it was the outcome of a difficulty experienced by the inventor in getting equal tones with Alpha paper, and which was attributable to unequal exposure. Sufficient Alpha paper was carried on a spool to make five hundred C.D.V.'s, or two hundred and fifty cabinet prints, and by the action of a drum controlled with clock weights, the paper passed under a negative for exposure, and thence to a receiving spool at the opposite end of the machine. By means of a lever the negative-frame was raised while the paper was in motion, and clamped tightly in contact during exposure; at the same time two gas jets at a fixed distance above, which were previously emitting a very feeble light, became automatically raised to their full illuminating capacity, and remained so during the period of exposure, when they were again lowered simultaneously with the change of paper. Several strips of prints exposed in this way were handed round, and it was advised to develop and also tone the strips in lengths by means of varnished tin dishes.

W. H. Walker, of the Eastman Dry Plate and Film Co., described the "Eastman-Walker Roll-Holder." He spoke of the difference between previously introduced roller-slides, and that which he was about to show, and which he said they preferred to call a roll-holder. He said the roll-holder was an entire instrument; it was a frame complete in itself, and could be adjusted to any camera. The advantage of such an arrangement must be apparent to all, since it in no way interfered with the use of ordinary dark-slides or double backs, being used for the same camera. He then took one of the roll-holders apart, and explained the use of each portion before it was passed round for examination, and said that the frame had been designed in its present form in order to better resist the great strain under which the paper had to be subjected. A spool of coated paper was then shown, and some comments made upon the smoothness of its surface. The impossibility of error in manipulating the frame, or of mixing up the spools, was alluded to, as well as the ease with which exposed portions could be detached for development without affecting the resistance break, the latter being governed by a key. The plan of registering by winding until four distinct clicks had sounded for the larger sizes, and three clicks for the smaller, was drawn attention to, and some reasons for adopting this plan were given. It was recommended that a fresh surface should not be brought into position for exposure until it was required, since it offered a premium for dust to settle thereon, and so caused spots. The manner of detaching a spool of exposed paper and packing for transmission by post was illustrated.

H. Compton inquired how the cut sheets were kept in position, and in reply was informed that the films were laid surface upwards on a board of suitable size, and a metal frame held the paper flat. These were introduced into the dark-slide as an ordinary plate would be. The speaker (W. H. Walker) then alluded to the apparent freedom from fog in paper negatives, as compared with glass plates, and referred to instances where good negatives were obtained on paper from the same emulsion which, on glass, gave a foggy image. This he attributed to a crushing of the silver bromide in contact with the hard surface of the glass, and the tenacity of gelatine on glass; he had noticed that whenever a strong positive image was seen on the back of a plate, the negative was nothing but fog, and he did not know what else to attribute it to, except that the particles had become crushed.

A Member inquired if it would be possible to make use of the large rolls on a small camera—say half-plate?

W. H. Walker: Yes, it could be done, but it would be hardly suitable for commercial purposes; and in reply to a second question from the previous speaker, it was stated that by masking one half in the camera, the other portion might be exposed.

J. M. Copeland referred to a possible difficulty in focussing, and wished to know if any necessary alteration of an existing camera to suit the roll-holder would interfere with the use of ordinary double backs. He also thought the paper negatives would become rotten by storing.

Some extracts from the Company's prospectus were quoted in reply.

E. Dunmore, speaking in regard to the commercial use of paper negatives, inquired if there was anything to prevent red spots appearing from contact with the silver paper in printing; otherwise, with constant use they, like unvarnished gelatine negatives on glass, would soon become worthless.

W. H. Walker could see no reason why paper negatives should be so affected; he had never seen any spots in their oldest negatives from contact with silver paper; and that might be prevented by the process of rendering them translucent with castor oil. Lately they had adopted common vetrinary vaseline instead of the castor oil, and found it easier to work; but paper negatives could be varnished by means of an atomiser.

S. G. B. Wollaston had recently taken 720 prints from one of his negatives made with the Eastman paper, and there was an absence of the spots referred to.

S. H. Fry remarked that from a considerable experience in printing from another make of bromide paper, he had not met with spots.

J. Traill Taylor inquired if the Eastman Company had tried making their paper negatives translucent with Canada balsam dissolved in benzole.

W. H. Walker: No. In some earlier experiments they had used it, but not for finished negatives.

J. Traill Taylor said that a few weeks ago he was present at a meeting of the Society of Amateur Photographers of New York, when Prof. Newton projected upon the screen a number of transparencies, fully half of which were from paper negatives, and no one discovered any difference so far as grain was concerned. It was not until the slides had been shown a second time, and those from paper pointed out, that the meeting became aware of the fact.

E. Foxlee, referring to the permanence of paper negatives, spoke of a series of calotype negatives made in India twenty-six years ago, being recently shown at the Photograpic Club, not one of which, he said, exhibited any signs of deterioration.

Similar experiences were mentioned by other members.

The Hon. Secretary next drew attention to Reynolds and Branson's "Universal Photographic Shutter." It somewhat resembled the "Phœnix," but possesses, in addition, for rapid exposures, a very effective form of simple drop-shutter, giving approximately correct exposures of $\frac{1}{4}$ to $\frac{1}{50}$ of a second. A neat view-meter from the same firm was also shown.

Two forms of cardboard dry plate boxes by Arundel and Marshall were then passed round for examination. The peculiarity in these boxes was that of employing square zinc grooves, and in one example backing the metallic grooves with a sunk block to facilitate raising the plates.

Some examples of portraiture taken at night by the "Photolux" process of J. A. Langton, followed; after which the room was darkened to enable W. J. Cox, of the Eastman Dry Plate and Film Company, to demonstrate the development, &c., of their paper negatives, the result of which was eminently satisfactory. The soda developer was employed according to their formulæ—in one solution only; it had been made three weeks, and was but very slightly discoloured. The importance of using boiling water and sodium carbonate was pointed out. Wollaston's diaphragmatic shutter was next shown by the inventor, who gave a detailed description of its construction. The diaphragm, which works in a tube, takes the place of that supplied by the opticians with the lenses, and exposure can be regulated by means of a screw from $\frac{1}{150}$ of a second to several minutes.

The Chairman briefly dwelt upon the advantages of paper negatives for amateurs, and the perfect results that could be obtained in that manner. He then referred to the other exhibits that had been brought before the meeting, and asked for a very hearty vote of thanks to the Eastman Company and other exhibitors, which was accorded. The proceedings then terminated.

London and Provincial Photographic Association.

The usual weekly meeting was held on Thursday, the 5th inst., A. Mackie in the chair.

A. L. Henderson explained a method of cutting prints to size. For this purpose he used a set of parallel rulers graduated in 10ths; a T-piece was attached at right angles, similarly marked. The size of the print being decided upon, each print could be accurately cut to guage. Mr. Henderson also passed round two negatives he had taken by gas-light of the Exhibition of the Photographic Society of Great Britain; a rectilinear lens was used; the exposure, two and a-half minutes with $\frac{f}{16}$ stop.

A series of negatives of the moon (taken by Captain J. Long) was shown by J. J. Briginshaw. A telescope, six and a-half feet focus, was used with an exposure of half a second.

J. Stuart, of Edinburgh, exhibited a finder for instantaneous work, which did not require to be brought close to the eye—the image being seen on a ground-glass screen of about one inch square—a small biconvex lens being employed of about two inch focus.

Sheffield Photographic Society.

The usual meeting was held at the Masonic Hall, on Tuesday, the 3rd inst., W. B. Hatfield in the chair.

After the minutes and balance sheet were passed, Messrs. Winder and Furness were elected members.

The monthly competition was adjourned until December.

An interesting discussion arose on the merits of various makes of plates for transparencies, and the President exposed and developed one (Mawson's), which was afterwards thrown upon the screen, and proved very successful.

A number of slides, the production of members, were then shown with the Society's lantern, and a most enjoyable evening spent.

Hyde Amateur Photographic Society.

The usual fortnightly meeting was held in the Mechanics' Institution on Wednesday evening, the 4th inst. The rules as revised by the committee were accepted.

Mr. McClean showed some transparencies which he had made by using iodised gelatine instead of iodised collodion in the silver bath. The results were fairly good, and Mr. McClean promised to give a description of the process at the next meeting.

F. W. Cheetham then proceeded to give a practical demonstration on the making of wet plate transparencies. He first showed how to make up a silver bath, and explained how to keep it in good order when in use. He then proceeded to clean a plate, coat it with collodion, and sensitize in the silver bath. The plate was afterwards exposed by copying through the camera, the method of illumination being a sciopticon lantern lighted by the lime light. The exposure given was two minutes. During development, Mr. Cheetham said that the great objection to wet plate transparencies, in his opinion, had been the want of transparency in the shadows. This objection he had overcome by using a special developer (which he described). After development, the picture was shown on the screen. The result was good, and the members expressed much admiration.

Councillor Horsfield moved a vote of thanks to the President for his demonstration; and in seconding, Dr. Sidebotham said that he had had experience in both processes, and had of late been much in favour of the dry gelatino-chloride process for transparencies, but Mr. Cheetham's success inclined him to try the wet plate again.

Glasgow Photographic Association.

A general meeting was held in the Philosophical Society's Rooms, 207, Bath Street, on Thursday, Nov. 5th, the President, Mr. Lang, in the chair.

The minutes of last meeting were read and confirmed.

The question-box contained a question asking for information as to the most suitable battery for producing light equal to 3,000 candles for photographic use. A number of members gave it as their opinion that a light of such power could only be produced by a dynamo-electric machine, as the number of cells for a battery would be so great as to be impracticable.

The Chairman then called upon Mr. John Stuart to read his paper on "Silver Printing" (see page 726.)

Mr. Dodd asked if Mr. Stuart thought that pictures would be as permanent when a weak silver bath was used as they would be with a stronger.

Mr Stuart said that with the papers now in the market much weaker silver baths could be used than formerly, and he found that with the strength he had mentioned superior prints were got than when a stronger bath was used.

Mr. Urie thought that we were not keeping up with the times by continuing to use silver printing. He thought that as good, if not superior, work could be produced on the quick printing papers as had ever been produced by the old silver printing process. Handing up a number of developed prints, printed by his automatic printing machine, the speaker said that such prints could be produced at the rate of hundreds per day, of an absolute uniformity.

Mr. Stuart said that in America he had seen an automatic printing machine for silver prints at work; the atmosphere there being so clear that with the ordinary process prints could be obtained in from ten to fifteen minutes, and with this machine, the printer had only to set it going, and return when the roll of paper had all been exposed so as to wash and tone them. He envied very much the rapidity with which printing could be done in that country. Mr. Stuart then inquired whether any of those present could tell him how to take silver stains out of gelatine negatives; but no one could suggest a cure.

A good deal of discussion took place in regard to the fading of prints, a number of members giving incidents of fading that had occurred in their practice.

The Wenham gas-lamp was shown by Mr. Lang, who also described it. There was also shown another lamp of a similar pattern, known as the "Bower Light," this latter being described by its inventor, Mr. Joshua Horton. Both lamps give most excellent lights, with very small consumption of gas.

A series of Mr. H. P. Robinson's photographs, kindly lent by him, were exhibited and very much admired by the members, both for their artistic and technical excellence.

A number of negatives and prints were sent by Messrs. Warnerke and Company, showing some excellent results on their single and double-coated negative tissue. The picture, by Mr. Warnerke, which received a medal at Pall Mall Exhibition, was considered to show that the tissue might be got to produce as good results as from glass negatives.

A sample of the substitute for glass, prepared by the late Mr. Walter Woodbury, and on the perfecting of which he was engaged shortly before his death, was examined by the Society.

Manchester Photographic Society.

Lantern Section.

The first meeting of the above section was held on Wednesday, the 28th inst., in the large room of the Memorial Hall, which was attended by about six hundred members and friends. The chair was taken by W. I. Chadwick (Hon. Secretary of the Society), who gave an inaugural address, in which he first explained the objects of the Section: they were not to be too technical; the intention was to make them popular and enjoyable to members and their friends, and as the members had the privilege of introducing as many lady friends as they liked to each meeting, it was hoped they would be appreciated and well attended. The meetings had been arranged to take place on the fourth Wednesday in each month, from September to March inclusive, and a Special Committee were entrusted to manage the affairs of the Section (subject to the approval of the General Council). Mr. Chadwick gave a retrospective sketch of photography, in which he called back many of the dark days of the black art, with some of his own experiences in the wet process, when he used to carry his bath wherever he went, and a tent to shield him from the public gaze during the process of "dipping." He alluded to the various dry processes, from the earliest to the present gelatino-bromide process, and concluded by another historical sketch of the magic-lantern. He then proceeded to show the development of the photographic image by means of the lantern, first of all explaining the chemical action, and showing the difference between positives and negatives upon the screen. He coated a glass plate with collodion emulsion, dried it (over a spirit lamp), and printed it in contact with a negative by the light of the lantern. Then a tank containing the developing solution was placed in the lantern, with a ruby glass between it and the light, and the exposed plate dropped in the solution. Very soon the image began to appear on the screen, and when development had proceeded sufficiently, another tank was substituted for that in which the development had been conducted containing clearing solution, and the plate was placed in this (the ruby glass having been removed). The demonstration was most successful and highly appreciated, the picture developed being a portrait of the lecturer.

A series of pictures thrown upon the screen by J. R. Greatorex followed. They included some magnificent Alpine views by Mr. Donkin. Then came a series by Mr. Gale; these were a very different class of subjects, some of which were thought to be unrivalled for artistic composition. These were followed by a few slides from W. Brooks, of Reigate.

Woodburytypes were next shown, and to illustrate the differences of colour that could be obtained by this process, two slides of the moon were shown, one printed in the ordinary photographic sepia colour, and another print from the same negative in blue ink. The next slide almost amounted to a curiosity: it was a Nile boat on the Niagara Falls; and after a fair selection of Woodbury slides had been shown, a number by Wilson, Valentine, and York were exhibited, and concluded by specimen slides on Cowan's gelatino-chloride plates.

During the exhibition of these slides Mr. Chadwick described them, more from a photographic point of view than any graphic description of the subjects, and by certain views showed how photography could mislead one who did not understand or make allowances for perspective; then by a photograph, and what was considered as a good and well-executed hand-painting of the same subject, illustrated how the artist of the pencil and brush could lead us astray altogether.

Several novelties in lantern appliances were laid upon the table.

The next meeting of the Lantern Section will take place on Wednesday, November 25th, which will be an exhibition of members' work. Slides to be sent in not later than Monday, November 23rd. Address J. R. Greatorex, Hon. Sec. Lantern Committee, Memorial Hall, Manchester.

The Photographic Club.

On Wednesday, the 4th of November, the Annual General Meeting took place. The sixth annual report and the yearly balance sheet were read, showing a considerable increase in the number of members and augmentation of the funds. The possession of an excellent and well-fitted laboratory free to all the members for experimental photography; an optical lantern for use with the lime light, made expressly for the Club, with many adaptations and improvements, and which is ready for use any evening that the members may desire for the exhibition of transparencies, &c., have proved great attractions. The excellent collection of photographic literature lent for home reading to the members, has been fully appreciated. An exhibition of photographs taken during the Saturday afternoon and Bank Holiday outings was extemporized, and proved so successful that a similar exhibition is proposed for the first Wednesday in the coming year. There is no doubt that the comparative smallness of the subscriptions, combined with the advantages offered (especially to amateurs), has had much to do with the unqualified prosperity that has been and continues to attend this Association ever since its establishment in 1879, and it bids fair to become in the future not only a useful but an indispensible institution.

Talk in the Studio.

Society of Arts Sessional Arrangements.— The first meeting of the One Hundred and Thirty-second Session of the Society will be held on Wednesday, the 18th November, when the opening address will be delivered by Sir Frederick Abel, Chairman of the Council. Previous to Christmas there will be four ordinary meetings, in addition to the opening meeting. The following arrangements have been made:—Prof. Silvanus P. Thomson, "Apparatus for the Automatic Extinction of Fires." Prof. Francis Elgar, LLD., F.R S.E., M.Inst.C.E., "The Load Line of Ships." F. Edward Hulme, F.L.S., F.S.A., "Technical Art Teaching." Dr. C. Meymott Tidy, "The Treatment of Sewage." C. V. Boys, "Calculating Machines." Major Templer, "Improvements in Balloons." George Clulow, "The History and Manufacture of Playing Cards." W. H. Preece, F.R.S., "Domestic Electric Lighting." Prof. R. Meldola, F.C.S., "The Scientific Development of the Coal Tar Industry." *Foreign and Colonial Section*—The meetings of this section will take place on the following Tuesday evenings, at eight o'clock:—Jaunary 26, February 16, March 2, 23, April 13, May 18. *Applied Chemistry and Physics Section*—The meetings of this section will take place on the following Thursday evenings at eight o'clock:—January 28, February 11, 25, March 11, April 8, May 13. *Indian Section*—The meetings of this section will take place on the following Friday evenings, at eight o'clock:—January 22, February 19, March 19, April 2, May 7, 21. *Cantor Lectures*—The first course will be on "The Microscope," by John Mayall, Jun. Lecture I.—November 23, Origin of the microscope: Its construction to the date of the application of achromatism. Reflecting microscopes. Lecture II.—November 30, Modern microscopes: Peculiarities of construction (1) in general form, and (2) for special observations. Lecture III.—December 7, Binocular microscopes. Demonstration microscopes. Lecture IV.—December 14, Objectives, oculars, and accessory apparatus. Lecture V.—December 21, the desiderata of a modern microscope as exemplified by English, Continental, and American models. Curiosities in microscope construction. The second course will be on "Friction," by Prof. H. S. Hele Shaw. The third course will be on "Science Teaching," by Prof. S. Guthrie. The fourth course will be on "Petroleum and its products," by Boverton Redwood. The fifth course will be on "The Arts of tapestry-making and Embroidery," by Allen S. Cole. The sixth and concluding course will be on Animal mechanics," by B. W. Richardson. *Juvenile Lectures*—Two juvenile lectures on "Waves" will be given by Prof. Silvanus P. Thompson on Wednesday evenings, December 30, 1885, and January 6, 1886.

City and Guilds of London Institute for the Advancement of Technical Education.—The presentation of scholarships, prizes, and certificates, by Alderman Sir Robert Nicholas Fowler, will take place at the Salters' Hall, St. Swithin's Lane, E.C., on Wednesday, December 9th, at 7.30 o'clock. The Lord Mayor will preside.

A New Society.—The "Scottish Science and Art Photographic Conference" has been founded in Edinburgh, for the purpose of disseminating the principles and practice of art and photography, and to spread among its members a knowledge of whatever in optical or physical science, or the fine arts, may help to promote that object. Meetings to be held at 5, Saint Andrew's Square, Edinburgh, on the evening of the last Thursday in the month. Subscription, 10s. 6d. per annum; entrance fee, 5s.

The Art Amateur.—This is a monthly American publication of considerable merit, which is now to be simultaneously published in London. The November number, which is before us, contains numerous sketch studies by artists of reputation and ability, and numerous high-class wood-engravings. Besides these features there is, in the letter-press portion, abundance of matter calculated to interest the amateur or professional artist. It is published at 4, Adelaide Street, Charing Cross, and the subscription is 15s. yearly.

Grove's Moveable Head for Tripods.—This is an arrangement the object of which is to enable the operator to point his camera in any required direction without altering the position of the tripod after it has once been set up. A hollow rod of brass is suspended by a universal joint in the apex of the tripod, and a plate is screwed to the top of the rod, the camera being screwed to the plate in the ordinary way. The camera is then pointed in the required direction, and the joint clamped by screws.

A Lecture on Photography.—At the Somerville Club for Women, 405, Oxford Street, an interesting lecture was given by Frederick Greening, on November 10th, the title of the lecture being, "Help Rendered to Science by Photography." The lecturer dwelt upon, and explained, the importance of photography to astronomy, biology, and other sciences, and his lecture was illustrated by photographs of various subjects, those of the nebulæ of Orion, of the sun spots, and of the lines of the spectrum being especially notable. Miss Raisin, who was in the chair, proposed a hearty vote of thanks to Mr. Greening, whom she referred to as a practical worker in astronomical, microscopical, and biological photography.

Abstract of Chapman Jones's Lecture at the Birkbeck Institute, November, 11th.—Dilute peroxide of hydrogen is useful for ensuring the destruction of the last traces of hypo or sulphite of soda in gelatine films, when the presence of a minute trace of either would vitiate subsequent work. Carbon is practically unalterable, except by actual combustion, hence the permanency of carbon prints. "Carbon tissue," however, is rarely prepared with only carbon for the pigment; "pigmented tissue" is the better name for it. Lamp-black is practically carbon, and is got from the smoke of burning oil. The black condensed on a cold surface from a gas flame is far more valuable for opticians. Mixed with French polish or negative varnish that is not too thin, it forms a good varnish for giving a dead black to wood or metal. Sulphur forms sulphurous acid when burned, and in sulphurous acid the sulphur has only taken up two-thirds the amount of oxygen that satisfies it—it takes up the other third with avidity by exposure to the air. Thus it is useful in the pyro developer, retarding very greatly its darkening, and quite obviating its staining, propensities. The compounds of sulphurous acid, the sulphites, will be considered in the sequel. Sulphuric acid or oil of vitriol is useful for preparing parchment paper; the method is to plunge unsized paper into the acid, mixed with half to a quarter its volume of water, and then to thoroughly wash it.

Photographic Club.—The subject for discussion at the meeting on November 18, 1885, will be on "The Effect of Varying the Apertures of Lenses in Landscape Work."

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To Correspondents.

*** We cannot undertake to return rejected communications.

A. Scott.—Considering that the articles to which you refer as contributed by yourself to another journal have been duly appreciated and paid for, we are at a loss to understand why you make the proposal contained in your letter. We cannot entertain it.

J. Gray.—Thank you for the lantern slides; that showing the express train is very successful.

W. H. & Co.—We can form no opinion in the matter from your J. letter; but if you will send us a set of your price lists, it is just possible that we may find something in them which will elucidate the point.

G. Davidson.—1. Treatment with moderately strong ammonia, one part, and three or four parts of water. 2. There is not any probability of failure as far as we can see; but should you experience any difficulty, do not hesitate to write.

W. H. B.—We cannot tell you the price, but believe you can obtain it from Shew, of 88, Newman Street, London, W.

W. Dailley.—The forthcoming Year-Book will contain the latest and best information on the subject.

A. Read.—1. That mentioned is excellent, and we do not think you can do better. 2. Quite as easy—perhaps easier.

A Foreign Subscriber.—Treat it with a moderately strong solution of ammonia—1 part of the strong solution in 3 of water. This will dissolve out the chloride of silver.

McLennan.—1. They possess much merit. 2. It is very efficient, and very little power is required to drive it; perhaps a twentieth of a horse-power. 3. There is no publication of the kind.

Gelatine.—Full information has appeared in the News, and the latest will be found in the forthcoming Year-Book.

J. W. Lindt.—Let us know what information you require, and we will do our best to furnish it.

Archer Clarke.—Your letter of complaint should be addressed to the Jury Commission. It is useless to write to individual members of the Jury.

J. N. M.—We like the matter, but the burlesque style is hardly suitable. Perhaps you will be good enough to let us have it in a plain and less varnished form.

R. F. Dixon.—1. You should well rinse the films after treatment with the alum. Those which have become covered with a crystalline deposit are probably spoiled (owing to the disintegration of the gelatine); but a bath of dilute acetic acid may, perhaps, remove the deposit of alumina, resulting from the decomposition of the alum. 2. There is no book on the subject in print at the present time. 3. Aperture and focus being the same, the exposure is identical. That first mentioned is the best. 4. It depends on what the stains are; tell us this, and we will do our best to help you to remove them. As regards silver stains, see Dr. Vogel's article on p. 730.

Ed. J. Hughes.—Fume the paper with ammonia, and rinse well before proceeding to tone.

Merrett Bros.—Most gum resins contain several substances, of which one or more dissolves in alcohol, leaving the remainder as a flocculent deposit, which must be either separated by filtration, or by standing for some time at rest; the clear supernatant solution can then be poured off for use. It is necessary to use strong alcohol for the purpose. Ordinary methylated spirit is generally of sufficient strength for making spirit varnish.

The Photographic News.

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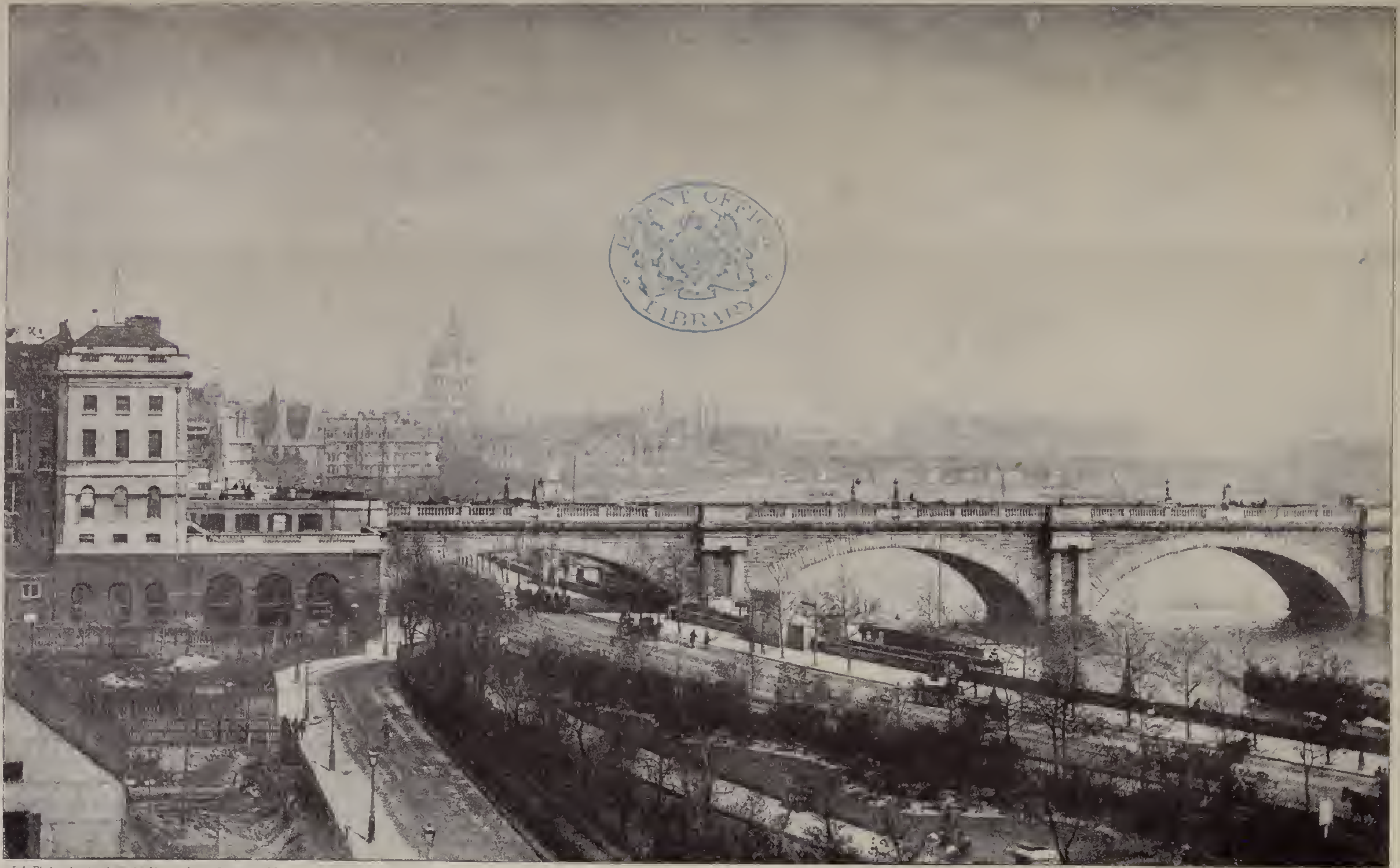
For Advertisement Scale, see page v.

SUPPLEMENT TO "THE PHOTOGRAPHIC NEWS" 13TH NOVEMBER, 1885



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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1420.—*November* 20, 1885.

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A WARNING TO DRY-PLATE MAKERS.

There is a matter of the utmost importance to photographers, which we think it well to bring forward at this particular time. It has regard to the amount of emulsion which is spread on plates, and perhaps our remarks may bear more directly on the work of the plate-maker than on that of the actual photographer.

It is well known that a film of a certain thickness is necessary, if it be desired to obtain the best results. This is necessary for two reasons: in the first place, it is necessary that there should be sufficient silver in the film to form the high-lights of the image after reduction. Indeed it is necessary that there should be some margin in this matter, otherwise there is liable to be no distinction in density between the few points of very sparkling brilliancy, which go more to make a picture than almost anything else, and the lights, which are a little less brilliant than these. Both will be represented in the print as one tint *approaching* to white, or, if the negative be intensified, both will be shown quite white. In either case the effect is very bad; in the first case there is loss of brilliancy, in the second case there results hardness. It may perhaps be said that the best result possible is not produced on a plate unless the film is so thick that there is no appearance at all of the developed image on the back.

In the second place, it is necessary to have a certain amount of opacity in the film to prevent halation, which is produced chiefly from reflection from the back of the glass. It is all very well for plate-makers to point out to photographers that this difficulty can be overcome by backing the plates. Photographers will *not* back plates for ordinary work.

A good way of testing if the thickness of a film is sufficient to give the required opacity is the following. The film is wetted, and the plate is placed between the observer and a bright gas or lamp flame. If the film is thick enough, the shape of the flame will not be seen through any part of it: in other words, it (the film) will be translucent, but not transparent. Of course the actual plate experimented on will be spoiled, but the destruction of one plate is a small matter if it will enable the photographer to determine whether he will be wise in purchasing a batch of plates or not; and if he desires to try several, he may use any safe artificial light in which no diffusing medium is used; in which, that is to say, the flame of the light is visible. But with the safest light possible. the examination must be very rapidly performed if the plates are sensitive. They must be held near the light, and at the best the test is not so searching as with an uncovered light. Of course the plates used may have received an exposure, and the test may be performed immediately before development, so that there is no waste. Plates which show a flame as described should be rejected, much more those which show the shape of the flame through the film whilst it is dry.

We have so far pointed out the evils which result from the use of plates too thinly coated, and the readiest way of judging of a film whether or not it is thick enough; and now we have to make a somewhat serious charge against plate makers in general. We have no hesitation in saying that the *average* opacity of the films of plates in the market has greatly fallen off during the last few years. One cause of this is doubtless to be found in the fact that the average *sensitiveness* of plates has, during the same few years, considerably increased, and that, therefore, the opacity has decreased, apart from any reduction in the amount of silver used. Every one who has experimented with emulsion knows that, as a rule, increase of sensitiveness means decrease of opacity and covering power.

But we fear that this is not the only cause; that besides this, there has been an actual tendency to save silver at the expense of the quality of the films produced. This doubtless is due to the keen competition between the manufacturers, and is an excellent example of the evil results arising from the competitive system of production, or, as some economists prefer to put it, the system of production for profit instead of production for use. The temptation to cut down the amount of silver, and then to be able to undersell a competitor in the market, is doubtless great, especially as the effect in the matter of deterioration in the quality of the resulting negatives may not be noticeable in all classes of work, and may not be noticeable at all except to an educated eye.

There are undoubtedly makers of plates who have not given way to the temptation to reduce the amount of silver, who have, indeed, as the average sensitiveness of their plates increased, increased the quantity of emulsion spread on them.

We were in conversation with one of these some little time ago, and he remarked to us: "My greatest difficulty now really is to spread a sufficiency of emulsion on the plates. All that will remain on them after the most careful coaxing is not at all too much."

This matter of the thickness of films is one of the greatest importance both to producers and to consumers at all times; but to the producer of films on glass, perhaps it has never been of so great importance as at the present moment, when there seems to be a great probability that glass will in a great measure be superseded by paper. One of the greatest faults showing itself in the case of emulsion on glass, when the film is too thin, does not occur in the case of films on paper. We refer, of course, to halation. We have no hesitation in stating that the introduction of paper films is greatly facilitated by the fact that, taking an average, the present films on glass issued by commercial plate makers are far too thin. Actual halation, as it is generally understood, does not in all cases arise from thinness of films, but merely a degradation of dark portions where they are near to bright lights, as, for example, in the case of foliage when adjacent to a bright sky. We noticed in connection with the late exhibition the large number of pictures which showed this defect. It is also to be noticed sometimes in the case of portraits, the eyes especially being rendered less brilliant than they should be.

It would of course be entirely out of place to name particular makers here; but we may state that in more than one case a test has shown that not more than half the amount of bromide of silver that was, four years ago, is now used. Our last word is one to plate makers, warning them that unless they bethink themselves in this matter, they are doing all in their power to aid the enterprising firms who are pushing the sale of paper films as a thing better for negative-making than glass.

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ALGIN AND OTHER SUBSTANCES FROM SEA-WEED.

Reference to algin compounds having lately been made in the Photographic News (Notes, page 648) as likely to be of use in photography, it may be interesting if we give a short description of their properties and mode of preparation.

It should be mentioned that we are principally indebted to papers read by E. C. C. Stanford, before the Chemical Society in 1883, and before the Society of Chemical Industry on April 8, 1884, for our information on the subject.

Algin much resembles gelatine in many of its properties, and, as its name implies, it is produced from seaweed. The principal British algae, which yield this body in considerable quantity, are the Fuci and Laminariæ. Formerly these seaweeds were collected, and burnt so as to yield kelp, which was not long ago the principal source of iodine; but this being an expensive and wasteful process, has been abandoned almost entirely, owing to cheaper sources of this halogen having been found.

It is, by the inventor of the algin process, proposed to extract the soluble salts from the weed by maceration with water, all the iodine salts being thus obtained in solution, to be afterwards treated by suitable means for the extraction of iodine. The residual weed, unaltered in appearance, and containing the peculiar principle named *Algin*, is next macerated with dilute hydrochloric acid, whereby it becomes greatly swollen through the setting free in the interior of the plant of alginic acid, in the form of a colourless jelly. The next process consists in soaking the weed in cold solution of carbonate of soda. In twenty-four hours the whole plant disintegrates, and forms a thick gelatinous mass, the cellular fabric of the plant being completely broken up. This mass, containing only about two per cent. of solid matter, is too thick to pour out. It is heated, if necessary diluted, and then filtered through linen sacking. The cellulose, which constitutes 10 to 15 per cent. of the original air-dry plant, remains in the filtering bags, and is said to yield a tough, transparent paper, the qualities of which at once suggest its being of use for flexible negatives.

The solution running from the filters contains, in addition to the algin, in the form of alginate of soda, some mucilage and dextrine. Hydrochloric or sulphuric acid is added, and the algin separates in albuminous flocks as alginic acid, and this is easily washed in a filter press. If the product is required colourless, a little bleaching powder is added during the precipitation.

Algin forms salts with the metals, those of the alkalies and magnesium being soluble in water; most others are insoluble. The silver salt is very sensitive to light, being rapidly darkened by it, which suggests this second product being in some photographic processes substituted for gelatine, but as to the comparative sensitiveness of algin-silver compounds, we at present have no information. Algin is also acted on in the same way as gelatine by bichromates, which render it insoluble when exposed to light. With shellac, algin forms a compound somewhat resembling gutta-percha in physical properties, and numerous important applications may be expected. In the soluble forms (alginate of soda, potash, &c.) it forms in solution a viscous fluid much resembling gum-arabic, which, when dried by suitable means—that is, in the same way as gelatine—yields a transparent, elastic film, much more flexible than gelatine in the same condition.

It is precipitated or coagulated by alcohol and the strong mineral acids, also by citric, tartaric, oxalic, and some other organic acids, and by most metallic salts except those of the alkaline metals and magnesium; but not by ether, glycerine, starch, or sugar; nor by acetic, tannic, pyrogallic, carbolic, and some other organic acids. The solution of algin is *extremely* viscous, a two per cent. solution being semi-solid. Alginic acid dries to a hard body, very much resembling horn. Surely these bodies possess abundance of properties which should render them of great service to photography, and probably before long we shall hear of their being utilised by photographers; especially from the descriptions we have of it, does algic cellulose paper seem likely to aid those who are seeking for a substance to replace glass for negatives—a tough paper without fibre. Is not that just the substance we are in search of?

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WITH A CAMERA IN MEXICO.

BY E. ERNEST PILBROUGH.

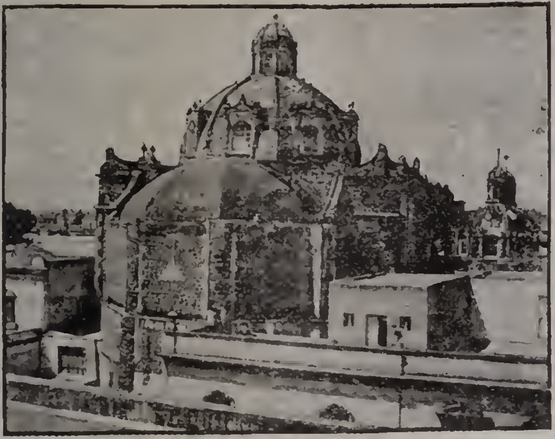
It may be taken for granted that a traveller whose only hobby was photography, would not choose Mexico as the best field for its pursuit. To the geological traveller, however, such an assertion could not apply, for the country is so rich in old ruins of a deeply interesting nature, that to take away representations of them would surely be the second best (though a very long second best) thing to transporting the ancient stones themselves.

But though Mexico might not be chosen as the best ground for work with the camera to other individuals than those deep in the lore of ancient relics, yet, when once there, there is no lack of subjects on which to uncap the lens. True it is that the almost vertical sun is at times exceedingly unmanageable, and militates against that pleasant *chiaroscuro* which we *can* get here in our much-vilified climate; but from this drawback comes unmixed joy on such occasions as the sun is balked in its flaring intrusiveness, or done without, through the kindly offices of a passing cloud.

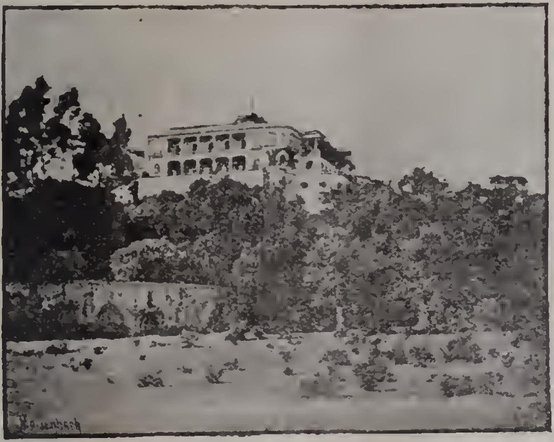
Clearer air than that which fills the heavens over Mexico city could not be had, and therefore such things as instantaneous street pictures—which are not the easiest subjects to reproduce, satisfactorily—come up exceedingly well, and distinct in all details.

It might be almost called the resident "Photographers' Paradise," as far as nature is concerned; for the studio lighting is of course of the best, since the sun, even during the "rainy" season, shines brightly every morning; and advantages for rapid printing are likewise equally great. And, judging by the exhibit sent by Valleto and Co. (the chief photographers in the Republic) to the New Orleans Exhibition, these advantages are fully taken advantage of. In their hands, photography is treated as an art; whereas with others in the city and elsewhere it is too often only a profitable business, worked by rule-of-thumb. Although devoting themselves chiefly to portraits, Don Julio—the prior of the firm—indulges in landscape for pastime; and it is owing to his kindness in the free use of his dark room, and in many other ways, that I have been enabled to preserve so many representations of Mexico and Mexican life, of which the accompanying illustrations form a part.

In the City there is much one feels a desire to preserve by the camera's aid. The churches and convents, with their domes and pinnacles—the domes glittering in the sun from the coloured tiles, inlaid, mosaic-like, in their rounded sides—at once attract attention, such a solemn, Moorish, old-world look have they. The Iglesia de la Santisima Trinidad—or, as it is generally known now, the Trinity Methodist Episcopal Church—which is reproduced here, is one out of a large number built in a similar style, and serves, therefore, as an example of the rest. When the Liberal party came into power—as is generally known—all the convents and monasteries throughout the Republic were confiscated, and the religious orders expelled. This made Church property become cheap, and some churches were bought with adjoining property by foreigners—Bishop Riley, for instance—and this Church of "The Holiest Trinity" was one.



No spot in or out of the city, however, attracts such attention as the Castle and Grove of Chapultepec, reached by the only decently-paved street and boulevard—though this latter is a very fine one—under civic jurisdiction. The Castle is built on "Grasshopper Hill," the original site of the Palace of Montezuma; and, beyond its interest for this reason, the fact of its having been captured in 1847 by the Americans, and later, having served as poor Maximillian's residence, makes it especially noteworthy. It stands above a grove of cypress trees, hundreds of years old, the largest of which, called the "Arbol de Moctezuma," measures some fifty feet in circumference ten feet from the ground. The view here given is taken from a field on the right of the entrance, and shows the willows which overshadow the old aqueduct in the foreground, and part of the grove beyond.



The grove is the favourite resort for picknickers from the city, and the usual morning ride, being just a sufficient distance for a pleasant canter before breakfast. The Castle is now used as a Military College, but there has lately been a report that the President of the Republic will reside there permanently, as soon as the alterations which are at present being made are completed. The view from the tower is very fine indeed, taking in the whole of the Valley of Mexico, and extending to the snow-peaks of Popocatapetl and Ixtaccihuatl, which look lovely on a summer evening when kissed red by the setting sun.

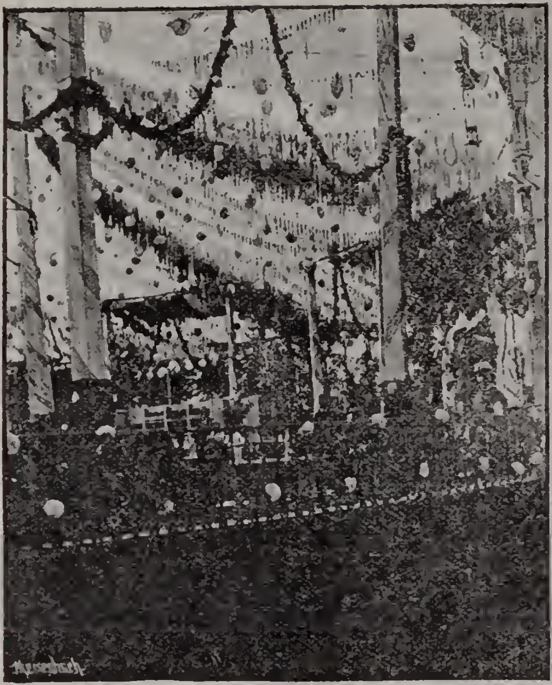
These same mountains, however, tantalize the photographer terribly; they are so effective in the landscape, but so far, and come out, therefore, so small on the ground-glass, that they seldom look as splendid as they ought. From Ayotla, however—the usual place from which ascents of Popocatapetl are made—that volcano comes out clear enough; but to get both in a picture has never, I think, been satisfactorily managed by the photographer yet.

The hoary Alpine giant of Mexico is not as difficult to climb as its great altitude would lead people to believe. In reality, with Mexico City lying 7,800 feet above sea-level, the ascent is less than 10,000 feet; and who has not done that in "Sunny Switzerland?" Several views have been taken of the crater and the huts, where the halt is made the first night. These huts are in connection with the sulphur works of General Ochoa, a very courteous gentleman, who is very willing to thus accommodate climbers, though it must be mentioned that the *huts* are what their name implies, and *nothing more.*

There is a canal which passes through the city, and connects the two great lakes of Texcoco and Chalco. In the city it is a disgraceful sewer, "foul and dank," but as it reaches the outskirts—although it cannot be designated with any truth as "fair and free"—it nevertheless improves very much, and is the pleasant means of spending a few hours poling along in a covered boat. There is a "paseo" (boulevard) beside it, when it enters the city from the direction of Chalco, and before it became so unwholesome the "Paseo de las Flores" used to be held there—a very pretty sight—booths decked with flowers of all kinds, grown round about, being on sale. It is a pleasing sight, too, to watch the people coming from their "chinampas" (floating gardens) with their canoes laden with vegetables and flowers in the early morning. Down this branch of the canal are the villages of Santa Anita, Mexicalcingo, and others, whither natives, and even Europeans—a little versed in the country's customs—go for a little outing, and "resignedly" eat a Mexican breakfast of Tamales, enchiladas, huevos fritas con salsa de tomates, papas fritas, and pulque to wash it all down. Not a bad meal by any means.

The custom of decorating the graves on "All Soul's Day" is deeply rooted in Mexico, and the most beautiful flowers are laid above the beloved dead. Popular heroes, such as Juarez, are not forgotten, and piles of wreaths lie on their last resting places. The Zocalo—a garden with a band kiosque in the centre—standing in the principal square, is generally decorated profusely on this occasion likewise, and very good music provided also, to hear which a charge is made, heavy at night when the electric light is ablaze and toilettes are in full display, but light throughout the day. My illustration reproduced on next page shows a view taken from near the entrance, a policeman having taken good care to put himself well in front of the lens.

But it was not to the city alone that my attention was directed; in different parts of the country I had the pleasure of looking out for interesting bits to secure. They require some looking for, too, in spite of the beauty of the country; for its views are so vast, that, although they fill with rapture the mind, touching its senses of beauty and grandeur, yet, when viewed through the lens, the glorious shades on the mountains, the undulations of the plain below, shrivel as it were by magic into atoms, and a vision of four-fifths sky is presented to your disappointed view.



Some of my most interesting and characteristic bits I obtained while visiting at an "hacienda" in Michoacan; one of these, an Indian hut with its surroundings all in perfect accord, I present here. The rounded structures are used as ovens, and the huts, covered with rushes, are the family dwellings. The individual in the "scrape" had just descended from his tired steed, and meant to disappear as I fixed the scene on the ground glass. He obligingly stayed, however, and thus, though nameless, will be handed down to posterity, honoured by the one fact of having been represented in the NEWS.

PHOTOGRAPHY IN A HOUSE-BOAT.*

(BEING THE RECORD OF A DAY'S EXPERIENCE.)

"Now then, look sharp!" exclaims Jones; "we've only time to make one more exposure each."

"Yes, and as mine's the slowest lens, and my camera takes the longest to arrange, I move that I have first turn," says Bagshaw.

"Not if you're going to stick it on that hideous combination of a box and paraffin stove," remarks Brown, decidedly; "*I'm* not going to be made ridiculous. And while I'm on the subject, I should like to say that if you persist in using the "universal," you must come down by yourself on the days when I'm not here."

"Quite so," acquisces Jones; "that's my opinion also."

Bagshaw is disposed to resent these reflections on his apparatus, but I mildly point out the light is going while they are wasting valuable time in a fruitless discussion, and he unwillingly consents to the arrangement, with the reservation that he is on this occasion to be allowed to plant his camera where and how he likes.

Brown and Jones agree to this, but insist on a reservation on their side. Their reservation is, that in view of a second fracture of the dark-room, Bagshaw must be the last to put his plate in the slide.

Bagshaw, to my surprise, readily accedes. After his expressed determination to be the first to arrange his camera, his suddenly yielding the point is odd.

Jones retires into the dark-room. Brown and I remain outside where the conversation just recorded has taken place. Bagshaw is doing something in the cabin.

All is silent for five minutes. Jones is much longer than usual. It appears he put the plate in with the wrong side towards the lens, and broke one of his nails in trying to pick it out, as of course he did not want to touch the sensitized surface with his fingers. But we only learnt this afterwards. The first announcement of his having completed the operation is made to us through the medium of a little altercation between him and Bagshaw.

"What the deuce is the meaning of this?" we hear him inquire.

"Just wait a moment, old man," Bagshaw replies, in muffled accents.

"But, confound it, I can't open the door."

"It's all right, I tell you—at least, it will be in a minute or two."

"What on earth are you up to?"

"Oh, seeing whether I can take a photograph out of the cabin window," is the calm rejoinder of Bagshaw.

This, then, has been Bagshaw's occupation during that five minutes' silence. He has arranged his "universal" so as to point the lens through the window, which plan is certainly far preferable to mounting the camera on the stove; the only drawback is, that he has stuck one of the tripod legs firmly against the dark-room door, and Jones is virtually a prisoner. Hence his remonstrances.

"Yes," at last Bagshaw says, with much deliberation, "it will do remarkably well."

And slowly shifting the "universal," which we have all come to regard with a deep and undying hatred, he permits the imprisoned Jones to issue from his dark cell.

"Look here, Bagshaw," says Brown, on entering the dark room; "perhaps you'll have the goodness to defer putting up that abomination until I come out."

"All right, only don't be as long as you were before."

For a wonder, the "improvements" behave themselves well, and Brown comes forth radiant. Unluckily, forgetting all about the "universal" tripod, which Bagshaw had only moved away a sufficient distance to allow the dark-room door to open, his foot catches in one of the legs, he stumbles, and his dark slide flies out of his hand, but falls providentially on a cushion.

Brown picks himself up, draws a long breath of exasperation, and glares at the "universal." If he had acted that moment upon his impulse, he would have fallen upon the thing and smashed it.

"A jolly good job your slide fell upon the cushion," remarks Bagshaw, philosophically; "it doesn't seem to be hurt."

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* Concluded from p. 725.

"No thanks to you," returns Brown, wrathfully.

"Tell you what, old chap," says Bagshaw, with provoking good humour, "it will be a capital opportunity to test your theory as to the physical action of light. I shouldn't be at all surprised if that plate hadn't received a shock which has disturbed the arrangement of the molecules."

This was adding insult to injury, for Brown, in addition to his foible for improved apparatus, was also very "advanced" in his views as to the theory of the formation of the photographic image. He was great on molecules, atoms, and vibrations. He knew all about the spectrum. He discoursed learnedly on the "violet" and "infra-red." He had conducted some elaborate and complicated experiments. He had attached a sensitized plate to a bicycle wheel, and subjected it to rapid revolutions; he had tapped another all over with a hammer padded at the flat end; he had ironed a third till he cracked it with the heat; and, in fact, in his hands the unfortunate sensitized plate passed a miserable and chequered existence. Up to the present his experiments had not led to anything, but this was because he had not time to pursue them to the end. But, as he always remarked with pride, he had accumulated "a mass of valuable data," which he believed contained the "germs of vast and important discoveries."

Brown disdains to reply to Bagshaw's sarcasm, but picks up his slide and walks out. Bagshaw, with a caution from Jones not to "shove" his elbow through the brown paper wall, retires into the dark room.

Brown and Jones have made their exposures for better or worse, and are happy. Their photography is over for the day, as they intend to defer the development until the morrow. Bagshaw has put a plate in his slide safely, and is once more struggling with the six-foot tripod.

Never was there a tripod I believe which required so much arranging. One leg was always too high, too low, too much to the right, or too much to the left. Nor did it add to Bagshaw's good temper when, in shifting it about, he put one iron-shod end through his ground glass screen, though the accident greatly gratified Brown, as it enabled him to deliver a lecturette on the advantages of an "improved" screen which, attached to the camera, cannot be removed.

"How long should the exposure be?" asks Bagshaw, having got his camera at last in position, the brass cylinder of the lens protruding through the cabin window, making the house-boat look as if it were defended by a small cannon.

Here arises a difference of opinion. Brown scornfully suggests a quarter of an hour; Jones is inclined to five minutes; Bagshaw to one minute. A compromise of two minutes is eventually arrived at.

Bagshaw draws up the shutter with an air as though his "universal" were so fragile that a fly settling on one side or the other would upset its equilibrium. He takes off the cap, and waits, watch in hand, ready to dart forward with the cap directly the time is up. His excessive caution appears extremely absurd to us, who can feel the house-boat gently rocking the whole time. If Bagshaw really does succeed in getting a picture, it is certain to look as though camera, lens, and plate, had been "on the spree." There will be at least a dozen "doublings," and Brown and Jones indulge in an audible snigger, of which Bagshaw affects to be totally unconscious.

Just as a minute and three-quarters have expired, we hear the sound of revelry on the river. The voices are close to us, but we cannot see the approaching craft, as the house-boat is between us and it. However, we—

Gracious powers! what is this? An awful smash against the house-boat—collapse of Bagshaw, who clings frantically to the camera legs—precipitation head foremost into the dark-room, and culmination of "universal" smash.

A punt propelled by heedless revellers has dashed into us!

I pass over the recriminations which ensue. We ar accustomed to strong language on the river, but it is not o that scientific nature which entitles it to reproduction in these pages.

We have had enough photography for one day, and we depart for town, sadder and wiser men. Whether the plates of Brown and Jones will prove satisfactory nobody can tell, but of one thing we are all secretly glad—Bagshaw's hateful "universal" is in fragments.

HOW TO MAKE VITRIFIED OR CERAMIC PHOTOGRAPHS.

BY THE LATE H. NATHANIEL WHITE.

To those who have experimented in vitreous photography, and failed, I would say, "Try again." Various and many formulæ have been given in the Photographic News and other journals for the attainment of this beautiful and fascinating branch. Any of these, with a little study and due care, will result in success, providing the basis of the experiments be first understood.

One gentleman says you may fire your pictures in an open muffle in an ordinary kitchen fire. Certainly you may, but with little chance of a good result, at any rate with vitreous colours. Platinum, iridium, and palladium are not quite so seriously affected by sulphur; and although I have been very successful with these metals, I would not risk spoiling them by using any one of the open kilns of the ordinary or present construction. Further on I will explain one of very simple make, and as perfect in action as it is simple. It may be used for any kind of work, providing it is closely watched, and instantly repaired should crevices occur, or a firebrick get displaced, by which sulphur could get access to the oven.

The tedious labour and the expense of the platinum or substitution process will commend itself to but few operators, so we will deal only with the powder process, which might, and should, be in the hands of every one, and the cost need be but very little more than that of paper prints, allowing, of course, for the difference in price of the porcelain or glass base and the paper, and the additional cost of firing.

In making a *cliché*, gelatine plates should certainly be employed; they are more soft and gentle in gradation than can be obtained by the silver bath.

The journals and year-books give formulæ for hygroscopic mixtures (which, for the sake of brevity, we will call photogenes). All are good, and most are improved by increasing the quantity of grape sugar. Thus—

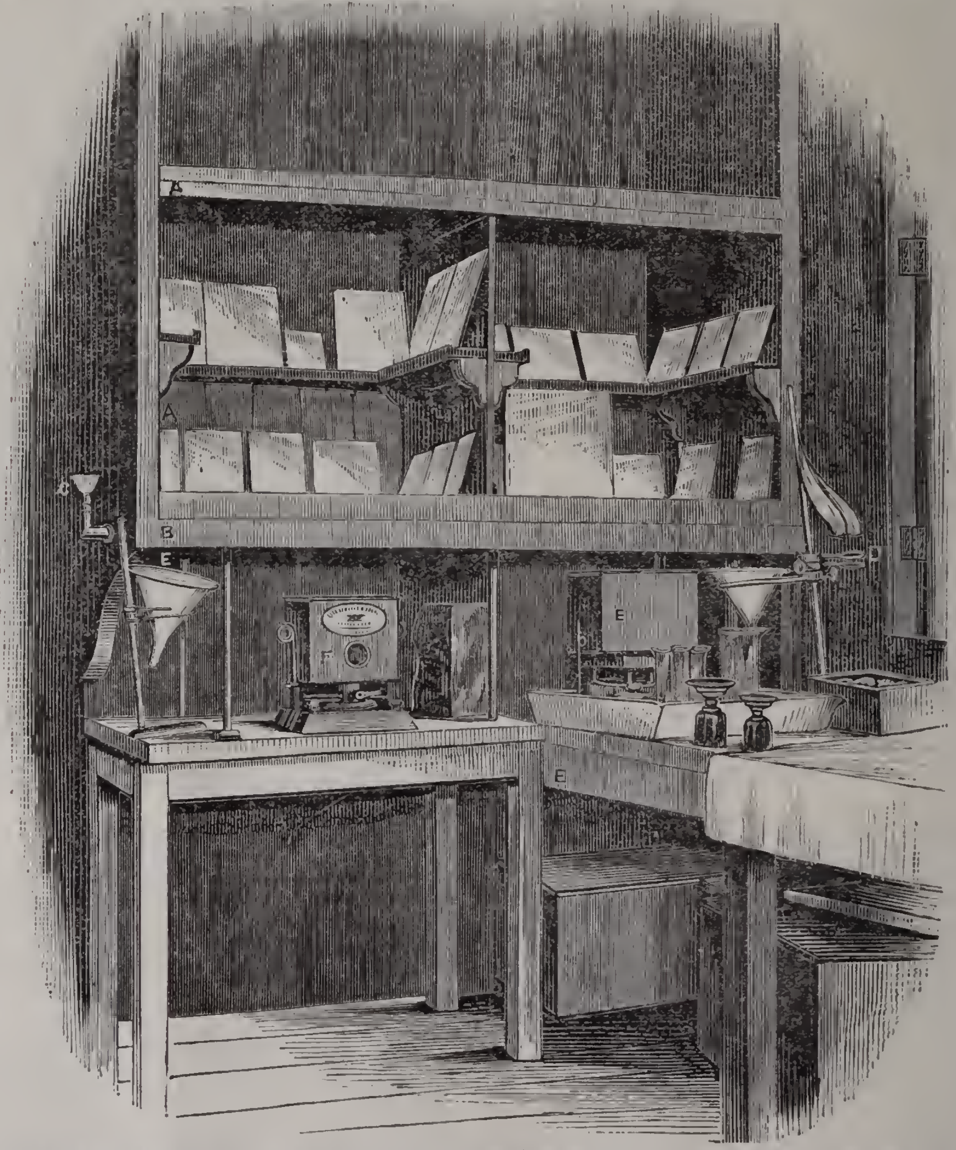
Dextrine	4 drams
Grape sugar	8 ,,
(instead of 4 drams)	
Bichromate potash	4 ,,
Glycerine	2 drops
Water	12 ounces

Clean the plate with whitening, to permit the photogene running smoothly, pour a good quantity on, drain on papier Joseph, and dry very gently by placing in a cupboard, excluding outer air as much as possible. Do not hasten, but let it take its own time; in winter, or when the ordinary temperature is below 60°, artificial means may be used. A cupboard constructed as below will answer every purpose, and for drying gelatine plates as well.

The temperature to which the plates are to be subjected is of importance (60° F. is a fair medium); if too much is applied the plates get baked, and after operations useless. When dry, place under the *cliché* and print, and develop with vitreous powder in a partially darkened room.

Colours that may be used with advantage are strong shining black and pearl grey, both of which are manufactured by Hancock and Sons, Diglis Works, Worcester; and a purple brown manufactured by Joseph P. Emery, Grange Street Colour Works, Cobridge, Staffordshire, They mostly require a little further grinding after coming from the manufacturers, and passing through a sieve of very fine lawn. The sieves may be obtained from Elizabeth Parlby, 96, Market Street, Hanley, Staffordshire.

When it is required to get very dense pictures (transparencies, for instance), grind some moist Demerara sugar with the colour; the hygroscopic nature of the sugar allowing it to be piled up with the colour as much as is necessary.



A, wooden cupboard with shelf or shelves, midway, or any other distance up; B, tin or zinc boiler; C, funnel for supplying water to boiler; D, vent for the escape of steam; E, iron framework, upon which boiler and cupboard rest, hollow underneath; F, a paraffin lamp, or, preferably, a Wright and Butler's cooking stove; a thick curtain, to let down wholly or partially, is required, to exclude outer air, and retain heat.

After development, place in a bath of soft water, and change until all yellow is removed, after which, pour over several times, from a lipped glass, a mixture of methylated spirit and water equal parts, and then, while still wet, a coating of the following:—

Carbonate of potash (dry*)...	10 parts, or ounces
Powdered quartz or sand, free from iron or alumina ...	15 " "
Charcoal	1 part, or ounce

These three must be fused together, dissolved in six times its weight of boiling water, and filtered.

When the print is dry, if it is to remain on the same plate, trim the edges, and cut outline to the shape required. If, however, it is to be transferred on to another plate or surface, cover with collodion, and proceed according to the instructions issued in a neat little book, at a small cost, by Messrs. Solomon, of Red Lion Square, Holborn.

For fixing, the box kiln on p. 743 is very safe, and to be recommended. It consists of an iron box with grooves for the batts or shelves to slide upon. The dimensions are—height, twenty-four inches; width, fifteen inches; back to front, twenty inches, inside measurements; the kiln is one inch thick all round; the whole set in work of fire-brick. The batts should be first sprinkled with dry whitening, to prevent adhesion of the pictures. The front of the kiln is provided with peep-holes, that the progress of the vitrifying may be watched. Square plugs close these peep-holes.

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* Put into a tin dish or basin and place in oven until all moisture is removed.

Pyrometers are rather uncertain in judging heat; it frequently happens that if driven to a greater heat (accidentally or otherwise) than that ordinarily required, they cannot be depended upon for the lesser heat afterwards.

Test pieces (also called watchers) are by some placed in the kiln through the peep-holes, and withdrawn from time to time to indicate the amount of heat; but this is not always satisfactory, for although the temperature should be raised equally on all sides, and the fire retained at a uniform glow by the continued addition of fresh fuel, yet it is difficult to get at all times perfect regularity. The direction of the wind may drive the fire to the one side or the other, in spite of all stoking. Nothing is so much to be depended upon as the eye, which very soon becomes accustomed to the work and amount of heat necessary.

In constructing your kiln, let the furnace door be outside of the building, by no means inside; the sulphur arising when the fire is drawn, as well as on every occasion of stoking, will undoubtedly spoil the work. The fire should be got up in from five to six hours, and the specimens not allowed to fire longer. The kiln should not be opened for from twenty-four to thirty-six hours after the fire has been drawn.

The simple open kiln before mentioned is a baker's oven exactly, with these two additions: the furnace *must* be outside the building, and the flue have no communication with the kiln room; secondly, there must be three or four apertures inside the oven, at the back, leading to an air-shaft, distinct from, and having no communication with, the chimney shaft. By this means, should sulphur find its way into the oven, it is immediately driven off by the current of air continually passing along the top inside, and hence no injury to the colours, which will come out with perfect lustre.

With all care, pictures after firing will sometimes have a matt or dull appearance. In this case they must have a coating of flux, and be fired again. The same flux should not be used for all colours indiscriminately. For colours containing iron, the following is a good formula:—

Crystallized borax	equal parts
Minium (red lead)	
Pounded glass	

Mix, and melt in a crucible for an hour. Pour the contents into water, dry, and powder fine upon a piece of glass an inch thick or more, and with a glass muller.

For colours containing gold—

*Silica in powder	1 part
Glass of borax	1¼ "
Minium (red lead)	⅝ "

Melt, and powder very fine, as above.

For colours containing silver—

Sand	1 part
Litharge	2 parts
Glass of borax	1 part

If, however, a general flux is required, here is one—

Minium (red lead)	4 parts
*Powdered silica	1 part

This is a very soft glaze, and a moderate heat must be given, or the colours underneath will fly.

As a final remark upon firing. The harder the heat to a certain point, the more beauteous and lustrous the resulting picture.

The foregoing remarks apply equally to staining coloured glass with photographic pictures, except that a glaze is less necessary (providing that the work is done); and as the addition of flux at all times weakens the colour, the less it is used the better.

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The above was written by the late author for the more especial benefit of those who are familiar with the dusting-on process for ceramic photography, and it contains information of very great value; but for the benefit of those who have no knowledge of the subject, and wish to commence, we give the following general instructions, which the reader can modify in accordance with what is written above.

The six stages of the dusting method are as follows:—1. A glass plate is coated with the sensitive mixture of organic matter and bichromate. 2. The plate is, after drying, exposed under a positive. 3. After the shaded parts of the plate have absorbed sufficient moisture, it is dusted with a vitrifiable pigment in fine powder. The united action of the bichromate and light so modify the deliquescent organic matter that it loses its property of absorbing moisture from the air, and the exposed parts of the plate consequently refuse to hold the vitrifiable pigment. 4. The powder picture is coated with collodion, and then soaked in a slightly alkaline solution, in order to remove all traces of soluble materials. 5. The collodion film, bearing the image, is next floated off and laid on a tile or other suitable surface. 6. The image is vitrified or burned in.

The composition of the sensitive mixture may be varied considerably without any very material influence on the result, but the following composition gives very excellent results in ordinary cases:—

Water	100 parts
Moist sugar	10 "
Gum-arabic	10 "
Bichromate of ammonium	4 "

This solution should be used within one or two days of its preparation, and ought to be filtered with the most scrupulous care, as any particle of dust or fibre is likely to cause a white spot on the finished work. The solution is poured on the glass plate after the manner of collodion, and after the plate has been held in a tolerably horizontal position for a few seconds, the excess of solution is quickly poured off, and the plate is set to dry on a kind of desk formed of a piece of sheet iron mounted at an angle of 15° with the horizon, and kept warm by a spirit lamp placed underneath; but it is advisable to distribute the heat by means of a few layers of blotting-paper placed under the glass, and the heat should not rise above a temperature which the hand can easily bear. It is best to use patent plate glass, and the greatest care must be exercised in cleaning it thoroughly. It is necessary that the positive under which the exposure is made should be quite dry, or even slightly warm; and in ordinary cases an exposure of one minute in sunshine, or ten minutes in diffused daylight, will suffice; but an actinometer should be used as in carbon printing. As soon as the exposure is finished, the plate is taken into the dark room, placed on a white surface, and some of the enamel colour is sprinkled on and worked round and about with a long-haired camel's-hair pencil, both the powder and the brush being perfectly dry. The image now gradually develops, and it is often necessary to shake the powder from off the plate, and allow the moisture of the air to act on the film for a short period, after which the treatment with the enamel pigment is resumed. Should the picture appear hard, only the extreme dark shades appearing, the exposure has been too long; but if the image is flat, and all the high-lights are veiled, under-exposure is indicated. Just as in ordinary silver printing, the image should appear a few shades over dark at this stage, as the enamel colours lose a little intensity when fired; but if there should be any difficulty experienced in attaining the required vigour, it is advisable to very gently breathe on the plate—previously freed from all loosely-adhering powder—and then to proceed with the development. When the development is finished, all non-adherent powder should be removed by means of the brush, and any required retouching can be performed either by breathing on the plate and cautiously applying the pigment on the part requiring it, or by removing the pigment by friction with a tuft of cotton wool or a stump. The plate is next coated with a collodion containing from 1½ to 2 per cent. of pyroxyline and about ⅓ per cent. of castor oil, and after the film has set, it is cleared away from the edges of the plate so as to leave a clear border of about ⅛ of an inch. The collodionized plate is next soaked in a 2 per cent. solution of caustic potash, until all traces of soluble chromium salts are removed from the film, and after a thorough rinsing in clean water, the plate is immersed in water containing enough nitric acid to make it taste about as sour as weak vinegar, where it should remain for some hours. By now placing the glass bearing the film in a large vessel containing clean water, and gently manipulating the pellicle with the fingers, it becomes easy to detach the collodion film; which is then caught, collodion side downwards, on the enamel tablet or tile. Should it be necessary to vitrify the picture with the collodion side upwards, the final transfer must be made in a solution of sugar containing one-fifth of its weight of this material, as otherwise the collodion film would be liable to scale off. In this latter case, the collodion must be dissolved away before firing, but when the collodion film is mounted downwards on the enamel plate or tile, this proceeding is not necessary. The most convenient method of dissolving away the collodion film is by soaking the dried plate for a whole day in the following mixture:—

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* Made by calcining the purest flints three or four times in a crucible, washing each time in pure water; then powder in a porcelain mortar, and sift very fine.

* The silica must be made from the purest flints, and free from calcareous specks.

Alcohol	50 volumes
Ether	50 "
Oil of lavender	100 "
Oil of turpentine	3 "

The plate having been again retouched, if necessary, all is ready for the final operation or the burning-in of the image.

For this purpose, some kind of a muffle furnace is required, and in many cases the portable muffle furnaces for coke will be found convenient. These furnaces can be obtained without difficulty in London, most dealers in jewellers' materials keeping them in stock. It will often happen, however, that the photographic enameller will prefer to avail himself of the superior advantages and convenience of gas as a fuel for heating the muffle, and in this case the excellent furnaces manufactured by Fletcher, of Warrington, may be adopted. The plates should be heated slowly, and occasionally turned round, so as to ensure equal action of the heat, and it is easy, after a little experience, to perceive the exact point when the enamel melts and unites with the surface of the tile. Although most will prefer to purchase the enamel colour already made, we subjoin a formula for the preparation of a black pigment:—

Oxide of copper	2 parts
Oxide of cobalt	1½ "
Oxide of manganese	2 "
Flint-glass	12 "

When fairly melted, add—

Oxide of copper	1½ parts
Oxide of manganese	1 part

The melted mixture must be poured into water, and then finely pulverised.

Notes.

Speaking the other day of varnishes for gelatine plates, E. W. Foxlee remarked that most, if not all, samples of commercial bleached lac are decidedly acid, hydrochloric acid being used in the bleaching process. If no steps are taken to remove or neutralize this acid, who can wonder at both the negative film and the printing paper being damaged? Ammonia may be used to neutralize the acid, but caution must be exercised. Half a drachm of strong ammonia should be diluted with an ounce of alcohol, and this mixture added, drop by drop, to the acid varnish, until there is no longer any acid reaction to litmus paper.

Identification by means of thumb-marks was referred to in our edition of last week, and we now find other suggestions in the *Philadelphia Photographer*.

Our American contemporary says:—A man applying for a letter of credit might be required to furnish his thumb-mark to the bank. It could be sent to the corresponding institutions, and when application was made for the money, a corresponding thumb-mark would be sufficient identification.

Each bank might keep a book of thumb-marks of large depositors. Forgery would be impossible where thumb-marks are used. The thumb-mark might be added to the signature in the form of a seal in all cases where much depends on a signature, as in deeds, wills, or marriage contracts.

Thumb albums would replace autograph albums, and would furnish a record of more characteristic marks than could the signatures of sentimental friends. Charts would be prepared of thumb-marks of great men, and books be written on the common characteristics. Season tickets to the fair, passes on railroads, and all non-transferable tickets could be signed with the thumb-mark.

One point in connection with the subject does not seem to have struck the *Philadelphia Photographer*. Forgery by mere manual copying would certainly be impossible, but forgery by the camera would be easy enough. Having obtained a negative from the thumb-mark, it is no difficult matter to make a phototypic block in india-rubber—a sort of reproduction of the thumb-seal. Where, then, is the security as regards deeds or wills? Still the idea seems good as far as circular notes are concerned.

We noticed a curious application of photography a few days since. In a nondescript kind of conveyance, a cross between a truck and a bath chair, and drawn by a very bony donkey, was a fragmentary specimen of humanity with, so far as could be seen, no legs, but one arm, and features minus an eye and the larger proportion of the nose. The sight was, indeed, a particularly painful one, and we should not have stayed to read the "legend" describing the colliery accident in which the occupant of the donkey cart was reduced to the one extremity left him, but for the fact that by the side of this framed and glazed document was a highly-coloured photograph of a very tall and stalwart man, dressed in the height of the fashion (music hall) in vogue some ten or twelve years ago, and leaning, or, rather, propped up against, a "property" Corinthian pillar of imposing proportions.

A broad grin played over the massive features of this large man, who, evidently screwed up in the most implacable manner in all the available "rests" at his photographer's disposal, was holding stiffly in one hand a huge book, whilst with the other he embraced the pillar aforesaid. Beneath the photograph, on a slip printed in letters large enough for those who run to read, was the declaration "Kind freinds (*sic*), this was me in my happy prime." One glance at the lead-pencil selling fragment of humanity in the cart was enough to throw doubt on this positive assertion. A second look at the framed document showed that a date had been assigned to the accident which rendered it impossible for the maimed beggar to have been at his "happy prime" in such clothes as those worn by the original of the photograph. But we did not denounce the too evident photographic fraud. It was, indeed, such an ingenious application of the "Look on this picture, and on this!" notion of young Hamlet's, that we were tempted to slightly subsidize the impostor, who has unconsciously imitated a plan which may be, and doubtless will be, largely developed by the begging fraternity.

Imagine, for instance, of what enormous assistance photography might be made to the begging-letter writer. A carte (enclosed) of his consumptive wife, or "five wee motherless bairns," for whom he pleads charitable aid, would appeal to many kind hearts more than sheets of close hand-writing. Think, again, what additional sympathy the broken-down commercial traveller, who goes about in a wheel-chair selling circular watch-keys and penny memorandum-books, would command were he to expose upon his asthmatic chest a framed photograph of the happy semi-detached home at Tooting he once possessed; and what martial memories the dilapidated old soldier on crutches might arouse if he did but exhibit a view of himself in complete uniform and full marching order, as on the fateful day when he, after Herculean feats of valour, received so many wounds. Beggars are already an elaborately organized body. In Paris they have their newspaper; and in London they have their special hostelries and houses of call. Ere long we shall expect to hear that they have also their "photographer in ordinary."

"Switzerland is the place where one can with advantage take a camera of large size, unless, indeed, I make an exception in favour of India." So writes Abney in the *Bulletin Belge*. "This is the reason," he continues; "because there are so many persons to hand who ask to be allowed to carry the burden."

The above may afford a useful hint to those who make a point of taking the tiniest of tiny cameras to the great recreation ground of Europe.

As the result of recent experiences in Switzerland, Captain Abney thus sums up:—"One must use iodo-bromide plates if it is wished to obtain good negatives, and at the same time have a wide margin as regards exposure."

The *Naturalist's World* offers a prize of a guinea for the best and prettiest photograph of British scenery! No easy matter to adjudicate, one would think.

It is not often that we hear of important collections of photographs being offered for sale; the value of the property does not seem to be sufficiently fixed; but the following has lately appeared in the *Athenæum*:—"Portrait photographs. A very large collection of photographs, collected during twenty years, is to be disposed of. It consists of photographs (carte and cabinet) of the sovereigns of Europe; the men and women of science, art, and letters of several nations; the more famous actors; the leading prelates and clergy of all religions; the principal statesmen of several kingdoms, &c. They are contained in albums to the number of about 800."

To make corks both air- and water-tight, let them remain five minutes under melted paraffin (paraffin wax), holding them down with a wire screen or perforated lid. Such corks can be easily cut or bored, have a perfectly smooth exterior, are introduced or extracted with ease, and make a perfect seal. Another hint: if you want the best quality, ask for "velvet corks. But, after all, there is no cork to equal one made of india-rubber.

To shape rounds or ovals (such as are often required for lockets) out of glass, one plan is to cut them out under water with a pair of dull scissors. The glass should first be cut as nearly as possible to the required size with a diamond, and with the scissors then gradually chip it into shape, working along the edge. A final rub on a soft grindstone serves to smooth the edges.

Mr. John Clerk, Q.C., Treasurer of the Inner Temple, has recently secured an admirable series of photographs of the interior of the Temple Church, and has given permission for their publication. This gentleman is, we believe, the father of Mr. Malcolm Clerk, whose capital *genre* pictures have attracted much attention at the last two or three Exhibitions of the Photographic Society.

If we may believe a contemporary, the latest photograph of Sir Frederick Roberts must be of a very unusual character. We are told that "it is a striking likeness. We see in the gallant general's features a determination to do or die. The astuteness of the experienced commander struggles with the dash of the soldier. The eye seems to conceal a latent fire which only needs the necessary stimulus to spring into life." What a fearful and wonderful portrait! According to this exuberant admirer, it means about as much as the celebrated three nods of Lord Burleigh in the *Critic*.

It is strange how often, in cases of bankruptcy, the obstinacy and ill-feeling of creditors stand in the way of their own interest. The swallowing up of the estate in legal expenses is to such people a matter of no consequence, so long as the debtor is worried and harassed. It would be a great pity if this result followed the action of a creditor of one of our oldest and most respected photographers, who, through an unfortunate concurrence of adverse circumstances, has had to declare himself bankrupt. In this case the course adopted by the creditor in question, an Insurance Company, is particularly vexatious, because it is admitted that the bankrupt, if allowed time, is able to pay 20s. in the £. But because certain securities upon which money has been borrowed from the Insurance Co. turn out to be less valuable than the Company imagined, their solicitor holds that "no leniency should be shown." No wonder the meeting of creditors at which this statement was made applauded the representative of the Autotype Company when he said that "if creditors advance money without properly examining the securities, it ought to be a reason why they should not oppose a scheme of arrangement for the benefit of the creditors." The effect of the opposition of this selfish creditor at present is, that the scheme of arrangement has had to be abandoned, and there is every prospect that the lawyers will get what should go to the creditors.

Every photographer ought to read E. L. Wilson's admirable account of his ride to Petra—the ruined city carved out of the living rock which lies in the Syrian Desert. The article appears in the November number of the *Century* magazine, and is characterized alike by the brilliancy of its style and the beauty of the accompanying illustrations. Our readers do not need to be reminded that the author is the Philadelphian photographer whose name is so familiar to all who have studied the development of the art in the United States.

According to Professor Sidney Colvin, artists are not yet reconciled to our ordinary photographs. Writing of an admirable reproduction in photo-gravure of a picture in the Brunswick Gallery (the reproduction being the work of the Berlin Photographic Company), he remarks: "However admirable as a translation of the original, no one would care to possess, or to hang up, either the best carbon- or the best silver-printed photograph for its own sake, and as a thing of beauty. Not so with photogravure." There are, however, a large number of lovers of art who think otherwise.

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Patent Intelligence.

Applications for Letters Patent.

13,807. Alfred Strivens, 53, Chancery Lane, London, for "Improvement in carriers for wet and dry plates for photographic purposes."—12th November, 1885.

13,851. Charles Anthony Burghardt, 1, St. James's Square, Manchester, for "Improvements in the method of, and in means for, estimating the degree of daylight obtained in buildings."—13th November, 1885.

13,861. Walter Brierley, Town Hall Buildings, Halifax, for "Improvements in adjustable chairs for photographers."—(*Carl Bentzin*, Germany.)—13th November, 1885.

13,889. Ernest Daniel Adcock, 53, Chancery Lane, London, for "An improved clip for holding photographic plates."—13th November, 1885.

13,890. George Corpe Whitfield, William John Wilson, George Sydney Whitfield, and Ernest Albert Whitfield, 53, Chancery Lane, London, for "Improvements in sensitive films for photography."—13th November, 1885.

13,941. George Frederick Redfern, 4, South Street, Finsbury, Middlesex, for "An improved protector for cards, photographs, books, and the like, during transmission through the post."—*John Markinski* and *Alfred Hearn*, Canada.)—14th November, 1885.

13,956. Joshua Billcliff, 54a, Arcade Chambers, St. Mary's Gate, Manchester, for "Improvements in photographic cameras."—16th November, 1885.

13,979. Alexis Kohl, 33, Chancery Lane, London, for "Album with receptacles for containing a number of photographs, address cards, and the like."—16th November, 1885.

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Reviews.

Handbuch der Chemigraphie und Photochemigraphie. Von J. O. Mörch. (*Düsseldorf: E. Liesegang.*)

Here we have a useful hand-book of 150 octavo pages, and those of our readers who wish to be instructed in the practice of zinc etching cannot do better than study J. O. Mörch's hand-book.

Photographischer Almanach und Kalender fur das Jahr 1886. Preis 1 mark. (*Düsseldorf: E. Liesegang.*)

Dr. Liesegang's annual for the coming year is, like its precursors, practical and useful, and those of our readers who can profit by using a book in the German language, may obtain it with advantage.

Der Positive Process auf Gelatine-Emulsionpapier. Von Dr. E. A. Just. (*Vienna: Published by the Author.*)

Compressed within 160 large octavo pages, we have here a comprehensive and detailed account of practical ways of working the emulsion process on paper, and the book is rendered more valuable by being accompanied with excellent examples of work. A description of the Schlotterhoss automatic exposer is also given; but as we have recently described this apparatus in the News we need not refer to it in detail.

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AN ATTEMPT TO PHOTOGRAPH THE CORONA.

From *Science* for October 23 we extract the following communication, by W. H. Pickering, in reply to a letter from W. Huggins :—

From the above interesting communication by Dr. Huggins I regret to find that he has failed to see my reply published in *Science* for May 9, to his letter of May 15. My experiments on the position of the drop-shutter were there taken up with some detail. Also other points presumably referred to in the beginning of his article are discussed.

As to the observations of the planets Mercury and Venus, as black discs before they reach the sun; the explanation usually given of this phenomenon is that it is due to the refraction of the sun's rays passing through their atmospheres, and thus illuminating rather more than one hemisphere at a time. Any small body surrounded by a ring of light would naturally appear darker by contrast than the surrounding background.

In regard to photographing the moon in the daytime, it may be as well to call attention first to the fact, that as the moon and sky are nearly of the same brilliancy, and there are accordingly no irradiation effects, it is not a question of the best form of apparatus, but almost entirely of the contrast qualities of the plate and developer employed. In fact, an ordinary camera furnished with a long-focussed landscape lens is as good an instrument as can be devised for this investigation. Fortunately, I had on hand some of Edwards's bromide plates, imported last June, and they, together with some Carbutt B and Anthony chloride plates were employed in the following determinations.

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* See Photographic News, October 9, page 654.

It should also be stated in regard to my remark, reading "the impossibility of photographing the moon in the daytime, when the sun is high above the horizon," that this was merely a general statement, founded on observations made in June and July, when the sun's altitude in the middle of the day was between 60° and 70°.

Dr. Huggins has now shown that this statement is not rigidly exact, as with the sun at an altitude of 35°, and the moon in the most favourable position at this season (the third quarter), he has obtained a distinct image upon his plates. I repeated his experiment, October 16 and 17, when the moon was in the first quarter, and with the sun at an altitude of 18° obtained a similar result. The images, though distinct, were far too faint to print, and only two plates out of nine showed any image at all, although the moon was very conspicuous to the eye. I should consider it doubtful if photographs of the moon could be obtained with the sun at an altitude of over 60°. If, then, there is difficulty in obtaining an impression of the moon at 90° from the sun, how much more difficult would it be to photograph the still fainter coronal rays, when masked by the dazzling brilliancy of our atmosphere in the sun's immediate neighbourhood.

But what particularly interested me in Dr. Huggins's communication was, that I saw at once that it furnished me a new constant, and accordingly a new method, for determining the relative light of the atmosphere near the sun, and the corona. Five separate measurements were made between 1.15 and 4.15 on October 16 and 17, of the relative light of the sky in the immediate vicinity of the sun and moon, by the photographic method described in a previous paper. These ratios varied from 16, when the sun was highest, to 50 at the later hour. Taking the average of these values, we may safely assume that between three and four o' clock, when my successful pictures of the moon were taken, the light about the sun is generally not far from 35 times as bright as the light of the sky in a region where it is just possible to photograph the moon. But according to the observation of Prof. John. W. Langley, previously quoted, the light of the moon is ten times that of the corona at 3′ distance from the sun. Accordingly the light of the atmosphere in the immediate vicinity of the sun would have to be reduced 350 times in order to obtain an impression of the corona upon our plates. If the sun were at a greater altitude, this figure would be somewhat smaller. The value found by my previous experiments was 320. The closeness of the coincidence is probably accidental, but of the two methods the first one seems to me rather the more accurate.

Correspondence.

PHOTOMICROGRAPHS.

Sir,—I have just read Mr. Bottone's letter in your last number. He has entirely misapprehended the object of my letter. I expressed neither "great surprise" nor "indignation," to quote his own words, that any microscopist should use and recommend the use of the eye-piece in conjunction with the objective when it is desired to take a photomicrograph. Whether it is advantageous, or not advantageous, to use an eye-piece, was not the object I had in view; and surely Mr. Bottone, with his vaunted long experience with the microscope—forty years, I think he said—should have been able to see this. His letter is as wide of the mark as is his allusion to the admirable enthusiasm of all beginners. W. Forgan.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 12th inst., Dr. T. Charters-White in the chair.

The Secretary stated, that having regard to the interest shown in their last year's competition of transparencies, two selected negatives had been this year circulated with a similar object, but, owing to short notice and other causes, only three members had taken part. Their results would be projected upon the screen, and it was proposed to use a pair of lanterns in order that a better comparison could be made; after which some 200 slides, by various members and processes, would be exhibited in the Society's new lantern.

C. Darker wished to correct a statement which had appeared in the report of the Society's proceedings, that the new lantern was made by his firm. Such was not the case, as their cheapest instrument would be thirty guineas. He had procured the best he could get with the funds at his disposal, and the parts which he had added would be a gift to the Association.

F. T. White was elected a member of the Society.

The Chairman read a communication from the L. and S.W.R. Company, to the effect that they refused to grant special reduced railway fares to members of photographic societies like those enjoyed by kindred associations.

A. L. Henderson drew attention to a recent article in these columns, which he thought was anything but flattering to their Society, and suggested if the writer could only be discovered that the Society should pass a vote of censure on him.

The Chairman then called upon C. Darker to proceed with the exhibition of slides, which was done by means of a pair of oxy-hydrogen lanterns.

It was the general opinion that the best slides by different processes from the selected negatives were as follows:—J. B. B. Wellington, collodio-bromide, 1st; A. Cowan, gelatino-chloride developed with ferro-citro oxalate, slightly restrained with bromide, 2nd; A. Cowan, gelatino-aceto chloride (Henderson's formula) toned with gold, 3rd.

Among the slides afterwards shown were some wet bromide, by W. Cobb, to illustrate the dissolving of a film in the lantern. A. L. Henderson's view of the Exhibition Gallery, Pall Mall, taken by gaslight; exposure 2½ minutes $\frac{f}{15}$, and another taken of the members, exposure 60 seconds; these slides were by the wet collodion process. Chloride plates exposed one minute in the camera, and developed with ferro-citro oxalate, by A. Cowan, who showed a number of chloride slides. The Chairman's exhibit was numerous, including many of his well-known microscopical subjects. Collodio-bromide was represented by J. B. B. Wellington, many of the subjects being familiar to the tourist in North Devon. W. M. Ayres showed some very fine transparencies of the moon from Dr. Huggin's negatives, in wet collodion; Capt. J. Long's series were bromide from bromide negatives; H. S. Starnes represented gelatino-aceto chloride, own formulæ with gold toning; and J. Slater showed a large number of carbon transparencies, which brought the proceedings to a close.

Edinburgh Photographic Society.

The twenty-sixth annual meeting of the Society was held on Wednesday evening, the 4th November, Charles Fraser in the chair.

The minutes of the last annual general meeting and those of last ordinary meeting were approved. The following sixteen gentlemen were then duly elected ordinary members of the Society:—George Wardlaw, A. Contie, J. Henderson, J. Bonar, Graham Burns, John Crichton, John T. Leighton, A. Lockhart More, Jas. Ballantyne, J. Simpson, Rev. James Gordon Mitchell, Thomas Millar, James Hetherington, David Ancrum, Donald M'Bain, J. E. D. Murray.

The Secretary submitted the twenty-sixth annual report, of which the following is an abstract:—

The Council have pleasure in congratulating the members on the continued prosperity of the Society, the attendance at every meeting being unusually large, and the interest taken in the proceedings being particularly manifest. The distinguishing feature in the work of the past session has been several "Conferences on the Picturesque." These have been of considerable educational value. The session was opened by an address from the President, and an excellent exhibition of work by the members.

The following papers have been contributed:—"A Plea for a Work-Room," by J. B. Readman; "Development, a Sketch, illustrated on copper," by Hugh Brebner; "Backgrounds of Portraiture," by Norman Macbeth, R.S.A.; "The Faculty of Observation," by A. B. Stewart; "Criticisms on Two Pictures," by Norman Macbeth, R.S.A.; "The Rapid Contact Printing Paper," by Morgan and Kidd; "Lantern Slides Copied in the Camera," by Andrew Pringle; "Paper Negatives," by T. G. Whaite.

Two demonstrations have taken place:—"Development by Copper," by Hugh Brebner; and "Construction of a Camera-bellows," by T. G. Whaite.

Two popular meetings were held in Queen Street Hall—a miscellaneous collection, the work of members, 21st January; and "Devonshire Illustrated," 18th March. On each occasion the platform was occupied by the Secretary, and the lantern most efficiently manipulated under the direction of J. M. Turnbull.

The Society has subscribed £25 to the Guarantee Fund of the International Exhibition of Industry, Science, and Art, to be held in Edinburgh next year.

To begin the new session there are 378 ordinary members, of whom 50 have been admitted during the past year, and 13 honorary and corresponding members, making a total of 394.

The report and the Treasurer's financial statement were approved.

The Society then proceeded to elect office-bearers for the coming session, and the new list as completed stands thus:—

President—William Forgan.

Vice-Presidents—J. G. Tunny and Charles Fraser.

Secretary—G. G. Mitchell. *Treasurer*—A. M. Forbes.

Curator—J. M. Turnbull.

Council—T. Wardale, S. Tamkin, H. C. Blane, J. Crighton, W. Crooke, T. G. Whaite, H. Brebner, T. Stock, J. Jameson, Jas. Lessels, R. H. Bow, W. T. Bashford.

The new President, W. Forgan, was cordially welcomed to the chair, and acknowledged the compliment in a few appropriate words. At the suggestion of Mr. Fraser, who paid a warm tribute to the retiring Secretary for the many valuable services he had rendered to the Society, and the great interest he had shown in its welfare, a hearty vote of thanks was accorded to Mr. Bashford.

A number of South American photographs of marine subjects were exhibited, kindly lent for the purpose by Professor Piazzi Smyth. They were extremely beautiful examples, and were much admired as they were passed round.

The President reminded those present of the annual exhibition of members' work, which would take place at next meeting in December, and urged that every endeavour should be made to produce a good show.

Leicester and Leicestershire Photographic Society.

A meeting was held in the Mayor's Parlour on Wednesday evening, 11th inst., the President, W. S. Hobson, in the chair.

The President congratulated the members on the happy result of the endeavours which had been made to originate the Society, and addressed a few words to the meeting on the importance of enhancing the value of the science by endeavouring to render every picture thoroughly artistic; this, he said, could only be done by a thorough mastery of composition. In support of this he introduced several quotations from authors bearing on the subject, and showed that a picture which was perfect as regarded manipulation, might be rendered pictorially valueless and insipid by a neglect of the first rules of composition and balance.

George Bankart (Vice-President) then spoke in support of the remarks of the President, and hoped that every individual member would use his best endeavours to render the Society useful.

The Secretary then described some novelties which were sent for exhibition by Messrs. Marion, including a camera and three slides by Middlemiss, which was closely examined, and much admired. Also some beautiful specimens of Christmas and New Year cards for mounts, and a speciality in plush frames for opals. They also sent a supply of their compressed pyro in tablets, which were distributed among the members, with a request that they would report thereon at the next meeting.

It was announced that at the next meeting Mr. Roche would give a practical demonstration of enlarging from the negative.

Bradford Amateur Photographic Society.

The usual monthly meeting was held on November 12th, D. G. Law in the chair.

After the minutes of the previous meeting had been read and confirmed,

B. Scorah reported on the first Annual Exhibition of the Society now on view, the prizes in the seven classes (1st prize, 20s.; 2nd prize, 10s.) being awarded as follows:—

Class I—Best Landscape, 8½ by 6½, and upwards.—1st prize, F. Illingworth; 2nd, H. Forsyth.

Class II—Best Landscapes, smaller than 8½ by 6½.—1st prize, J. W. Goodall; 2nd, M. B. Wallace.

Class III—Instantaneous.—1st prize, M. B. Wallace; 2nd, W. S. Smith.

Class IV—Architecture.—1st prize, H. Tankord; 2nd, D. G. Law.

Class V—Best Composition.—1st prize, M. B. Wallace; 2nd, D. E. Wilson.

Class VI—Best three Lantern Slides.—1st prize, G. D. Scorah; 2nd, H. Forsyth.

Class VII—Best picture in the Exhibition.—J. W. Goodall.

The judges were Messrs. Sachs, Ramsden, and Greaves. They reported very favourably on the quality of the pictures exhibited, particularly praising the one by Mr. Goodall.

The subject chosen for discussion was on "Exposure and Choice of Subject," introduced by the President. A lengthy discussion ensued, which was adjourned to next meeting.

Cheltenham Photographic Society.

The annual general meeting was held November 12th, when the officers and committee of the past year were re-elected.

F. Bertram exhibited and explained a very interesting collection of apparatus kindly lent by several firms.

Messrs. Marion and Co., amongst other things, sent a half-plate camera with reversing back (Middlemiss Patent), one of their miniature metal cameras with drop-shutter, Cadett's "Lightning" shutter, a very ingenious vignetting frame, and specimens of printing on the Alpha paper. Messrs. Dale sent their "Newman" adjustable photographic shutter intended to work between the lenses of a double combination. Brown's patent camera, 12 by 10, from Messrs. Shew, was also on view, and a new sliding leg camera-stand by Hart. The Secretary brought a specimen of photogravure by Messrs. Annan and Swan, of Glasgow, accompanied by a letter from them suggesting the publishing of a series of views from the Society's negatives by this process. Samples of Marion's compressed pyro tablets were distributed by the Secretary.

Liverpool Amateur Photographic Association.

The usual monthly meeting was held on Tuesday evening in the Technical School, Princess Street, Dr. Tatham in the chair.

The following gentlemen were elected members of the Society:—H. M. Lowther, G. E. Blundell, F. D. Gordon, E. A. Ehlinger, and Edwin Foden.

In consequence of a severe indisposition, the President, Rev. H. J. Palmer, who had been announced to give a demonstration on "Enlarging," was unavoidably absent. The meeting was, however, made interesting and profitable by a series of questions being put in the question-box on cameras, lenses, development, printing, and toning, and led to considerable discussion, in which Messrs. Tatham, Graham, Stanley, Flower, Jones, Bather, Lane, Bird, Stephens, Hay, and Dawson took part.

The Society being obliged to change its place of meeting, William Stanley announced that the Council had decided to take the rooms at the Masonic Hall, Cooper Street. The next meeting, December 8th, will therefore take place in that hall.

The Chairman made a few remarks on his method of sodic-sulphite development, which he said had always given him clean negatives of full density, without any fear of fog.

J. H. Stephens gave a short communication on photographing plans to scale. He said the original drawings of the Ordnance Survey were made on the scale of 25 inches to the mile, and then reduced by means of photography to the 6 inch scale. Recognizing the importance of photography in making reductions to scale of engineering drawings, he had endeavoured to get the work done professionally, but without successful result. He had thus been led to take up photography as an important adjunct to his own profession. Referring to his struggles with the dry and then the wet process, and again back to the dry, he warned his fellow members against the use of cheap lenses, fairly good enough for landscape work, but quite useless for the purpose of exact copying and reducing. After calculating the amount of reduction required, a parallelogram must be ruled upon the ground glass of the camera with absolute exactness; and it is necessary not only that the sides of the figure should correspond one with another, but that diagonals should be made on the drawing, and agree with similar diagonals on the ground glass, in order that each and every part of the resulting photograph should be true. One of the old rigid forms of camera was most suitable for this work, and care should be taken that the drawing and the camera were in the same plane, vertically and horizontally. In his own case he had affixed set-screws to the back and sides of his camera. There was still one more drawback to overcome, arising from the unequal stretching of the sensitized paper in toning and fixing, but this could be overcome by judicious drying.

A number of drawings to scale were exhibited, also negatives of the same, and a number of prints to show the facility with which copies of the greatest nicety could be indefinitely reproduced.

L. Widdop exhibited photographs of his recent tour in Italy, and Mr. Graham prints of Ingleborough, toned by the chalk process.

S. F. Flower gave his experience with paper negatives, several of which he laid on the table, with prints of the same.

Society of Amateur Photographers of New York.

A meeting of the Society was held at 1260, Broadway, on Tuesday evening, October 13th, President Beach in the chair.

The President: I have to show a small drop-shutter, operated by a ten-cent. pneumatic device, devised by Mr. Grisdale. The novelty of this release is its cheapness, as you cannot buy a pneumatic release ordinarily, I believe, for less than three or four dollars. Mr. Grisdale saw, in a ten-cent. penholder, an opportunity for making a very cheap pneumatic release. In making the release, Mr. Grisdale took an ordinary nickel-plated patent pen and pencil-holder, made by Faber, which is nothing more than a cylinder in metal three-eighths of an inch in diameter by four inches long, and provided at each end with a punched up screw-thread. In one end is a short tube, with a corresponding thread, holding a short pencil; in the other, a like tube holding a pen. Both the pen and pencil tubes are closed at their rear ends, and when the articles are not in use, these capped ends close the holder and make it easy to carry about. The lead pencil was taken out of its tube, the main cylinder was cut off so as to shorten it, and the closed pencil tube soldered to the lower end, having a small metal tube passing through it slightly up into the cylinder. From the metal tube is a flexible rubber tube reaching to a rubber bulb. Pressure on the bulb compresses the air in the cylinder, and while there is some leakage between the cylinder and cap, yet it is sufficient to prevent the cap piston from instantly responding by being forced upwards and operating the level trigger. Releasing the bulb at once draws the cap back.

The shutter to which this release was attached was the fly-open door and drop-shutter combined, similar to Dr. Janeway's fifty-cent. shutter. Mr. Beach operated the release before the audience; its smooth working and simplicity elicited applause. An arrangement was also shown for wedging the shutter on to the lens tube by two pieces of wood on to the back of the shutter, which were pressed by a wedge against the lens tube, securing the shutter firmly, and adapting it for use on different sized lenses. Mr. Grisdale, for a bulb, took off that used on a common atomizer, and found the rubber tube lying around in the house. Continuing, Mr. Beach said: The next article I have to show you is a portable dark-room light, designed by Mr. Grisdale. He says that in travelling around, and having to develop his plates in different places, he often found difficulty in getting a good dark-room light. So he purchased an ordinary ruby argand gas chimney and an ordinary brilliant kerosene burner, with a tall, round chimney, such as can be bought at any lamp store, and a wick. This particular burner will fit almost any ordinary lamp, so that all that is necessary to be carried around is the ruby chimney, the wick, and a tall tin tube to fit on the top of the chimney to prevent exit of white light. To use it, all that is necessary is to fill an ordinary glass lamp with oil, and screw on the burner and wick which you carry; then put the ruby chimney over the burner, and the tin tube on top of that, and your lamp is complete. The small amount of light coming out of the bottom perforations of the burner is stopped by placing a piece of paper over the side nearest the developing tray. Another form of portable dark-room light has been invented by Mr. Tisdell. When packed for travelling it is put in a small, round tin box, about 2 inches in diameter by 8 inches long. When the upper half is removed, we see in the lower portion a common tin candlestick, having a hole through its centre to hold half a candle, a spiral spring being at the bottom to force up the candle as fast as it burns, in the usual way. In this shape the candle can be carried around as for a white light. When you want a ruby light, all that is necessary is to slip the ruby chimney over the light and place on top a simple metal cap, which allows the heat to pass out, but prevents the escape of the light. I am told that it is apt to smoke a little in its present construction, as the cap is not sufficiently large to let the heat off fast enough. This can be easily remedied. He continued: I have received quite a voluminous letter from Mr. F. D. Bull, of St. Louis, regarding a new method of packing dry plates. This shows that the dry-plate makers are paying some attention to the efforts of our Society to improve the packing of plates. He sends me two specimens of packing, and desires me to select that which I think appears to be the best. The first plan consists in packing the plates in two thick card-board boxes, one sliding over the other, like a telescope. In each end of one of these boxes is a corrugated card-board or manilla paper, fastened on to a card-board backing, which is set in loosely, but sufficiently tight to retain it in place. The plates are then packed, back to back, in pairs by a special mechanical device, two to each corrugation, and then the whole dozen, with corrugated strips, slipped into the lower half or smaller box. The cover is next slipped on, and the package is complete. In removing the plates, they are easily moved by their edges with the thumb and middle finger. These boxes can be used for preserving negatives by simply gluing the corrugated strips to the ends of the box. If the plates happen to be too thick, as they are sometimes, you are apt to raise two plates out instead of one. Still the method works very well. The other method is to pack the plates between corrugated strips, but to lay them in the card-board box flatwise, instead of edgewise. He says, so far, some photographers prefer to have them packed in this way, as they think the plates can be taken out quicker. The inner box is protected by two or three boxes. Now you invert the inner box and take out the whole box of plates; then you remove from one end the corrugated paper strip, which leaves the paper separated at one end by the other strip. You then replace the whole dozen in the inner box, and when you wish to remove a plate for use, simply by a sudden movement throw out the upper or unseparated ends of the plates, and take one out. It may seem a little quicker, but the first plan looks to me to be the most satisfactory, especially for small sizes. It is claimed that by this method a superior grade of paper can be used, which contains no deleterious material, and that the boxes can afterwards be used to preserve the negatives in.

Dr. Piffard—I desire to exhibit a new test-paper for testing the alkalinity of the toning bath. It is an ordinary piece of white blotting-paper soaked in an alcoholic solution of phenolphthalein. On immersion in an alkaline fluid it immediately turns a bright scarlet, and is much more sensitive than litmus paper commonly used. The change of colour is much more striking than in the case of litmus, and I have used it some time in preference to the latter. I am not aware that a test paper of this description has been used before for the purpose indicated, although the reaction in question has been known to chemists for some time.

The President then gave an account of some experiments he had recently made in development in two solutions, a matter just now attracting some attention abroad. He said: I thought I would try it on some negatives of the explosion, and I have a series of negatives here, marked A, B, C, and D, on which I experimented. The way I proceeded was this:—The negative marked A, I soaked in a solution of water, 3 ounces, and carbonate of potash, about 35 grains, for five minutes. Then I washed it off, and soaked it in a solution of pyro and sulphurous acid, with a strength of about 3 grains of pyro to the ounce. I left it in that solution for about five minutes, but there was not a sign of an image appeared. Then I immersed it in a fresh solution of carbonate of potash and sulphite of soda—35 grains of potash to 3 ounces of water—and immediately the picture came out. Now the pyro solution I poured back into its graduate, and kept the negative in the same tray. On examining the pyro it was apparently perfectly clear, just as when I poured it on. After finishing the development, when I poured off the potash, it had a dark sherry colour. The detail is pretty well out in the shadows. The sky is somewhat thin, but that is due to the extreme shortness of the exposure. Including the whole manipulation, I was altogether about thirty-seven minutes developing negative A. I thought I would see if a preliminary soaking in potash would not improve it. The next negative (marked B) I developed, was in a solution of pyro, 4 grains to the ounce for three minutes, then poured back to graduate. Afterwards the potash solution was put on. Development at once commenced, and the pyro kept clear just the same. That I developed in about twenty minutes, and it is somewhat more dense than the other one. I think the reason is because I put the pyro on first. The third negative (marked C) is developed in ordinary developer. It is somewhat thinner. I have no prints from that negative as yet. It represents the explosion immediately after it subsided, and you can see the white film, and foam due to gas fumes rising out of the water. For the fourth negative (marked D) I simply put a little potash with the first pyro I used. That is a time exposure. It is much more vigorous. From my experiments, I infer that it is going to be quite an advantageous thing to use the two solutions, because you can use the pyro over and over again, and therefore it makes it more economical; and, furthermore, you do not stain your fingers, because the alkali and pyro are not brought together in one solution: and a third advantage would be that the plate only has just the amount of pyro that is necessary to be absorbed by the film.

Mr. **Tieman**: After you soak the plate in the pyro, do you wash it before putting it in the potash solution?

The **President**: No; you must take the tray and pour the pyro off into the graduate. You can have bromide in the alkali and restrain it, if the plate is very much exposed. Then you can go to work on the next plate and pour on your pyro, and then pour that off, and pour on your potash. The development may be a little longer than if you use only one solution, but you can use your pyro over and over again for a series of plates. It prevents fogging, and your picture seems to come out clearer and better. Another point is, in case the negative looks too thin, you just pour off the alkali and wash the plate, and put on your pyro again, increasing the strength of the pyro solution. You can manipulate with two solutions in that way. If the film is very hard, you wait to soak it four or five minutes. If the film is one of the porous, spongy kind, three minutes is sufficient. The negative marked D was developed after the two plates had been developed with the pyro, or the pyro had been poured on back and forth. Then I simply added a little potash, and it came up very prettily.

Mr. **Darrow**: Did you find better results from using the alkaline solution first, or the pyro solution first, or did it make any difference?

The **President**: I think the best result is gained by using the pyro solution first. I merely tried using the alkaline solution first to see if, when I put the pyro on, it would bring any picture out. You get more density, and get it easier to put the pyro solution on first.

Mr. **Walker** offered the following resolution: "That the thanks of this Society be and are hereby tendered to Brigadier-General Newton, Chief of Engineers, U. S. A., for the courtesy extended by him to the members of this Society, in affording them such excellent facilities to photograph the explosion at Flood Rock, Hell Gate, on Saturday, October 10th, 1885," which was carried.

Dr. **Wilcox** moved that the thanks of the Society be extended to the Comissioners of Charities and Corrections for the facilities extended to the members of the Society for photographing the explosion at Flood Rock. Carried.

Note.—The solutions used by Mr. Beach were the Nos. 1 and 2 of the "Beach potash developer," made as follows:—

No. 1.—Pyro Solution.

Warm distilled or melted ice water ...	4 ounces
Sulphite of soda (crystals, chem. pure, 437 grains to ounce)	4 „

When cool, at a temperature of 70° add—

Sulphurous acid	3¼ ounces
Pyrogallol (1 commercial ounce) ...	437 grains

The concentrated solution will measure 9¼ fluid ounces, and be a 10 per cent. solution, 6 grains of pyro to each dram.

No. 2.—Potash Solution.

Made of two solutions:—

A.

Warm water	4 ounces
Sulphite of soda (crystals, chem. pure 437 grains to ounce)	2 „

B.

Water	4½ „
Carbonate of potash (chem. pure, 437 grains to ounce)	3 „

A and B are mixed, and the combined solution, measuring 10 ounces, is ready for use. 1 dram contains about 16 grains of potash.

Newcastle-on-Tyne and Northern Counties Photographic Association.

The ordinary meeting was held in the College of Physical Science, Newcastle-on-Tyne, on Tuesday, the 10th instant, the President in the chair.

Mr. Henry C. Hemey was elected a member.

The **President**, in a brief speech, announced the awards of the judges in the recent amateur competition, as follows:—First Prize, J. G. Sinclair, West Hartlepool; Second Prize, W. Armstrong, Wingate; highly commended, Thomas Galloway and Lieut.-Colonel Osbaldestone, Mitford.

A vote of thanks was passed to the judges (the President, W. Cozens Way, and J. P. Gibson).

Henry R. Proctor showed and described a light and portable shutter, and an ingenious camera dispensing with the ordinary double slides, made by himself.

Lydell Sawyer then read a paper on "Retouching," and a discussion followed in which the President, Messrs Gibson, Laws, and Sawyer took part. Mr. Sawyer replied.

The pictures sent in were on the table during the evening, and were very generally admired; among the more noticeable being those contributed by Messrs. Goold, Templeton, and H. R. Proctor, in addition to those already mentioned.

Birmingham Photographic Society.

A meeting was held on Thursday, November 12th, at the Technical School, Bridge Street, the chair being occupied by **W. J. Harrison**, F.G.S.

Messrs. Collings and Phillips were elected members.

After several questions had been asked and discussed, Mr. Iliff was called upon to give his lantern display.

Many of Mr. Iliff's transparencies of microscopic objects were remarkably well done, clearly showing that he must have devoted much time and attention to this rapidly growing branch of photography. He exhibited the magnified original side by side with the transparencies, thus giving the members an opportunity of judging for themselves.

Notts Photographic Society.

The first business meeting after the summer vacation was held in Shakespeare Street last Monday evening, when a lime light exhibition of lantern slides, produced by various processes, was shown by Mr. Townsheud.

Through the kindness of Sydney Birkin, a magnificent selection of large instantaneous views of the "Falls of Niagara," &c., was submitted for the inspection of those present, and very highly appreciated. After the proposal of the names of several gentlemen as new members, the meeting terminated.

Birkenhead Photographic Association.

The annual meeting was held on the 12th inst., at the Free Public Library, **J. Alexander Forrest** in the chair.

The annual and Treasurer's report having been read and confirmed, the following gentlemen were unanimously elected to conduct the affairs of the Association for the ensuing year:—

President—J. Alexander Forrest.

Vice-Pres.—H. Norwood Atkins. *Treasurer*—T. Cragg James.

Council—A. W. Beer, A. W. Cornish, J. H. Day, R. W. Hill, J. M. Jones, P. Lange, E. Newall, and E. Whalley.

Auditors—A. W. Beer and R. W. Hill.

Secretary—P. H. Phillips, 476, New Chester Road, Rock Ferry, Birkenhead.

Several photographic novelties were exhibited and freely criticised, among which may be mentioned a very compact and portable camera clip, the invention of Richard Crowe, described by J. H. T. Ellerbeck; two vignetting frames, the production of Warwick Brookes (one for portraits and the other for landscapes); these were shown by H. A. Davies, and universally pronounced to have supplied a long-felt want. J. F. Shew and Co. kindly sent a number of specimens of new apparatus, including a camera clip, their new instantaneous shutter, a quarter-plate pocket "Eclipse" camera, and a half-plate patent camera of latest form.

The large and now well-known splendid collection of yacht studies of Messrs. Symonds and Co., from which the members were to select their presentation pictures for 1885, was passed round, and most favourably commented upon by all present who had the opportunity of examining its contents, and knew the difficulties to be overcome in the production of instantaneous views of so large a size (12 by 10).

The Secretary acknowledged with thanks the donation of a copy of A. Wood's "Classified Photographic Directory."

The announcement of J. H. T. Ellerbeck of his intention of presenting the Association with an album to contain the portraits of the members, elicited general applause, and the President warmly thanked him on the part of the Society for his proffered donation.

H. A. Davies having volunteered to give a lecture upon "Practical Emulsion Making and Coating of Plates" before the Society at the January meeting, his offer was accepted. He then informed the meeting that Mr. Atkinson desired him to state that he should be happy to place the use of a dark room on his business premises at the disposal of the members.

H. N. Atkins, in the course of the evening, took portraits of the President and a few of the members, using about nineteen inches of burning magnesium ribbon as a source of light, which he found provided the correct exposure necessary with the full aperture of his half-plate Steinheil rapid rectilinear lens and an Edwards' plate.

In the annual report, the Council stated that they had no information of a particularly startling nature to convey in the account of their stewardship; on the other hand, it was a source of extreme gratification to be able to report that, what is with every society, more or less, a severe ordeal—the first year of its existence—had passed away, leaving behind it a very satisfactory record of well-attended meetings, at which good work has been done, and which might, they thought, in a measure, be taken as a fair indication of a bright and prosperous future.

Since the Society's formation its numbers had increased more than threefold, there being at the present time forty-six members' names upon the books—of itself a tangible proof that the establishment of the Association in this district had supplied a local want. The thanks of the Society were due to Mr. Hartley for generously placing his studio at their disposal on the evenings of meeting for several months; to the Birkenhead Free Public Library Committee, for granting the use of their handsomely-appointed rooms for a similar purpose at a nominal cost; to the Librarian, Mr. May, for his hearty reception of the Society and thoughtful attention to its comforts; to the gentlemen who kindly consented to act as judges of the pictures sent in for competition, Rev. H. Victor Macdona, M.A., and Messrs. Hartley and Thompson; to the ladies and gentlemen who assisted at the inaugural *soirée*, which, although barely a financial success, was well attended, and at which one of the finest collections of specimens of photographic art ever brought together in this town was exhibited; and, finally, to the gentlemen who had contributed so largely to the success of the Society by reading papers, giving demonstrations, and exhibiting apparatus and other objects of special interest at the meetings from time to time.

As a means of further adding to the attraction of the meetings, it was intended to institute periodical lantern evenings.

It was further stated that H. Norwood Atkins had kindly undertaken to provide a short digest at certain intervals of the contents of the various photographic periodicals, home and foreign, to enable such of the members as may not have the time nor opportunity, to keep themselves informed upon the various matters of moment which may happen to be exercising the minds of the photographic public.

The excursion arrangements generally had not proved so successful as could have been wished, although several pleasant outdoor meetings were held, and a large number of plates were exposed. The presentation pictures selected for distribution to those members whose subscription is paid for the current year, are the production of the celebrated prize-medallists, Messrs. Symonds and Company, and comprise a large series of beautiful 12 × 10 instantaneous yacht studies.

In conclusion, the Council begged to call the attention of the members to the last of the Society's rules upon the list, which provides that each individual shall, upon enrolment, present the Society with his photograph and autograph for insertion in their album.

Glasgow and West of Scotland Amateur Photographic Association.

The usual monthly meeting was held on Tuesday evening, November 3rd, Mr. Hugh Reid, President, in the chair.

After the approval of the minutes, the following new members were admitted:—W. Berrdman, Jas. R. McKay, T. N. Whitelaw, James Hodge, Finlay Brown, John Tennent, Donald Dove, R. B. M. Stewart, and Hugh S. P. Taylor.

After the nomination of office-bearers for the ensuing year—

The Rev. S. Penworth gave a short address on "An Amateur's Mistakes—personal reminiscences by a beginner"—a highly amusing account of his own troubles.

W. Lang, junr., then exhibited and explained Ackland's scale of photo. equivalents. Mr. Lang handed round the transparent film prepared by the late W. B. Woodbury, also a number of negatives and prints from Warnerke's negative tissue, which were exceedingly fine.

It was agreed, after some discussion, that the Society become affiliated with the Camera Club, London.

A number of members then gave their experiences of the Eastman and other films, and most of them found that after squeezeeing the negative on to glass, it was difficult to get same off.

Bolton Photographic Society.

The November meeting was held at the Baths on the 5th inst., R. Harwood presiding.

The minutes having been read and confirmed, the Hon. Secretary read the annual report, which was accepted.

The following ten gentlemen were elected as the Council for 1886:—Messrs. Bridson, Harwood, Parkinson, Ashworth, Knowles, Dalton, Taylor, Slater, Johnston, and Banks.

R. Harwood exhibited two fine enlargements from full-plate negatives.

At the conclusion of the formal business a lantern exhibition was given by Mr. Boothroyd, jun., a large number of slides by members of the Society being shown.

A vote of thanks to Mr. Boothroyd brought the proceedings to a close.

At a meeting of the Council held on the 12th inst., the following officers were elected:—

President—J. R. Bridson.

Vice-Presidents—E. H. Ashworth, Rev. J. W. Cundey, R. Harwood, J. Hawksworth, and T. Parkinson.

Treasurer—W. Knowles.

Hon. Secretary—C. K. Dalton.

Talk in the Studio.

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will take place on Tuesday next, November 24th, at 5a, Pall Mall East, at 8 p.m.; open at 7 p.m. for reading journals, &c.

The Photographic Society of Philadelphia, U.S. America.—An exhibition of photographs will be held in the galleries of the Pennsylvania Academy of the Fine Arts, beginning January 11th, 1886, and continuing one week. Pictures will be received only in accordance with the rules and classification given in the circular issued May 1, 1885. Those proposing to send pictures will please notify the Secretary immediately, stating the probable number and size, in order that entry blanks and labels may be furnished them. All entries must be made in accordance with rule 4, and particular attention is called to rules 5, 6, and 7. Early notice in regard to transparencies and lantern slides is important, in order that proper arrangements for exhibiting them may be made. A lantern exhibition will be given upon one evening during the week. Pictures should be sent to arrive after December 25th, and not later than January 6th. They must be marked (except when sent by mail) "Photographic Society of Philadelphia, care Penn'a Academy of the Fine Arts, Broad and Cherry Streets, Philadelphia, Pa." All transportation charges must be prepaid. All mail matter should be addressed to the Secretary, as below. Copies of the rules and classification, and any further information required, will be furnished on application to Robert S. Redfield, Secretary, 1601, Callowhill Street, Philadelphia, Pa.

Action of Direct Sunlight on a Mixture of Nitric Acid with Carbon Bisulphide contained in Sealed Tubes.—Tiffereau says that when two vols. of nitric acid, and one of carbon bisulphide, contained in a sealed tube, are exposed to the action of direct sunlight, the nitric acid is decomposed, nitrous gases and hyponitric acid, with the vapour of carbon bisulphide, distil into the upper part of the tube, condensing to a greenish-blue liquid, which runs back into the carbon bisulphide; this, by degrees, acquires a bluish-green colour, and finally becomes almost black, whilst the layer of undecomposed nitric acid continues quite colourless and clear. After twenty to thirty days, white crystals—probably having a composition analogous to that of nitroxyl sulphate—are formed in the upper part of the tube. When the action is complete, and sunlight has no further action, the tube contains two layers of transparent liquid—one quite colourless, and the other of a slightly yellowish tinge, whilst in the space above the liquids are some white cubical crystals; on one occasion the author observed the deposition of a small quantity of carbon.—*Journal of the Chemical Society*.

Masks and Discs Manufactured by Mann and Fursman.—The above-mentioned firm sends us a set of their new series of masks and discs cut out from black paper, and the series is quite sufficiently comprehensive to meet the ordinary requirements of the photographer, whether professional or amateur. The masks (round, oval, square, cushion, and dome) intended for lantern slides may be specially mentioned.

The Case of Mrs. Finch.—We have received from J. B. Currie, of 16, Edgware Road, a list of subscriptions which have been sent to him, and also a letter from Mrs. Finch, in which she expresses her gratitude for the assistance, and her sense of Mr. Currie's kindness in exerting himself on her behalf. Should any reader still wish to contribute, he should send the amount to Mr. Currie at the above address.

Sham Amateurs.—Many so-called amateurs do nothing more than focus, pull the slide, uncap and recap the lens; and, in Paddy's description of the ease of his vocation as hod-carrier, "the man at the top does all the work;" the professional does the developing and printing—still, it goes out as the amateur's work. The injustice of this, when selection and prize-giving come into the question, is obvious; and if to remedy this was the animating principle of the committee who made the regulation, then they deserve credit for attempting to encourage amateurs to print from their own negatives. But we fear there are many who will be barred by this regulation, and it will not be a matter of surprise if the number of entries is small; although we understand that at the last meeting an announcement was made to the effect that prints by professionals from members' negatives will be received for exhibition, though they will be barred from competition, which may help out in numbers.—*Photographic Times*.

Norwegium is the name given to a new metallic element not long ago discovered by Dr. T. Dahll, in nickel ore, from Kragero, in Norway. Its colour is a brownish white. It is invaluable, and has a metallic lustre when pure, but quickly oxidizes on exposure to the atmosphere. The melting point of Norwegium is 350° C. In hardness it is about the equal of copper: its specific gravity is 9·441.

Among others, M. Morier, of Rio Janeiro, has applied selenium to the measurement of the solar rays at different hours of the day. The new instrument which he has devised depends on the now well-known fact that the electric conductivity of this metal varies in accordance with the power of the light to which it is exposed. M. Morier's apparatus consists of a cylinder composed of discs of copper, separated by leaves of mica, and connected electrically at their edges by selenium. This cylinder is insulated on a glass support, and is fixed so that its axis is parallel to that of the earth. Under these conditions the rays of the sun strike it approximately at the same angle throughout the day. The cylinder is interposed in an electrical circuit of constant force, along with a galvanometer, and by the variations of the index of the latter instrument the intensity of the sunlight, which falls upon the cylinder at any given moment, is registered. By affixing a small mirror to the galvanometer index (so as to reflect a spot of light on to a moving strip of sensitive paper), the apparatus can be made self-registering, and we hope to hear of some interesting results which have been obtained by its aid.

Gold in Russia.—A report recently made by the United States Consul at St. Petersburg, states that from 1820 to 1850 Russia ranked first among gold-producing countries, yielding at the time of the discovery of the gold-mines in America and Australia 12·7 per cent.; from 1861 to 1870, 14 per cent.; and at the present time, about one-fifth of the world's production. A table showing the total production of all the gold-bearing districts in Russia for various periods, shows that from the year 1814 down to 1880, the total production amounted to 32,718,000 ounces.—*Science Monthly*.

Abstract of Chapman Jones's Lecture at the Birkbeck Institute, November 18th.—Potassium compounds act in the same way as sodium compounds, but they are more vigorous. Caustic potash or soda is not recommended for cleaning glass plates, because these alkalies corrode the surface of the glass. The ordinary crystals of carbonate of soda contain nearly two-thirds their weight of water, but carbonate of potash contains only about one-fifth its weight of water. All carbonates and sulphates are insoluble in alcohol. Sulphite of soda is useless unless, when mixed with an acid, it gives a strong smell of burning sulphur; it is never pure, and soon deteriorates by exposure. Hyposulphite of soda also deteriorates, but the fixing bath is so strong that this deterioration is unimportant. Iodides were not known till 1812, and bromides not till 1826. Cyanide of potassium is never pure; as usually sold it is chiefly carbonate of potash, about a quarter its weight, perhaps, being cyanide.

Photographic Club.—The subject for discussion on November 25th will be "On the Preparation of Lantern Slides." This is a lantern night; visitors are invited.

To Correspondents.

*** We cannot undertake to return rejected communications.

*** T. G. S., Valentine Blanchard, W. R. M., H. S. Starnes, Major Young, Arthur Santer, W. A. Watts, William Coles, W. Cotesworth, H. Pickering, the Rev. W. A. Crofton Atkins, C. Wood, D. Ireland, A. MacDonald, Ed. V. Boissonnas, G. A. Bignell, A. Donald, R. Davies, E. Clifton, and H. Platt, are thanked for their several communications.

A. G. Brophy.—1. You can obtain very good results without the condenser if you exercise care. Put one or two pieces of clean fluted glass next to the light, and the ground glass between these and the negative. 2. The lens you mention will answer admirably.

J. I. Harrington.—1. It will do very well for making enlargements, but will be of rather too long a focus for general work with the lantern. 2. Achromatic condensers are not necessary, and a diameter of 4½ inches is quite sufficient. 3. As far as our knowledge goes, there is no difference in this respect.

J. F. Shew & Co.—It is better that we should not do as you suggest.

R. N.—1. Send the particulars as to the construction of the lens, and we will tell you. 2. There is no need to alter the position in this case.

H. C. Braun.—They will not answer very well, as there will be a considerable loss of light, owing to the great distance between the condenser and the light. 2. There is no lens which will do what you mention.

Ebbw Vale.—1. You are right; but you will see that the term must necessarily be vague. 1*a*. This method is quite accurate enough for practical purposes. 2. Certainly. 3. We never heard that there was such an understanding. 4. Send it to the makers with such a memorandum as you send us, and if there has been any mistake it will doubtless be rectified.

H. Rendell.—Consult our advertisement pages.

Charles Stuart Hyason.—The gentleman whose address we sent you has experimented considerably in this direction; but we do not know of any patents bearing on the matter.

T. G. S.—We have never used it, and do not know of anyone who employs it.

Dropping-Cork.—It will be very useful, and we are obliged to you.

J. R. C.—1. Unless you use the acid, there will be an element of uncertainty in the matter, as the film may adhere in places. 2. Perhaps it might be well to give a somewhat longer exposure. 3. It is merely a question of patient labour.

John Terras.—Thank you very much. We will communicate with you.

C. R. Pancoast.—Your pictures of the *Genesta*, *Puritan*, and the other yachts, are first-class, and have been much admired by those to whom we have shown them.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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RENDERING PAPER NEGATIVES TRANSPARENT.

As paper becomes more popular as a support for negatives, it becomes more and more a desideratum to discover an easy means of rendering the paper transparent. It is true that—besides the Warnerke films coated on both sides—there are paper films produced which will give excellent impressions without the adoption of any process for rendering the support transparent, but the time taken for printing from such negatives is comparatively long. The problem is a much more difficult one in the case of paper coated on one side with emulsion, and therefore impervious to oily substances from that side; thus, in that of the Calotype process, where the sensitive salt was in the substance of the paper.

The object is to obtain a grainless transparency with some substance which will not dry out, which is colourless, and will not turn yellow, which will not render the paper brittle, nor be liable to crack itself, and which can be easily and conveniently applied.

The results produced by castor oil leave but little to be desired, but the very name of the substance is almost enough to condemn it. The ideas associated with it in most minds are, to say the least of it, of no pleasant nature. Moreover, the method of application can scarcely be described as either easy or convenient.

We suggested the use of vaseline in these columns some little time ago—the first time, so far as we know, that vaseline was suggested for the purpose—and we have had considerable success in using it, but there are certain difficulties connected with its application in the manner we described; that is to say, by smearing the substance over the back of the negative, then holding the latter in front of the fire. A certain temperature must be reached by the negative, when transparency will be produced; but if this temperature be not reached, semi-transparency with a distinct grain is the result; whilst, if it be exceeded, the vaseline dries away, and a mottled appearance is produced, which we have been unable to remove by after treatment. As the negative tends to curl up during the heating, it is difficult to heat the whole of it sufficiently without over-heating some parts.

The Eastman Company, some time ago, suggested a mixture of vaseline and paraffin oil, of the consistency of cream. This, if smeared over the back of the negative, will, after a few hours, sink into the paper and produce transparency without the application of heat, or it may be made to sink in at once with a less rise of temperature than vaseline without the addition paraffin oil requires. We have been successful with this method, and also using, without addition, lubricating paraffin oil. We should explain that the paraffin oil we have first spoken of above is the ordinary lamp oil, which is very volatile. Applied alone to paper, it produces a beautiful transparentness almost at once, but it evaporates so rapidly that a grain appears in a few hours after its application. The lubricating oil is, on the other hand, a comparatively viscous fluid, but slightly volatile at ordinary temperatures. It is smeared on to the head of the negative, which is laid aside for a few hours, when it will be found that the oil has sunk in, and that the paper has become transparent.

The method which we consider the best of those which we have tried up to date is one which we first saw performed by W. K. Burton. A mixture of one part of lubricating paraffin is made with three or four parts of vaseline. This is thickly smeared on the back of the negative, and the front of this latter is held in the steam issuing from the spout of an ordinary kettle, at a distance from it of about an inch. Almost instantly the back of the negative turns white opposite to where the steam is playing. This is always a sign that the material used has sunk into the paper, and that when the negative has become cool it will be transparent. The action of the steam keeps the negative quite limp, and prevents it from curling up, a matter of greater importance than those who have not tried the process of rendering paper coated on one side with emulsion transparent might imagine. The whole operation can be gone through in about half a-minute with an ordinary kettle, whilst a degree of transparency is produced which we have not obtained by any other method which we have yet tried. We imagine that by constructing a special flat nozzle for a kettle, so as to produce a flat jet of steam, the operation could be performed in a few seconds.

It might be supposed that the emulsion films would be melted by the heat of the steam, but we have not found it so. Indeed, a jet of steam will not affect the film of a pyro developed negative, even on glass, although in this case water enough is condensed, before the glass is heated, to melt the film readily enough were it sufficiently soluble. In the case of a paper negative the film heats so instantaneously that no appreciable amount of water is condensed, and, as is well-known, dry heat will not melt gelatine.

We should mention that it is always advisable, especially in damp weather, to thoroughly dry the paper negative in front of a fire before the vaseline composition is applied. The excess of greasy matter may be removed from the back of the negative, after transparency is gained, with a dry rag. If any get on the front it is well to use a cloth wetted with methylated spirit to ensure the removal of the last trace of grease, which might, if it remained, affect the printing paper.

The vaseline sold by the "Chesborough Manufacturing Company," 41, Holborn Viaduct, E.C., as veterinary vaseline, is quite good enough for the purpose indicated. The lubricating paraffin can be had at any oil shop.

A PHOTOGRAPHER'S VISIT TO PETRA.

The Philadelphian photographer—E. L. Wilson—writing in the *Century* magazine for November, tells us how he had longed to enter the portals of Petra; and although the fierce Bedouin tribes who now inhabit the vicinity of this ancient ruined city, carved out of the living rock, have only at rare intervals permitted travellers to inspect its wonders, yet this did not shake his determination to make the effort, at least, to "take" Petra.

Picking up at Cairo, in 1882, that prince of dragomans, Hedayah Effendi, through whose personal friendship with the sheikh of Petra the only chance of success lay, Mr. Wilson's party travelled through Suez to Akabah, whence they started on camels for Petra.

After a ten days' ride through the wilderness, the wonderful ravine in the sandstone rock was reached in which the ruins are situated, and by a strategic movement the party avoided the Bedouin village of Eljy, situated near its entrance, and slipped in unperceived.

The beauties and wonders of the place surpassed all expectation. The city lies in a narrow valley, whose sides—of soft, richly-coloured sandstone—rise precipitously to the height of 600 feet. Out of the sandstone, colossal edifices have been carved—temples, theatres, and tombs, the work, probably, of the palmy period of the city during the third and fourth centuries of the Christian era, when it formed part of the Roman empire.

But our travellers were not to be permitted to gaze, undisturbed, upon these wonders. Soon the Arabs were upon them, and at once began their work of extortion. As a rule, when travellers get into Petra at all, they are hurried out again as rapidly as possible, seldom remaining a full day; one reason being that the Arabs firmly believe in the existence of immense treasures buried in the ruins, which they fear will be discovered and taken away by their visitors. But Mr. Wilson wanted to stay long enough to get a tolerable photographic *resumé* of the ruins, and by various pretexts he succeeded in remaining four days. For his detailed and most interesting account of Petra, we must refer our readers to the article itself.

The Bedouin chief made continual applications for money, which, after secreting a certain proportion as commission for himself, he would roll up in his skirt and retire to a cave with his followers to divide. "A dreadful scene always followed, of quarrelling and sword-drawing; but they always seemed to come out of it unhurt, and I ceased to worry about them. One day I caught the rascals with my camera, after one of their angriest discussions, as they emerged from their office. My photographic apparatus, with my leather cases of glass, were a mystery to them. No custom-house appraiser was ever more gloriously baffled over the witchery of a female smuggler than was sheikh Salim and his staff over my American camera. It was at last decided to be 'magical apparatus,' which meant 'no good to Petra,' and I was taxed accordingly."

The picturesque figures of these rascally Arabs, with their flowing robes and long lances, were, of course, very desirable "accessories" to the pictures of Petra; but they wanted heavier pay for "sitting" than any professional models. "I had to pay thirty dollars for the privilege of making my picture of the six scoundrels on their horses."

Finally the party, after a stormy scene, got away uninjured, but without a single remaining coin! The illustrations to this interesting paper—taken, of course, from Mr. Wilson's photographs—are of the most telling nature. Only one artist—the American, Church—had ever previously found his way to Petra, and the few sketches which he had been able to make are of course not to be compared with the extensive series of photographs secured by Mr. Wilson, whose work would again have been impossible without those "gelatine dry plates" which now render such efficient aid to every explorer able to make use of them.

TRANSFER PAPER FOR SILVER PRINTING.

On another page of the present number will be found some details of a positive printing process, wherein ordinary transfer paper takes the place of albumen. We refer to the ninth article of the series, "Positives on Gelatino-Chloride of Silver," written for us by W. M. Ashman and R. Offord, which deals with the subject alluded to by us on p. 208, under the heading, "Talk in the Studio." Judging from the prints which have reached us, we are inclined to think the idea is one of considerable value, and it is probable that in this direction lies the germ of the silver printing process of the future. As it stands at present, there is sufficient novelty about it to commend it to the attention of experimentalists and amateurs, who will doubtless introduce important modifications. On the whole it is simple enough, but there are several points in the process that indicate weakness, and we shall only be doing justice to our contributors by directing their attention to the same.

Cost is somewhat disregarded, since at the outset a more expensive paper than plain Saxe or Rive is first subjected to treatment. Even supposing that an English-made paper, sufficiently white for silver work, could be found—one quite fitted for backing upon a carbon print, produced by double transfer—it might have a very injurious effect upon silver compounds; while the tendency which English paper always has to absorb water in excess of that taken up by the special foreign article referred to, increases the difficulty of manipulation to a great extent.

The first objection may be overcome by the intervention of a coating of plain gelatine between the layer which carries the image, and the surface of the paper, thus isolating the sensitive salts; and the second can only be met by having a specially prepared paper of close texture and fine quality; one also that has the least possible tendency to turn yellow under the influence of light or time. Under any circumstances the washing would have to be much more thorough in one case than in the other, although our experience, so far, has not determined the extent to which traces of salt may be left in such a gelatine film without injury to the image. In the matter of time also there seems to be some waste, as we cannot see why the addition of haloids, &c., to the gelatine before its application to the paper cannot take the place of the somewhat tedious floating upon a salt bath.

By testing quantitatively, the floating could be made to indicate the exact and most effective amount of haloid or organic salts to be incorporated with a given proportion of gelatine; a matter of the greatest importance, which, as it is, seems to be left entirely to the absorptive powers of the gelatine itself. An easy analysis could be effected by thoroughly drying a piece of the transfer paper, weighing it accurately, floating, drying, and weighing again. This would give the total amount of dry salts held in the paper, and the proportions of each being known, the calculation of quantities for a large salting bath becomes a simple matter. Without any pretension to analytical accuracy, such a method would answer fairly well in many photographic processes.

The fact of these pictures curling up so much in the several baths is to our mind a great drawback to the whole system, and we cannot see how it would be possible, in toning some hundreds of prints, to avoid wetting the backs in the course of the necessary removals for inspection alone. Yet, on the other hand, the same difficulty was experienced by those who practised the collodio-chloride printing-out process, and they also surmounted it by having no more than some quarter-of-an-inch of liquid at the bottom of the bath; but then the toning was very rapid, and perhaps the number of prints was not large. Even then, the final washing must be carried on under great drawbacks, as a rolled-up surface could by no means be so thoroughly cleared of salts as a flat one. There must either be some method of treating the paper by which this failing can be obviated, or a description of gelatine selected which shall have very little tendency to swell in water. Our experience would point to chrome-alum as the source of the annoyance, for when toning gelatine paper which had only been soaked for a minute or two in a weak solution of common alum, this phenomenon did not present itself. How far chrome-alum affects the quality of prints we are not prepared to say; but it is very likely that if it were omitted from the formula, in greater part or entirely, one obstacle to the success of an otherwise valuable process would be removed.

Another matter to be considered is that of finishing. We understand that these prints are capable of a very high burnish, but this again may be dependant upon the perfect coagulation of the gelatine, in which case the absence of chrome alum would be injurious; but it would perhaps be sufficient to employ a saturated solution of ordinary alum before and after fixing.

Another process of silver printing, detailed on pages 533 and 596, by the same writers, is also worthy of notice as one likely to find many advocates. The opinion is held that albumen has much to answer for in the instability of silver prints. This opinion is no doubt gaining ground in many directions; therefore any practical suggestion towards a solution of the problem thus presented deserves unprejudiced attention.

AN ATTEMPT TO PHOTOGRAPH THE CORONA.

Captain Abney writes in *Nature*:—

I have been following with interest the communications which have been made from time to time to *Science* by W. H. Pickering, regarding the photography of the corona in full sunshine. Whilst admiring the manner in which he has built up his theoretical objections to its possibility, I am forced to dissent from his deduction from the fact that the theory does not fit in with the results actually obtained during the eclipses observed in Egypt and the Caroline Islands.

I have in my hands at present spectrum and other photographs of the corona, made during the expeditions to these localities, and from them I gather he has evidently much under-estimated the photographic brightness of the corona, as compared with that of the sky.

As I propose shortly to read a paper before the Royal Society on the subject, I cannot enter into details at the present moment. All I will say is, that the comparative photographic intensity of both can be estimated with approximate exactness from the data I have by me.

THE LAST OF MY STUDIO

BY ONE WHO HAS SUFFERED.

I frankly confess that I am disappointed with photographers. I think I have tried them fairly, but they have worn me out. I was the possessor of a studio and apparatus. It was not my fault that I was in this position, but it certainly proved my misfortune. It was a well-built studio. You had not to get to it by climbing half-a-dozen staircases terminating in a ladder. The reception-room was neither a back kitchen nor a cupboard, but a well-appointed apartment; there was a large garden, into which the studio opened; there was a capital printing room—in fact, it had not a fault save that it was in a dull, semi-genteel, and, I am afraid, more than semi-impecunious, suburb of London. Had it been in Regent Street, I could have lived comfortably on the rent; as it was in—never mind where—it could not find me in tobacco.

But until I had grown wiser by experience I always had a profound belief in the studio, if not as "a possibility of acquiring wealth beyond the dreams of avarice," certainly as a probability of yielding a comfortable competence. Never was mortal more deceived.

Tenant No. 1 was a cold-blooded Scot; he was always grumbling, and continually wanting something he had not got. At the end of six months he suggested the advisability of the rent being reduced to one-half, and as I could not see the matter in the same light he gave up the premises and opened on the other side of London, hiring my apparatus, as he had none of his own. It was a source of mild satisfaction to me that in his second venture the Scot was completely taken in. A lady, it was, who proved too much for him. On the other hand, my satisfaction was considerably tempered by the discovery that the Scot was totally unable to pay me for the hire of the apparatus. And at the end of a twelvemonth—the studio remaining empty all this time—I got back the apparatus and started afresh.

Tenant No. 2 was an Englishman, but knew nothing about photography, and so he had to pay someone who did. The new man went in for ferrotypes and Sunday work, to the great scandal of the highly genteel neighbourhood, and, I am bound to say, without my sanction. But he paid his rent regularly, and this virtue surely condones any number of Sabbath breakings! I said nothing, and rather regretted when, at the end of six months, he, too, gave notice. As he had to pay his operator and expected to make a profit the first month, perhaps it was not to be wondered at.

Again the studio was in the market. No. 3 was a foreigner who had a remarkably keen eye for getting everything he wanted at about quarter of the value. However, he remained longer than any of the others, but having, I supposed, sucked the neighbourhood dry, started for fresh woods and pastures new, owing me nearly £20. For two years the efforts to recover this debt, the broken promises, the miserable driblets of instalments, were simply sickening. I was thankful at last to take less than a third of the amount owing, and never see the man's face again.

The studio now began to show signs of delapidation. It was thoroughly overhauled, and away went half a year's rent at one fell swoop. I had apparently let it, but the prospective tenant drew up an agreement so curiously one-sided that it was impossible to accede to it, so he went his way.

For three months the studio was tenantless. Then came along the most insidious individual, and the most accomplished swindler, it was ever my lot to meet. I have not the heart, and I have not the space, to go through the impish trickery of this person, especially as those who are anxious on the subject will find it fully set forth in these pages about a year or so ago.* Suffice that after letting him the place for three years, I was glad to get him out of it at the end of two months, forgiving him his rent, and deeply grateful I had not to pay him to go.

Once more I had to advertise, and tenant No. 6 seemed to be all that was desirable. Indeed, I have not a word to say against him, save that he could not make the studio pay. Let me place on record that his thoroughly honourable conduct stands out in strong relief against that of nearly all the others. He was an amiable, but, I fear, a castle-building and imaginative youth. He had a turn for art, and not for commerce; and what is a photographic business without the faculty for money getting?

In what I am about to say, let me assure my young friend, should these lines ever meet his eye, that I do not wish to write one syllable to hurt his feelings. But, as a matter of solid truth, it must be set down that on the solitary occasion I visited the premises when in occupation, I saw at least one reason why he did not succeed. A more desolate, woe-begetting aspect it was difficult to imagine a place could have. A faded ragged square of carpet occupied the centre of the reception-room floor; all the rest was bare board, which hadn't known scrubbing brush for many a long day. An oval mahogany table strewed with proofs, scraps of paper, and the odds and ends of photographic work all tolerably dusty, and a couple of chairs, made up the rest of the furniture. The studio had not a thing in its place. Backgrounds were in the middle of the room, and while one camera was on a chair, another was on the ground. The focusing cloth was lying on a property table, and a plate-box and a bottle were standing on a property chair. Miscellaneous articles were deposited here and there, and yellow, weather-stained tissue paper hung in ribbons from the windows. Dust abounded.

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* See "My Studio," p. 634, vol. xxviii.

The look of the place made one shiver and shudder, and yet, with all this, the misguided young man hoped to make his fortune. Of course, in due time, the inevitable notice to quit arrived, and though tenant No. 7, in the shape of the brother of No. 6, tried to carry on the business with the aid of a manager, he was wise enough to drop it after a trial of a few weeks.

This was the last straw. Had I had any doubt left as to the wisdom of again trying a photographer as tenant, a look round the rooms when they were empty would have at once dispelled it. The studio roof had leaked, and the linoleum—*my* linoleum—was ornamented with patches of mildew. The head-rest—*my* head-rest—was rusty and broken. A copying camera—*my* camera—was split, and the dark-slide and frames were afterwards found in the dark-room in fragments, the damp completing what careless usage had begun. The posing-chair was in the stage of rickettyness—the seat sloping down in front at an angle of sixty degrees, and one of the legs cracked. There was not a handle on any of the doors, nor a knob on the cupboards and shutters, while one of the locks and a venetian blind had disappeared bodily. In one room a tap over a fixed basin which never had been, and never was intended to be, connected with a drain, had been allowed to run, and the water had rotted the floor and converted the ground below into ill-smelling mud. There was a hundred-weight of old negatives, broken and unbroken, in various parts of the premises, while torn prints, bits of cardboard, and paper abounded. The dirt was simply appalling, and, to complete the picture of misery, there was an epitaph scrawled in pencil on a ground-glass window! It ran, as nearly as I can recollect, thus:—

> "To the memory of ———'s prospects at ———,
> Let them be buried in deep oblivion and dark forgetfulness."

Poor fellow. I do not blame him. He was not in his right vocation, and he failed—that is all.

And the studio now? Oh, it is let to a respectable middle-aged widow without an *h* in her vocabulary, and not the least notion of photography beyond the glass positive of her deceased partner which stands on the mantel-shelf of what was once the reception-room. I hope she is comfortable. I know I am.

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POSITIVES ON GELATINO-CHLORIDE OF SILVER.

BY W. M. ASHMAN AND R. OFFORD.

Ninth Article.

We brought under the notice of our readers in the seventh article of the series, headed as above, a new method of making paper positives, and doubtless ere this it has been put to practical tests, and the record of our experiments corroborated by the experience of others. We refer to the plan of employing a salted mixture of starch and gelatine rendered sensitive to light by being floated upon a solution of silver nitrate, and we pointed out, when giving formulæ, that they were more indicative and suggestive than absolute, although we had assured ourselves that good results could be obtained therewith. The fact is, that there is a very large field for experiment, affording full scope for the development of individual ingenuity and patience, and, we believe, opening up the opportunity of obtaining valuable results. We shall look forward with more than ordinary interest for an account of improvements in the direction of, or arising from, the line of experiment which we have described, and which we claim as a new departure in the history of silver printing.

Before concluding the present series we have to draw attention to yet one more method of employing gelatine in conjunction with the chloride and other salts of silver, a method by which we have obtained by far the most delicate yet brilliant prints that we have seen produced by any other process without exception. In making this statement it is not to be inferred that extreme rapidity of printing or toning is implied, though in neither case is the action slower than in that of ordinary sensitized albumen paper if the proper formulæ are adhered to; but the pictures possess a peculiar piquancy, a transparency of shadow, with a faithful gradation of half-tone, and a purity of colour, not lost even when toning is carried right into the region of the greys. In this latter case, it is remarkable to see an overtoned silver print that is neither inky in its shadows nor washed out in its half-tones, but is literally shaded from black, through pure greys to white. Burnishing can easily be resorted to under the condition named in our last, that is, by rendering the surface quite dry, and making use of powdered curd soap as a lubricant (liquids such as an alcoholic solution of soap, wax in ether, benzole, benzoline, &c., being quite inadmissable), or the prints can be squeezeed on to waxed glass if preferred. In the former instance, spotting-out is a far easier process; moreover, when once any gelatine print has been dried for the purpose of spotting, an after soaking and subsequent drying on glass does not produce the equivalent result to treating it straight from the washing bath.

Our first and perhaps most successful experiments in this direction were carried out by means of commercial paper known to printers in carbon as "double transfer." It is produced by a double coating, the first being gelatine to which is added about ten per cent. of barium sulphate, and the second, clear gelatine; both coatings are rendered insoluble by means of chrome alum. This description, of course, only applies to the special sample with which we were working twelve months ago, and we found by subsequent experiment that if the barium were mixed with the gelatine to form an emulsion, and spread upon the paper, it was not possible to produce the results obtained in the other way; that is, by coating the paper twice. The surface in the other instance cannot be smooth and bright, and the prints therefrom, though perhaps very suitable for the purpose of making direct negatives for collotype printing, possessed too much grain to be pleasing as pictures.

Having obtained, then, a good sample of the double transfer paper, we float the same upon a salting bath composed as follows:—

Distilled water	1 litre
Ammonium chloride (pure)	10 grams
Sodium citrate	10 „
Acid citric (sufficient to make slightly acid)	

Or,

1.—Distilled water	800 c.c.
Ammonium chloride	10 grams
2.—Liq. ammon. fort. ·880	3 c.c.
Distilled water	400 „
Acid citric (sufficient to neutralize and leave the solution just acid). Mix 1 and 2.	

Perhaps the second formula is the better of the two, and we were rather more successful with it than with the first named. Possibly this may be due to the ammonium nitrate (obtained by the decomposition of silver nitrate and ammonium chloride during the action of sensitizing) exercising a better influence upon the printing than does the sodium nitrate. We certainly are in favour of introducing ammonium citrate into the second formula, under the conditions above shown, for we can rely upon the quality of ammonia hydrate. Citric acid, too, is a fairly pure commercial substance, whereas the ammonium citrate salt is difficult to obtain in anything like a state of purity, and it is also troublesome to keep. Potassium citrate may be substituted for that of ammonium, but we prefer the latter; moreover, the two constituents (liquid ammonia and citric acid) are to be found in every laboratory.

Enough, then, of either of the above salting solutions should be poured into a clean flat dish, and the transfer paper floated thereon for about five minutes, the usual precautions against the formation of air-bells as in the case of albumenized paper being of course taken. The sheet should lie flat upon the surface of the liquid, which denotes that the gelatine has become evenly penetrated by the salting solution. Upon removal from the dish it is well to pass the surface of the paper over a smooth glass rod, either fixed in a cradle at one end of the vessel employed for this purpose, or in some other convenient manner. The paper is then suspended to dry in a warm room free from dust, care being taken to ensure its being tolerably flat when dry; the details regarding the management of other papers apply here with equal force. If the solution be too strong, or the time of floating longer than we have suggested, after the next operation, viz., sensitizing, a deposit of silver salts will accumulate upon the surface and quite spoil the print; therefore it is better to remove superfluous solution with extra care; and one plan of doing this effectively is to use two or even three glass rods fixed parallel to each other in a suitable handle or cradle, and to drag the surface of the paper steadily over the rod, which removes the excess in a very satisfactory manner.

The paper at this stage will, of course, keep white for any reasonable length of time if preserved in a moderately dry place, and can therefore be made in large quantities. Under these circumstances care must be taken to keep up the strength of the salting bath, and to guard against its becoming too strong by evaporation. It is also advisable to agitate the solution occasionally when salting, since such a proceeding is favourable to evenness of result; the *raison d'etre* will be given further on.

As with albumenized paper before sensitizing, sufficient transfer paper for the purpose of salting should be placed for a few hours where it may absorb enough moisture to prevent its being chip dry and unmanageable in floating, which is a fertile source of air-bells and inefficient action of the silver bath Gelatine papers require making a trifle damp, even more than albumenized; after coagulation with alum, the presence of moisture is even more necessary, it being so much more difficult to make it lie flat on a liquid when quite dry.

After salting by the second formula above given, damping is an easier matter, on account of the hygroscopic nature of the organic salt there employed (ammonium citrate). The same end can be obtained by the use of glycerine instead of a deliquescent salt, and we find a considerable acquisition of vigour by a moderate use of this substance. The addition of glucose, either to melted gelatine or the salting bath, considerably enhances the strength of the shadows in printing, but when accompanied with glycerine tends to a rapid discolouration of the whites after sensitizing, and increases the difficulty of keeping the paper even fairly dry. There is room for experiment in this direction.

The silver bath need not be strong, and, as we used it, was made up as follows:—

Distilled water	1000 c.c.
Silver nitrate	30 grams
Citric acid	3 ,,

The time of floating varies with the temperature of the room, but three minutes may be taken as the average, and we recommend the same precaution as in the previous case for the removal of excess of silver solution from the surface of the paper. Should it fail to dry bright, the reason is to be sought in our previous remarks upon the salting bath.

Temperature exercises a greater influence on the penetrating power of aqueous solutions where gelatine is concerned, than it does upon many other substances under somewhat similar conditions; and it may be taken as an axiom that if you want to make an aqueous solution go into gelatine, the hotter the liquid, short of melting point, the quicker it goes in; hence there is a distinct advantage in keeping the temperature even. Again, hard gelatine appears to absorb salts from a solution to a certain extent only, and after that, the additional water absorbed merely swells the gelatine, and by continued action dialysis would occur, and the salt thus finally be partly eliminated; hence our suggestion to stir up the salting liquid will now be more easily understood.

The double transfer paper found in commerce has a great tendency to curl outwards when swelled with water; therefore, in all subsequent operations, it might be found more convenient, when dealing with small quanties of such a sample of paper in its subsequent treatment, to substitute floating for immersion; and after a little practice this becomes quite easy in washing, toning, and fixing. After this, the prints can be soaked in the usual way. The reason is to be found in the tendency common to all papers prepared with hardened gelatine to expand upon the coated side, and, in thus curling, to prevent an equal action of the toning or other baths over the whole surface.

To prevent this, we do not let the back get wet if possible, and recommend the use of shallow baths rather larger than ordinarily employed; the depth is not of so much importance, extent of surface upon which to float being the first consideration. If the prints are not numerous, and are moved about the whole time, and constantly unrolled as fast as they roll up, of course our suggestion of floating need not be taken; and should this paper be introduced commercially for the purpose we are advocating, the curling difficulty could be easily overcome.

Prints do not lose much in finishing unless the lime chloride bath is used. After the usual washing in two or three waters by floating or soaking, they are transferred to the toning bath. We have succeeded in obtaining the best colours by means of the plain borax bath, freshly made for each occasion, and *strong*. We have described this bath before. It may, perhaps, be advisable to add a little sodium bicarbonate to the second washing water, to neutralize the citric acid, but we do not consider it absolutely necessary; still, it hastens the work of toning somewhat.

It is really difficult to tone the paper when curled up, and here we get the full benefit of keeping the back dry. A large shallow dish will accommodate as many prints as can be fairly watched, and there is then no doubt about the evenness of toning. As a rough experiment to test the quality of transfer paper, the solutions can be applied to the surface by means of a flat Buckle's brush in the same manner as calotype paper was prepared, and it is likely some of our amateur friends will resort to this method. The ammonium thiocyanate and gold toning bath is both certain and rapid in its action upon prints made as above; but we do not prefer the tones to those we get by means of strong borax and gold.

We have already spoken of the finishing of these prints, and it must always be remembered that, however easy it is to obtain a really bright surface by drying upon glass, the difficulty still remains of mounting the same without deterioration of that brilliancy. Again, there can be no doubt about the stretching of a print so treated; and this forms, as everbody knows, one of the greatest drawbacks to developed prints. Suppose we are printing from paper negatives, and these have been stripped from collodionized glass, as has been suggested, and we employ a printing process by development, in which stripping from glass is also resorted to, it is easy to imagine, when the stretching in both cases was in the same direction, and to a similar extent, how unlike the original the photograph would be. We think that it is generally conceded that a paper which is easily hot burnished, and which yields a gloss nearly, if not quite, equal to the stripped print, is at all times a useful article to either amateur or professional.

In our next article we shall give further details in the method of preparing a paper of this kind, and make a few remarks upon some of the subjects treated of in this series.

PHOTOGRAPHIC MISUNDERSTANDINGS.

BY H. CHAPMAN JONES.

Misunderstandings are evil trees that can bring forth only evil fruit, and the trade or profession wherein they flourish must suffer in dignity and prosperity. There is, perhaps, no calling of equal importance that is so overrun with misunderstandings as that of photography, and probably no profession where the good and the bad are so confused by the public. But it is not our present object to speak of the common ignorance and want of discrimination, except to state, in passing, that the cure for this lies with photographers themselves. We are thinking of the misunderstandings that exist within the ranks of those who consider that they have a certain ability to do something—perhaps a proved ability to earn a living by means of the camera.

A misunderstanding that is very prolific in the evil that it brings forth, is the notion that two or three lessons, a few lectures, or a week or two of practice, will entitle an individual to call himself a "photographer." There are dabblers in every profession, and it is well, to a certain extent, that there should be. Every man of sense "doctors" himself for slight ailments, and does a little carpentering on his own account; but he sees at once the absurdity of therefore calling himself a physician or a mechanic. There ought to be a fairly sharp distinction between those who engage in a pursuit as their life work, and those who take up the subject merely as an instructive pastime. This distinction is universally admitted in most cases, the "amateur" and the trained worker helping one another when they come into contact, but each one ever preserving his individual character. The amateur (using the word in its usual sense) generally picks up his information and gains his experience in a precarious way, as other circumstances allow; but with the professional, one aspect or other of his profession is his main object, and "other circumstances," where they exist, are subservient to it. The amateur will always have the best of wishes for his success, but still, he does not belong to the profession; and though it may be impossible to define exactly the relative position of both, there is in most cases a very practical and useful distinction maintained, because it is felt necessary from all points of view. This distinction lies chiefly in the fact that the professional is trained, and his profession is his duty. The photographer must be trained if photography is to maintain even its present dignity as a pursuit, whether it be called a profession, a business, or what not; and the necessary training is not a matter of a few weeks, however they may be spent.

It takes at the very least some three or four years to fit an individual to engage in the practice of medicine or analytical chemistry, and the architect, the engineer, and the artist must study for quite as long. To properly prepare himself so that the photographer shall rank with other professional men, would require as much time, and as arduous labour, as if the student had selected any other subject such as those mentioned above. Instances may be quoted that seem to disprove this statement, such, for example, as a young man who, after failing in one or two different lines of business, worked for three months with a West-End photographer, and then set up on his own account in a quiet suburb, where he has since earned a fair livelihood for some years. But the money result is entirely beside the mark; the quack pill-maker may become a millionaire, yet he is none the nearer being a physician, and occupies, from the professional point of view, exactly the same status as the pedlar who hawks cough lozenges. That man is not a photographer who simply brings his business tact to bear upon matters, and systematizes the labour of others, any more than the merchant is a manufacturer. But the prevalent ideas are so thoroughly confused on the two or three points here indicated, that all we can hope for is a very gradual improvement, and this can only be insured by every one concerned always pushing forward in the right direction.

Another misunderstanding, which we had thought was so old-fashioned as to be altogether a thing of the past, rests not with photographers at all, but with their employers. There is a well-known firm that strongly discountenances any effort of self-improvement on the part of the photographers who work for them; at least, it is believed to be so by those most interested, and it may fairly be presumed that employers take care that their wishes are known. There are no arguments that can be addressed to those who wilfully raise barriers to progress, especially when they have the power to lend a helping hand, and, in some circles, enjoy the reputation of being to the front in matters concerning technical education.

The lack of knowledge on the part of a large number of those who consider themselves as qualified in their way, as engineers, physicians, or artists are in theirs, naturally leads to misunderstandings in connection with actual practice. It would be interesting to know what proportion of those who would claim recognition as photographers could show why exposure must be increased as we approach the object, as in portraiture, copying, &c., in spite of the law that the intensity of light is inversely proportional to the square of its distance; that is, the light increasing as the distance is diminished. But this is quite a simple matter.

A group of misunderstandings results from the adoption of opticians' nomenclature by photographers. It was pointed out in these pages, some months ago, that though an optician is quite correct in talking of a "wide angle" lens, there is no need for the picture produced with it to include a wide angle; and that to say of any picture that it was taken with a wide angle lens may be as unmeaning as if a painter sought to describe his picture by cataloguing the brushes he had used. The focal length of an individual lens is a perfectly fixed datum to the optician, but an ever variable quantity to the photographer. Suppose, for instance, a twelve-inch portrait lens is used at a distance of thirteen feet from the sitter, the focal length of the lens is thirteen inches instead of twelve; and if, for a large head, it is brought to within seven feet, the focal length becomes fourteen inches. The photographer's calculations are quite upset if he thinks he is using a twelve-inch lens under such circumstances.

There is another point of a similar sort, which is not quite so obvious. Depth of focus, or depth of definition, depends upon the focal length of the lens and the aperture employed. The late Mr. Dallmeyer says:—"It increases in the same ratio as the diameter of the aperture is reduced, and it diminishes as the square for any increase in the size of the picture or the focal length of lens." A varying focal length, therefore, obviously means a varying "depth," but this is not all. A photographer who has to take a view of (say) a certain church, on a certain sized plate, and who has the choice of a twelve-inch and an eight-inch lens, may calculate the proportional "depths," and at once conclude to use the eight-inch, because of its vast superiority in this matter. He takes the view, and it never occurs to him that he has had to stand much nearer the church than if he had used the lens of longer focal length, and that, therefore, he actually needed greater "depth" by reason of his nearer position, and that the eight-inch lens was not so very much better, after all.

So we might go on. But enough has been said to show that just as a man plus a knife is neither a surgeon nor a butcher, and a student with analytical tables is not an analytical chemist, so an individual is not a photographer because he stands behind a camera. None but trained men should be called photographers. The dignity of a profession rests with its members. There must, for practical purposes, be a broad line drawn between professionals and amateurs, and it is the professionals who must draw it, not by depriving amateurs of their friendship or assistance, but by showing clearly that they themselves are the masters of the art, and that they are in earnest.

PHOTOGRAPHIC APPARATUS AT THE ENGLISH PATENT OFFICE.

BY CHAPMAN JONES.[*]

Roller Slides.

Roller slides in which the sensitized paper is transferred from one roller to another, the piece between the rollers being ready for exposure, have been described by S. B. Spencer and A. J. Melhuish (May 22, 1854), and W. H. Beck for P. Piquepé, otherwise Morgan (May 17, 1881). Spencer and Melhuish have two rods or tubes of yellow glass "to retain the part of the sensitive surface which, for the time being, is brought into position in the correct plane." Beck has a stretching board between the two rollers, and suggests a perforating apparatus to facilitate the separation of the strip as required. Neither invention is more fully described.

C. Silvy (July 26, 1867), in using a round-ended camera for panoramic pictures, arranges his sensitive paper exactly like a tape measure, drawing it off the roller and out of the case for exposure, and winding it up again for removal from the camera.

Focussing Screens, &c.

This section includes substitutes for the ordinary ground glass screen as well as additions to it. The movement of the screen for focussing has been considered in the section on camera backs.

The image formed by the lens is upside down, but after a little practice the eye gets quite accustomed to the inverted picture, and can judge of its qualities as well as if it were in the usual position. It is therefore quite natural that the earliest photographer should have sought to rectify an apparent awkwardness, and that subsequent workers have not thought the least trouble worth taking in the matter. Daguerre and Niepce, as stated by M. Berry (August 14, 1839), had a mirror attached to the outside bottom edge of the focussing screen, and inclined so as to make an angle of 45° with the ground glass. The picture on the ground glass, viewed by looking down upon the mirror, would be right way up to the observer. The device was intended to aid in composing the picture, and perhaps was not used for focussing. T. Sutton (August 20, 1861) has a mirror extending right across the camera, hinged to the upper edge of the camera back inside, and set at an angle of 45°. By this means an erect picture is produced upon a ground glass screen, which may be of orange glass, in the back part of the top of the camera. The erection of the image is not the chief object of the invention. The mirror, when in position, intercepts all light from the sensitive plate, but can be drawn up by its lower edge so that it lies close to the top of the camera, and allows the picture to fall, as usual, on to the sensitive plate. The mirror is thus an exposure shutter also, and the point of the invention is, that moving objects may be watched upon the focussing screen, and the exposure given at any selected instant. The focussing screen and its mirror, therefore, are at once a focussing screen, an exposure shutter for instantaneous or other exposures, and a very effectual finder. The defects inherent in the apparatus need not be pointed out; they are such that probably no experienced operator would prefer to use the arrangement.

One usually views the picture on the ground glass from outside, but many inventors have constructed opaque screens for focussing, and allowed for looking at the picture from within, or through the camera. R. Beard, (June 13, 1840), in a camera where a concave reflector is used instead of a lens, puts the focussing screen in the plate-holder, and inspects the picture produced by looking through a hole in the top of the camera. This hole has a lid to it. F. East (May 15, 1854) and H. E. Newton (February 14, 1866) view the front of the focussing screen through a suitable opening in the camera wall. C. Langlois (September 16, 1856) has a plate-holder pivotted so that the back side, which is whitened, can be turned to the front to focus on, and the picture is inspected by looking through one side of the camera that consists of folding doors. E. Hodgson (June 16, 1873), who mounts his plates round a drum, so that by turning it they may be successively brought into position for exposure, fixes the ground glass in the place of one of the plates.

J. B. Spencer and A. J. Melhuish (May 22, 1854) in using waxed paper, focus directly on to the sensitive surface, while it is protected by a yellow glass in front of the lens, and another piece behind the paper, apparently looking through the waxed paper as one in the ordinary way looks through the ground glass screen. The method is in connection with their roller slide. T. Bolas (Nov. 3, 1881) likewise has no focussing screen proper, but a second objective opening into an outer case only, and behind it a reflecting prism, so that the picture formed may be observed through an eye-piece fixed in the side of the outer case of the camera. The side of the prism next the eye may be ground, so that the picture, or a part of it, is produced upon the ground glass surface.[*] W. Brookes (Oct. 4, 1881) also uses an extra lens for focussing, but he has a ground glass screen in conjunction with it. No focussing at all is necessary with the "globe" lens by R. A. Brooman for C. C. Harrison (October 13, 1860), or with the "periscopic" lens by W. Bunger for C. A. Steinheil (November 15, 1865). These lenses will be subsequently described.

Using the ordinary focussing screen, some inventors have fixed a microscope outside it, that the image may be better observed, and so a more perfect adjustment made; but the addition is found only in apparatus fixed for some specific use, as for photographing microscopic objects, getting negatives for preparing printing surfaces, &c. J. E. Atkinson (October 4, 1883) makes the hinges of the focussing-screen to slide outwards, that it may lie close against the camera-back when the latter is in position, for convenience in transport.

The focussing cloth is as troublesome an adjunct now as it was a generation ago, and bids fair to survive in spite of the attempts made to do without it. In fact, the focussing cloth is not simply what its name indicates; it is the fast friend of the camera maker, for it covers a multitude of sins. Is there yet a maker that will warrant his instruments to work in bright sunshine, no light leaking in during any of the manipulations that must be done in the field? Till such cameras are made, cloths are necessary, however the focussing is done. With such cameras, a focussing cloth would be a luxury.

It is obvious that a cloth is not necessary for focussing when an eye-piece is used, as by T. Bolas (November 3, 1881); also any dark chamber behind the focussing screen obviates the need for a cloth, nor is it required where the focussing is done by looking through a hole in the camera on to the front of the screen. It would be waste of space to catalogue the numerous cases where these or similar conditions are to be found, even though in some cases the inventors specify that a cloth is not necessary; but the following deserve mention as having been designed for the especial purpose of getting rid of the focussing cloth. J. Mawson (November 13, 1855) says:—"I also place at the back of the camera a shutter or screen, which serves as a permanent focussing cloth, which, when not in use, folds down and fits into the body of the camera." J. H. Blamires (November 24, 1879) seeks protection for the novelty (!) of using a dark chamber instead of a focussing cloth.

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[*] Continued from p. 717.

[*] A convenient way of observing whether the plane of a picture coincides with a polished surface, is to draw a coarse network of fine lines upon the polished surface, and to view the picture and network with an eye-piece, moving the eye-piece gradually to and fro. If the planes of the lines and the picture exactly coincide, the same position of the eye-piece will show both at their maximum sharpness, otherwise a slight movement of it will improve the sharpness of the one, and deteriorate the sharpness of the other.

Notes.

Those who wish to make a transparent medium for flexible negatives may, perhaps, take a hint from information contained in a recent issue of the *American Druggist* The paper—which one may suppose should either be unsized or very slightly sized—is soaked for some days in copal varnish, and allowed to dry. When dry, the surfaces are polished, by rubbing down with pumice stone; after which a layer of soluble glass is applied, and rubbed in with salt.

In preparing the material as a basis for the gelatino-bromide film, salt should not be used, but the soluble glass must be applied with a rubber of cloth, or something similar. Emulsion flows readily on a varnished surface prepared with soluble glass.

An "enthusiastic admirer of the Metropolitan Fire Brigade" has made a suggestion which should have been made public before the tide of the General Election set in, if he really wished it to attract attention. Starting by disclaiming any practical knowledge of photography, he goes on to propose that a photographer—let one be tried to begin with, he says—should be officially attached to the head-quarters of the Fire Brigade, and that his services should be utilized at Captain Shaw's discretion at any fire which, either from its proportions, or the nature of the risks involved, promises to afford the best field for his efforts. Perhaps even now, however, our readers do not quite catch the purport of the "E. A. of the M. F. B.'s" suggestion. Let us hasten to explain, then, that the object of the official photographer's presence is that "a series of faithful and realistic views may be obtained of the various thrilling episodes in which firemen risk their limbs and lives."

In short, he hopes that in course of time, thanks to the photographer's presence, each fire station will contain a picture gallery of the deeds of heroism which make the Brigade famous," the results being that new firemen will be incited to future acts of gallantry, whilst those who have distinguished themselves will have their memory ever kept green by infallible photographic testimony of their daring." With all due deference to the good intentions of this ingenious correspondent, we certainly do not think his notion could be successfully carried out. An official photographer in the glare and bustle and tumult of a great fire would of course work under the most serious disadvantages. Nor does it seem from past experiences that the London fireman needs the incentive of a photographic record of his gallantry.

The tendency would be, we fear, were the suggestion actually carried out, to make the official photographer a too common adjunct of public life and action. If the Fire Brigade went into action with their artist in attendance, we should next hear of a camera being attached to each Police Division, and of constables on perilous beats being dodged by a photographer with a store of dry plates in readiness in his pocket. And then, possibly every pack of fox-hounds famed for its hard riding, would have its official photographer accompany the hunt with a portable camera fixed on his saddle; whilst by a further development of the same idea, each county cricket club would have its photographer on watch in the scoring tent, with the batsman in focus, and his camera, so to speak, "at full cock." And even football clubs would begin to have negatives of their most prolonged "scrimmages," produced by the committee's own photographer.

Abney's experience with emulsion paper for negatives will interest our readers. "I prepare it myself," he says, "and sixteen sheets which I took out yielded me twelve good negatives." "To prepare the paper," he continues, "I laid a sheet of moist Saxe paper on a glass plate a trifle larger than was absolutely necessary, and I cemented the edges with gelatine, after which the paper was allowed to dry."

"It was then just as easy to coat the covered plates with emulsion, as if they had been plain glass." "The emulsion used contained about 5 per cent. of glycerine—that is to say, 50 cubic centimetres of glycerine were added to each litre of emulsion."

Captain Abney found that the glycerine in the emulsion caused a certain repulsive action, which he overcame by immersing in a glycerine bath before developing—one of glycerine and twenty of water.

Many lenses, even from the best houses, become tinged with yellow after being in use for some time, owing to the chemical action of light upon the material of the glass. This yellow colouration, although so faint as to be hardly noticeable, materially affects the rapidity of the lens, since it prevents the passage of the most actinic rays. To detect the yellow hue, lay the lens upon a piece of paper of a very pale blue tinge—such as blue foolscap—when even a very slight degree of yellowness will be easily perceived.

It is curious that travellers who take journeys of more than ordinary interest, and who rely upon photography to secure them absolutely accurate mementoes of the anthropological and geographical aspects of a country, are not more particular in satisfying themselves that apparatus and materials will not play them false. A few weeks ago we instanced the case of Mr. Stavely Hill, who imagined he had obtained some valuable pictures of floating icebergs, but discovered afterwards that the dealers had omitted to place plates in the double backs. We have now Mr. Hallett, the pioneer of railways in Siam, failing to get a single photographic record of his experience in this interesting country, because the plates he had with him were not suitable for a hot climate. The disappointment under such circumstances must be exceedingly keen.

The photo-mechanical printing competition has not, to use a homely expression, "set the Thames on fire," nevertheless a large number of competitors, we are assured, has entered. A few specimens, as we noted some time ago, were hung at intervals in the space allotted to them in the Inventions Exhibition, but the collection was so incomplete, and the method of classification so confusing, it was impossible to institute any comparison. We understand that the samples exhibited by no means represented the extent and importance of the competition, with the results of which it is to be hoped the promoters will be satisfied. Necessarily the competition occupied a considerable time, as the drawings to be copied were the same in each case, and a number of foreign firms entering the lists, the delay incurred in transit was considerable.

The oldest-known lens is one made of rock-crystal which Layard unearthed during his excavations at Nineveh. It was exhibited by Sir D. Brewster, at the British Association meeting in 1852, and is now in the British Museum. Its use was probably that of a magnifying glass to aid in the execution of the beautifully-engraved gems of coeval date. Lenses were first introduced into Europe during the eleventh century—about the time when William the Conqueror was invading England.

The well-known newspaper correspondent and explorer, Charles Marvin, is lecturing on "The Region of Eternal Fire," the petroleum district which lies round the Caspian Sea. Mr. Marvin's lecture is made doubly effective by lantern slides—from his own photographs—one of which shows an oil-well spouting up a column of petroleum to the height of 130 feet. It appears that when the boring is first made—if the oil be tapped—the pressure is so great that the liquid is forced out as a gigantic jet.

"Papa, potatoes, poultry, prunes, and prisms," Mrs. General's famous recipe for giving a pretty shape to the lips, must sink before the formula of a photographer whose nationality we cannot fix, though we fancy from internal evidence that he must hail from across the Atlantic. This authority recommends to ladies who want a serene and bland expression in their portraits, to say "Bosom" just before sitting, and keep the expression during the exposure. If, on the other hand, she wishes to assume a distinguished and noble bearing, she must say "Brush," the effect of which is infallible. If she has a large mouth, it may be reduced by exclaiming "Flip"; if, on the contrary, it is too small, all she has to do is to say "Cabbage." In the case of a mournful expression being required, "Kerchunk" will produce the requisite effect. If a resigned look is wanted, forcibly ejaculate "S'cat." We have doubts as to the efficacy of the last two words; any way, photographers had better keep the formula in mind.

At the last meeting of the Royal Astronomical it was announced that a photograph of a part of the Way had been received from the Brothers Henry, of Paris Observatory. It was stated that the exposure w an hour, yet the star discs were perfectly round and sharp, showing that the driving of the telescope was practically perfect, and that the object glass had been corrected with great nicety for the photographic rays.

As a matter of photographic history, it is worth noting that the first person who took two portraits in different positions on the same plate, was probably a Paris photographer, living in the Rue de Bac. In the *Journal pour Rire* for 1850, we find him advertising: "A professor of portraiture, author of a system to take portraits of one self, has just invented a Daguerreotype, to reproduce the same person in different positions upon the same plate."

A well-known comic actor told us the other day of an odd photographic experience which happened to himself. He had had his photograph taken in a dozen different characters, and, with the dozen portraits arranged in one frame, was travelling proudly homeward in a four-wheeled cab. The frame of photographs was standing on the front seat, and he was gazing fondly at it from the back seat, when suddenly the horse fell down, the cab stopped abruptly, and our friend was precipitated head first through the photographs, and while the frame hung round his neck pillory fashion, the portraits were distributed over the cab. As he drily remarked, he had never appeared before in so many *pieces*.

The cultivation of the vine is of supreme importance to our neighbours across the Channel, and naturally all that concerns its ailments is of interest. An exhibition is therefore proposed of the diseases of the plant, wherein not only specimens of the real thing are to be shown, but photographs and paintings also. It is rather unkind of a Parisian paper to point out that the same thing was done when the potatoe disease was exciting attention, but that the exhibition did no good, as the potato turned over a new leaf of its own accord. But, if we remember rightly, there were no photographs at the potato exhibition. This may have been the cause of the failure.

The amateur experimenter, Michelson, finds that in carbon bisulphide red light travels about two-and-a-half per cent. faster than blue light; a fact which is in accordance with calculations previously made from theoretical considerations.

At the London Institution, Finsbury Circus, Captain Abney will lecture upon "Light and the Atmosphere," on December 17th.

Photographers who go in for "moonlight effects" should be careful to put the moon in the right place. We saw the other day a photograph of a ship which was supposed to be taken by moonlight. There were the rays on the water

, ere was the moon. The first were e secon s obviously "put in." Unluckily, r place f e moon, according to the shadows ections, was immediately in a line with the main ; but the "artist," doubtlessly thinking that if he put moon there it would look like a semaphore apparatus r a storm signal, stuck it at one side. The effect was exceedingly droll.

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Patent Intelligence.

Applications for Letters Patent.

14,081. Henry Kerridge Judd, senior, and Henry Kerridge Judd, junior, 166, Fleet Street, London, for "Improved method of making book-covers with movable pieces connected therewith, for exposing or closing up photographs, pictures, inscription cards, and the like fitted within said covers." - 17th November, 1885.

14,082. Henry Kerridge Judd, senior, and Henry Kerridge Judd, junior, 166, Fleet Street, London, for "An improved method of making covers for books, with facilities of inserting photographs or pictures therein at will."—17th November, 1885.

14,205. James Ashford, 179, Aston Road, Birmingham, for "Improvements in portable stands for photographic cameras and other similar purposes."—20th November, 1885.

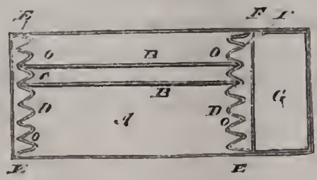
14,239. Charles Henry Stanbury, 24, Southampton Buildings, London, for "Improvements in portable dark chambers for photographic purposes."—20th November, 1885.

Patents Granted in America.

330,182. Vincent M. Wilcox, New York, N.Y., assignor to E and H. T. Anthony and Co., same place, "Photographic plate-box."—Filed May 27, 1885. (No model.)

Claim.—1. In photographic plate boxes, the adjustable and removable corrugated or notched spring-partitions, and adjustable or removable block or wedge G, substantially as described.

2. In photographic plate boxes, the adjustable and removable corrugated or notched spring-partitions having extended or widened sides E, as and for the purpose described.



3. In photographic plate boxes, the adjustable and removable corrugated or notched spring-partitions, normally longer than the interior dimensions of the box A, so as to adjust and retain themselves in position therein, as described.

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FRENCH CORRESPONDENCE.

Louvre Museum—Conference on Photography—French Term for the Woodbury Process—Photographic Society of France—Carte d'Identity.

Photographic Rooms at the Louvre.—The firm of Braun and Company have been treating with the Fine Art Directors for the right of reproducing the works of art in the Louvre, and also for selling the photographs in the building, for which purposes a studio, with sale and exhibition rooms, have been granted them. The President of the Republic went on the 7th inst. to inaugurate these rooms, accompanied by the Fine Art Directors. The *Chambre Syndicale* rather demurred at the privilege accorded to Messrs. Braun and Company, but the Directors answered that the Administration had the right of allowing it. Still, much might be said on this point, as we have come to regard the museums as part of the private domain of the State.

Photographic Conference.—The Directors of the Trades' Exhibition at the *Palais de l'Industrie* have arranged a series of conferences at the Exhibition for the benefit of the State High School Scholars. Photography formed the subject of one of these conferences, and it was entrusted to me to open. I took for the title of my paper, "Photography for Everybody's Use," and showed small portable apparatus with which everyone might practise photography as a pencil and delineator possessed of exactitude and precision. The photographic section of the Exhibition was so small that it was useless to conduct my audience round after showing the remarkable views of Chantilly taken by M. Chalot.

Woodbury Process.—Since our late friend Woodbury arranged with Goupil and Co. for the sale of his patent process, it went under the name of photoglyptie, a word signifying engraving by light, but otherwise not recalling anything whatever of its nature. It has been proposed to change the name for that of Woodburytypie, as in England, and thereby render homage to its inventor. It may be objected that personal names are inadvisable to be used, but to overcome this objection I can cite as a good example the word Daguerreotype, which remains absolutely attached to Daguerre's invention. The Chambre Syndicale and the Photographic Society of France have been called to deliberate on this motion.

Photographic Society of France.—After two months' holiday, this Association met on the 6th inst. Of course new instantaneous shutters were presented, but of no real novelty in construction or action. Some remarkable pictures by M. Chalot attracted our attention, and also reproductions of horses trotting and at a gallop by M. Hielkel, shown on the screen in an enlarging lantern by M. Molteni with oxyhydrogen light. Among others was one of a horse leaping over an obstacle, all four hoofs in the air. M. Hielkel used the Paget plates and Thury and Amey shutter. At the present moment, matters seem to have come to a standstill in photography, but its applications are expanding in all directions, and amateur work will eventually, no doubt, bring out more useful and worthy results. Rome was not built in a day, and photography, mere infant as it is, has been making giant strides, so we must not be astonished if it should have to pause for breath now and then.

Photographic Carte d'Identité.—One of our most important journals, the *Figaro*, has issued to all its subscribers, as premium, a *carte d'identité*, the photographing being executed by M. Liebert. I think professional photographers would gain a good deal by pushing this kind of work into popularity. I should also like to see the postage stamp portrait made useful. It might be turned out in a convenient form without much cost. I should think a hundred ready-gummed and perforated could be produced for four shillings. This idea is thrown out for any other widely circulated journal to take up. Leon Vidal.

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A CHANGING BOX AND A DETECTIVE CAMERA.

BY R. OFFORD.

Some five years ago, in photographic circles, the cry was raised of "Down with the old silver bath, and long life to dry plates." To parody the poet Laureate (ye gods forgive me)! many intended to say—

> "Bury the old bath,
> With no word of lamentation;
> Let us bury the old bath,
> To the sound of welcome to a new sensation.
> Glad to see an old friend fall,
> Silvery stains on a velvet pall,
> And dull days brighten when sitters call."

But we photographers are "fickle folk," and somehow we soon began to find, those of us who go view hunting, that to carry about for half a-day a dozen or two whole-plates in box or slides, with camera and tripod, was a sore trial to our strength, and very wearisome to the spirit, especially in lonely places, where it was difficult to prevent destruction of tissue by the timely application of internal preservatives. And, pray, how many years ago is it since we thought it no hardship to shoulder a folding dark tent, two tripods, some ten-ounce bottles, plates, camera (heavy), lenses, and whole-plate bath in case? Our strength was equal to that, even when we added a sandwich tin, and a case bottle that would have rejoiced the heart of Mr. Bob Sawyer, full of a special intensifier. And now, shades of departed "viewists," we want a large camera to weigh a pound, a tripod a few ounces; we banish dark tent, chemicals, and plates (we shall get rid of lens and camera soon), and then, posing à-la-Ruskin in rapt appreciation of the beautiful, we murder some more of his lordship's charming utterances, and jerk out :—

"The splendour falls on castle walls,
And snowy summits old in story,
The long light shakes across the lakes,
And the wild cataract leaps in glory."
Come, paper, come, catch the wild vision flying;
Welcome, paper, reel it off, glass plates are dying.

Dying, indeed! If so, what in the world is the good of a changing-box for glass, or of a repeating camera to hold some dozen charges for small game? Maybe just here lies the very reason why no time should be lost in presenting to the criticism of the faculty any practical idea which provides accommodation for plates, and not for paper. Besides this, perhaps, there yet remain some who have a notion that glass is better, especially for small work; and among these our worthy Editor may possibly be found quietly, but somewhat incisively, suggesting his customary "audi alteram partem," and acting up to his part as a veritable "chiel among ye takin' notes."

The accompanying illustration (Fig. 1) taken from a photograph of the interior of the changing-box, will enable me better to explain the simple principle upon which both it and the camera are constructed.

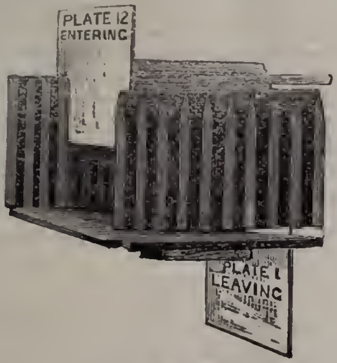

Fig. 1.

Roughly speaking, it is only an arrangement of flexible grooving, which, while it keeps the plates separate, allows of their being moved altogether in one direction. It is made of some inelastic material—by preference, stout silk, black, or better, crimson; a strip the width of longest diameter of the plates is laid down on a perfectly flat surface, and some 28 or 30 pieces of smooth wood one-eighth inch square are glued thereto, one-eighth inch apart by guage, quite parallel, and at right angles to edge. Upon joining the ends of such a strip you have an endless rack, which will move freely if slipped over a piece of wood well smoothed and blackleaded, with rounded ends. The construction of this band of grooving will depend much upon the size of plate to be used; with large ones it would, no doubt, be necessary to make the wood wider, and screw it or rivet it, as well as glue it, from behind, providing rollers for the ends grooved to take screws or rivets. I find glue quite strong enough for small plates. Two such endless racks are placed opposite each other (like the sides of a plate-box) with a smooth woode between them, the grain of which should go fro end. In the illustration the grooving is shown too and too wide apart.

At one end of the case that contains this rack, on top, is a slot through which the plates pass, droppi through a pair of grooves as usual. A small knob at the same end of case actuates a little spring plunger, which presses against the back of the plate and moves it forward one step; this leaves a pair of grooves open under the slot in case, and so the process is repeated until a dozen are in. The next movement of the plunger will force that one first introduced over the edge of the smooth base, so that it falls through a slot provided in bottom of case, and thence into the camera if held below. Each plate, after exposure, is allowed to pass from the camera, either by inversion, or by opening a slot beneath, into the top of changing box as it first entered; and so on until all are exposed.

This system is capable of a variety of applications which will suggest themselves to the ingenious photographer; but the manner of stopping of the light and opening slots in changing-box and camera, is perhaps worthy of a few words of description.

The rough sketch, fig. 2, shows the section of what I call a light tap, which is simply a tap with an elongated plug provided with a slot the greater part of its length, through which the plate can pass. This plug is best made of ebonite or hard wood, and its thickness must be determined by its length. I use less than $\frac{3}{8}$-inch tubing. They can work in blocks of wood bored to fit tube, and these are easily secured to any case. The simplest way of making them is to provide yourself with some of the new "vulcanized fibre" tubing $\frac{3}{8}$ or $\frac{1}{2}$ inch inside, and to turn a hard wood plug to fit and work smoothly therein. Plug and tube are both to be slotted, rather wider in the centre to avoid contact with sensitive surface, and a handle or milled head is fixed to one end with which to turn the tap, and so shut in plate and shut out light.

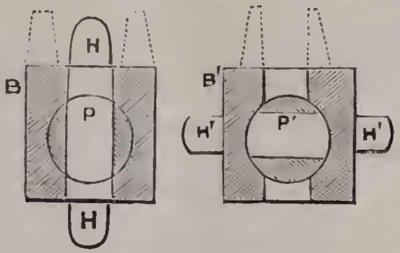

Fig. 2.

I see the vulcanized fibre is one shilling and sixpence per foot under one inch outside diameter. This is cheaper than ebonite, size for size; and although more costly than wood, it is very convenient, as two tubes can be obtained which fit one in the other, and so reduce the work of construction considerably.

In the sectional representation, B and B' are the blocks, P and P' the plugs, while H shows handle when open, and H' the same closed. The dotted lines above indicate the arrangement for temporarily joining two of them during passage of plate. B' is furnished with a projecting collar which fits into the top of that upon B, and a covering and lining of thick velvet makes a light-tight joint.

The manner of employing such flexible grooving for camera purposes will be easily understood. One condition must be complied with, and that is the backing of the plates by means of quick drying colour, as for interiors, &c. This is better done before they are cut up to size required.

If two pairs of such moveable racks as have been described are placed parallel one above the other, with the end of the top one projecting the distance of one clear same in the bottom one, plates can be to the other by gravity, with ease and ie upper rack is filled with unexposed plates, worked by two pairs of hard wooden clutches the outsides, and attached to slides in such a the lower rack is moved back one groove by a motion of the slides, while the return motion ces the upper one and drops a fresh plate ready for sure. Thus the exposed plates accumulate in the lower k, and can be removed through a slot in the bottom of e case. A contrivance to register number employed can be arranged to work by a ratchet-wheel moved by the action of the slide. The lens is immediately opposite to the lower set of grooves, and the rays of light therefrom cannot touch the unexposed plate above.

At the beginning of this year I tried some experiments with a view of ascertaining the best description of lens for a small detective camera, and arrived at the conclusion that nothing comes up to a short focus portrait combination stopped down. Instantaneous work in the open country, in sunny weather in towns, by the sea-side, or at sea, can be done with the ordinary rapid symmetrical type of lens. But for figures rather near the camera, and with a proportionably rapid shutter, I prefer a portrait lens of which the working open aperture is not more than $\frac{f}{3}$, but $\frac{f}{2 \cdot 5}$ is better. Such a lens will not be of very small diameter, and should be stopped down to about $\frac{f}{6}$ for single figures, or $\frac{f}{8}$ for groups, &c. For such a purpose, I found no shutter equal to one that works close to the diaphragm through the lens case. The lighting is equal all over; it is easily made compactly with a strip of black mackintosh, lined black, working on two small rollers provided with elastic band and catch, and it takes up very little room in camera.

The diagram (fig. 3) shows relative positions of parts in the camera. Upper and lower racks, the clutches, C C, the knob of slide for moving plates, K, the detent of shutter, D, contrivance for setting shutter, B, the shutter slot in lens at S.

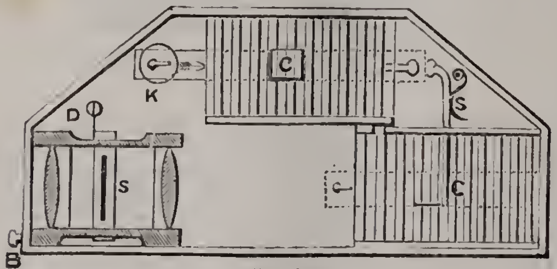

Fig. 3.

Presuming the camera is held under the right arm, these three movements at K, D, and B are out of sight, and yet just within reach of the left hand, as also is the flap at the end, which protects lens from injury and observation, and allows of shutters being set without light passing to plates.

The size of camera is a matter of taste, and is determined partly by size of lens and plates. I cannot see why anything larger than 2 by 2½ inches is necessary for the latter, even when the object is to obtain a useful memento of a suspected character as he passes along the street.

For legal purposes a small enlargement could easily be made, and by using collodion and bath, several duplicates might be ready at an hour's notice; while printing by development gives the power of putting hundreds into circulation in an incredibly short space of time.

I have had many discussions on the subject of the most appropriate outside for such an instrument, but have not yet had a suggestion which to my mind is any improvement upon that which I have adopted. Black bags are very well, but we do not usually carry them under our arm; besides, they invariably give us more room than we really require. Polished mahogany is, of course, too self-evident, with or without brass work. Even a dull black box has a smack of the scientific instrument, not to say old collodion about it, sufficient to excite passing curiosity. A leather box may have a harmless look, but fancy a London *gamin* saying to his "pal"—"Look, Bill, that 'ere bobby's bin an' got the jewl box wot slipp'ry Jim wor lagged for!"

But *a brown paper parcel* under the arm, cunningly devised by means of stout stuff double, and plenty of paste, so that it is really a thin case enclosing the box, and of a shape suggestive of two long books and two smaller ones on the top, with creases ingeniously put in before it dries; and perhaps a twist or two of string across or a bit of red tape straight from the office. Can anything be more innocent in appearance, or be more likely to pass without the slightest notice being taken of it? Certainly one might have *real* imitation books, with real bindings to form the cover of box, but that would be expensive, and useless unless done remarkably well. A Keily's Post Office Directory might perhaps do; but if seen much about under the arm of some member of the force, the red binding would attract attention to the bearer.

Two things are especially needed for success—a cool head and a steady hand. The face of the subject must be watched to note if the eyes stray to the operator's arm; and the camera must be held free from vibration, as at such close quarters it will not do for both camera and subject to move.

As to plates, my difficulty has been to get them rapid enough. None giving less than 26 on the sensitometer will do; a higher number would be better. With slower plates, one must work with larger stop or slower shutter; in either case losing sharpness. So-called instantaneous and "drop-shutter plates" are, in my experience, useless, giving about 21, or less.

I strongly advocate the use of potash or soda with sodium sulphite and pyro as being the best developer for short exposures; but some commercial plates do not work well with it. It is perhaps worth noting that the quickest plate I have ever had to develop clean pictures free from fog was the cheapest; but I cannot get such now.

Anyone able to say where such rapidity can be obtained, combined with freedom from mist or fog, might confer a blessing on many experimentalists. Indeed, I should like to see a commercial tournament for speed, with strict conditions, and well-known judges to superintend the tests.

PRACTICAL CHEMISTRY FOR PHOTOGRAPHERS

BY RALPH W. ROBINSON.

III.—Sulphite of Soda.

A great deal has been written and said both for and against the use of sulphite of soda in the developer, and indeed the advantage, or otherwise, attending its use is still a debated point. It has also been suggested as a fixing agent.

Now, this salt easily deteriorates on keeping, and as a large quantity is sold of inferior quality, it is very desirable to test every fresh sample, most especially when it is to be used in the developer, as for this purpose slight impurities in the chemicals are liable to land us among innumerable difficulties and perplexities.

The deterioration of the sulphite of soda is caused in this way. This body is an easily oxidisable salt represented by the formula, Na_2So_3. This has a considerable tendency to unite with oxygen to form the more stable compound, Na_2So_4, and in a sample which has been exposed to the air for any length of time, this action will be found to have taken place to a greater or less extent. By dissolving a crystal of the salt in a little distilled water in a test tube, addition of a few drops of pure hydrochloric acid, and a small quantity of solution of barium chloride, we shall find the presence of sulphate of soda marked by the formation of a white precipitate more or less dense according to the quantity of sulphate present.

On a reaction somewhat similar to the case of simple oxidation in the air, the estimation of the quantity of sulphite in a given sample is based. Iodine in the presence of water and a substance having a tendency to unite with oxygen, combines with the hydrogen of the water, leaving the oxygen free to combine with the oxidisable matter present. Thus in the case of sulphite of soda—

$$\overset{\text{Iodine.}}{I_2} + \overset{\text{Sulphite of Soda.}}{Na_2SO_3} + \overset{\text{Water.}}{H_2O} = \overset{\text{Hydriodic Acid.}}{2HI} + \overset{\text{Sulphate of Soda.}}{Na_2SO_4}$$

The first thing necessary, then, for the quantitative estimation of a sulphite is a standard solution of iodine. Place about 200 grains of iodine and a small quantity of potassic iodide in a small evaporating basin, which should be covered with another somewhat larger, and having a glazed exterior. This uppermost basin is filled with cold water. Heat by means of a Bunsen burner is then applied to the basin containing the iodine, which will gradually vaporise, and again condense in a pure condition on the bottom of the covering basin. From this it should from time to time be scraped, and the water occasionally changed, so that a low temperature may be maintained to insure complete condensation of the vapour.

Having thus purified the iodine, we weigh out 127 grains of it, and transfer to a litre flask. To this is added about half ounce of potassic iodide, which, though taking no chemical part in the process, greatly facilitates the solution of iodine. Water which has recently been boiled to expel dissolved air, and cooled, is added to the containing mark, and the flask thoroughly shaken until complete solution has taken place. The standard solution, containing 1 grain-equivalent of iodine to 1,000 c.c., is now ready.

We next require a solution of starch. Stir 1 part of starch with 100 parts cold water, and heat to boiling. Allow any lumps or other solid matter to settle, and pour off the clear solution for use. We are now in a position to test the sample.

Having thoroughly powdered a portion of the substance in a glass mortar, press between filter paper, the latter operation being several times repeated to ensure the removal of all water except that in combination in the crystal. Now weigh out any convenient quantity of the substance thus prepared—say 50 grains. Transfer to a 250 c.c. flask, and dissolve in that quantity of water. Having thoroughly mixed the solution, draw out 50 c.c. with a pipette, and run this into a flask, adding about 3 ounces of cold water. We thus have 10 grains of the sample for our test. Add to this a few drops of starch solution, and then from the burette run in standard iodine, occasionally shaking the flask well. As long as there is any sulphite in the solution the iodine will be converted into colourless hydriodic acid; but when all the sulphite has been converted into sulphate the iodine is left free, and forms a deep blue colouration with starch. This colour marks the end of the reaction, and we read off the number of cubic centimetres of standard iodine used. Suppose this was 78 c.c.

Now, a crystal of sodic sulphite consists of one molecule sodic sulphite, and seven molecules of water, which is thus represented—$Na_2SO_37H_2O = 252$. We find from the equation—

$$I_2 + Na_2So_3 + H_2O = 2HI + Na_2SO_4$$

that one equivalent of sodic sulphite requires two of iodine; therefore, 1,000 c.c. of standard solution $= \frac{252}{2}$ grs. of pure sodic sulphite crystals, and 100 c.c. $= \frac{252}{2 \times 10} = 12{\cdot}6$. The weight of pure $Na_2SO_37H_2O$ in the amount used for the test (10 grs.) is therefore found by the equation—

$$100 : \overset{\text{1 Equiv. Pure Crystal Sulphite Soda.}}{12{\cdot}6} = \overset{\text{C.C. of Standard Iodine Used.}}{78} : 9{\cdot}823$$

and this being known, it is of course an easy matter to calculate the percentage. I may here mention that in a sample of sulphite of soda which I recently obtained from a firm of good standing, as re-crystallised, I found as much as 18 per cent. of sulphate of soda, calculated as dry uncrystallised, Na_2So_4.

The iodine solution may also be used for testing hyposulphite of soda, all the testing being carried out in exactly the same way as in the case of the sulphite. The analyst will easily calculate the results when he knows that the "hypo" crystal is constituted thus—$Na_2S_2O_35H_2O = 248$, and the action of iodine on "hypo" is represented by the equation—

$$I_2 + 2Na_2S_2O_3 = Na_2S_4O_6 + 2NaI$$

Therefore, 100 c.c. standard iodine are equal to $\frac{248}{10}$ grs. of "hypo."

It must be borne in mind that iodine solution will not keep its proper strength for any length of time, and is for that reason best prepared fresh, and, if kept at all, it is best preserved in the dark, in bottles filled right up to the stopper.

Errata.—In No. II. of these articles, page 708, the weight of chloride of sodium should be 58·5 grs., not 585 grs., as printed. Also at bottom of first column, page 709, the proportion should be—

$$100 : \overset{\text{C.C. of Silver Solution.}}{\frac{111}{2 \times 10}} = 50 : x$$

THEORY AND PRACTICE OF PHOTOMICROGRAPHY.

BY MAURICE N. MILLER, M.D.*

To sum up, therefore, we may say that a great deal of very fine work can be done in photomicrography with the secondary mirror, the centering sub-stage, and an ordinary microscope stand. I should rather discourage attempts that had not these facilities in contemplation at least. Much amusement can doubtless be secured with less than I have indicated; but it is not to these idlers in science that I am speaking here.

I desire now to refer to some matters connected with our subject, more especially the outgrowth of my practical work.

As to lenses. What objectives are best? I think I can safely say this: As a rule, the lens that is found to produce the very best photomicrographic pictures will also be an excellent lens for general microscopic work. It is no longer necessary to look for lenses corrected for photography. This idea is a delusion and a snare. If you have a lens that works well on tissues, you need not be afraid to try it on these subjects in photography. If you have a lens specially made to resolve the *amphlipleura pellucida*, why try it on *amphipleura*, and don't try it on anything else. Occasionally you will find an objective that, for some reason unknown to men and opticians, does excellent photographic work. You order a duplicate, and it is a dead failure. I have in mind an instance in which the great and lamented Tolles made three several and separate attempts to duplicate one of his previous lucky hits, and signally failed. I can—and I say it with regret—only say, try. There is no certainty about it. Of one thing you may be sure: a poor, cheap lens will never make successful photographic pictures. I have a one-sixth by Miller Bros. not specially made for photography, which, they frankly tell me, they would not guarantee to copy. The most successful pictures the world has thus far seen have been made with the objectives of Powell and Leland, Tolles and Zeiss, although the great master of this art died before he could give a final verdict respecting many of the latter maker's lenses.

From the little I have worked with the very low-priced lower powers of this cunning optician, it seems probable that they will prove most excellent lenses for our purposes. There is no necessity, however, in importing lenses, unless it may be in certain instances where the expense is the most important item, for the objectives of William Wales, of our own city, have produced some excellent pictures, and we owe much to his patient work in the direction of producing lenses for this special work. I must, however, repeat my original opinion, that success will more generally be gotten by trying first-class working glasses than in attempting the construction of lenses specially corrected for photography. I have no special theory on the matter. The statement is made only as a result of experience with very many trials with almost every known maker. For low amplification, almost any first-class microscope objective will answer. It is only when the higher powers are required that the striking difference in objectives will be apparent.

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* Continued from page 701.

It will not be found sufficient to simply attach a lens to our apparatus and proceed, leaving the glass to work out its own salvation. The same delicate correctness of thickness of cover, the same careful preparation of immersion fluids, and the same patient adjustments for illumination are required in photo-micrography as in ordinary microscopy.

To be concluded.

Correspondence.

THE PHOTOGRAPHIC EXHIBITION.

Dear Sir,—Would you kindly allow me to answer the "criticisms" on our pictures in your paper of Nov. 13th, p. 722. "W. A. Skill's picture (No. 442) is certainly more appropriately labelled on the frame 'By the Highway Side,' notwithstanding the man has moved a little.,' This is a mistake; the man has not moved at all; the exposure being brief, it is out perfectly sharp on the plate, and the print we sent to Pall Mall was also.

The next criticism: No. 593: "'A View of the Choir, Lincoln Cathedral,' is a well-lighted interior, but the uprights are a little out." Yes, the uprights are a little out, but not through any fault of the camera, lens, or myself. We have used a level most exclusively for the last five years, both in landscape and, most particularly, in interiors; and the camera is perfectly rectangular, and the lens a Dallmeyer's rectilinear. The explanation is this:—The portion of the choir in which the stalls are placed was built by St. Hugh, of Grenoble, in the year 1192, dated as the earliest Gothic in Europe. The vaulting shafts in all his works went right down to the ground or base moulding, same as now seen on the Continent in Early Pointed work. But about the year 1380, when the Early Perpendicular style was just coming out, the four bays on each side of the choir had their vaulting shafts taken away up to about two feet above the cups, and Early Perpendicular corbels inserted to carry the remaining portion of the shafts, and also making the corbels throughout the Cathedral all uniform, but weakening the piers, which were afterwards stone-propped. The removal of the shafts made more room for the then new stalls, and the stalls on the north side hang considerably over south; while the south ones are not particularly vertical, hence the deception; but further, the cutting away the vaulting shafts and the building of the broad tower brought another trouble, that is, the peculiar hour-glass distortion of the choir walls, and with this and the north stalls leaning most palpably forward, what is to hinder a stranger from thinking that the camera was cocked?

N.B.—How would the camera have to be put to make the lines straight?

The photograph was not placed before the Parent Society to show off either the rectilinear lens, or the upright lines of the interior; it was merely a technical one.

"*A Well-lighted Interior.*"—Now, if he had said a well-exposed one, I should have understood him. It is the darkest I have had to contend with for years; and, what's worse, the distance is exaggeratively light—that is, plain glass in the side windows, blue glass predominating in the east one, and the fore part black oak stalls, and heavily-stained clerestory windows. It requires tremendous patience in exposing, and, further, it was taken with the smallest stop.

I here venture this statement that you cannot find up to the present moment, photographs taken by professionals and amateurs, and our Lincoln photographers, that are as comparatively sharp, and yet have the east window in their plates clean, and showing most of the stained glass patterns—that is, with clear details in the lights.

I have placed a fresh photo of this interior in the last three times I exhibited at Pall Mall East, thinking it the best subject I could find for displaying the technics of exposure and development, and this is the first time it has received a criticism. The judges are not likely to think much of the technical character of the photo if it is a well-lighted interior.

Sorry to have occupied so much of your valuable space, I remain, yours sincerely, F. J. Skill, *pro* W. A. Skill.

58, *Bailgate, Lincoln.* *November 24th*, 1885.

PAYING FOR ARTICLES OR WORK ADVERTISED.

Sir,—It is often to be regretted that we have not, in this country, a system similar to that known in France as *contre remboursement*, or payment on delivery. When sending away for goods, the customer is either at the mercy of the seller—when he sends his "cash with order"—or he who sells must risk the integrity of his customer as to whether the goods supplied will ever be paid for at all. In photogrographic matters another point occurs, of which I am experiencing an annoying illustration.

About two months ago I sent a negative (with cash) to a firm who, from advertisements, look respectable enough, to be enlarged for a guide, and it was only after repeated applications that I obtained a curt acknowledgment of the receipt, and a regret for the delay. Since then no further notice is taken, and I have neither my negative, enlargement, nor cash. This man may argue that the order was only trifling, and not worth attention; but if he advertises to do enlargements, and states his price, it is little short of fraud to say, "Well, I only agree to do them in an unlimited time." Unfortunately this case is not worth arguing legally, or I should take some pains to expose such a system, if only to warn other customers.

Now as to the French system. When we had a sitter who did not pay at the time the copies were sent *contre remboursement*, and the cash paid to the postman on delivery, when sending for plates from Paris, I paid for them to the carrier's agent. In the case of disputes I believe each party paid carriage one way; but the effect of this check was that the goods were generally according to order, and delivered within reasonable time, so that disputes very rarely occurred. The nearest approach we have to this is the deposit system through the *Exchange and Mart* paper, which must pay the proprietors of that journal liberally. It occurs to me, might not an improved edition of this system, emerging from the Photographic News Office, be of great value to country photographers, and a protection to both sides? A small fee would scarcely be grudged when it insured fair business dealing and a bar to roguery. I merely give this suggestion, which may be worth discussing, but I strongly advise all photographers (who value their own reputation and promises to customers) to get a lantern and make their own enlargements.—Yours obediently, W. Shaw.

Proceedings of Societies.

Photographic Society of Great Britain.

A monthly technical meeting was held on Tuesday last, the 20th inst., in the Gallery, 5a, Pall Mall East, W. England in the chair.

A. Cowan exhibited an ingenious contrivance, by which emulsion plates can be successively carried under a cooling chamber, the traction being effected by a double line of cord.

J. A. Harrison handed round a wooden measure for guaging out known quantities of dry pyrogallic acid.

A fence or shield for guarding the diaphragm-slot against the entry of light was shown by W. M. Ayres.

F. Greene exhibited a model of a changing-box; after which

J. A. Harrison referred to the fact that he had long ago invented the kind of multiple-back which was subsequently modified so as to form the revolving album, and which has been several times since re-introduced as a camera-back.

J. H. Harrison showed a season ticket, bearing a portrait of the beneficiary, and also examples of portraiture from Italian studios.

F. Shew exhibited a roller slide with detachable rollers.

W. England next exhibited a very compact and convenient arrangement for electric light and the developing-room, two cells of bichromate battery being used, and a two-candle incandescent lamp.

London and Provincial Photographic Association.

In accordance with a previous announcement, the first of a series of smoking concerts took place on Thursday, the 19th inst., at the Mason's Hall Tavern, Coleman Street, E.C., the Hon. Secretary (J. J. Briginshaw) presiding.

There was a somewhat large gathering of members and their friends, many of whom entertained the company with music and recitations of a high order.

The second of the series will take place on Thursday, Jan. 21.

Photographers' Benevolent Association.

The Exhibition of the Photographic Society of Great Britain was, by the kindness of that Society, open on the evening of the 13th, in aid of the Benevolent Association. The attendance was very fair, and the visitors evidently appreciated the excellent collection of photographs contained in this year's exhibition. At nine o'clock the optical lantern of the Society was brought into use, and about one hundred and fifty slides were passed through, the last to be shown upon the screen being an excellent portrait of James Glaisher, F.R.S., who, as W. S. Bird, chairman of the Benevolent Association, remarked, had devoted his life to scientific investigation, and the Photographic Society of Great Britain were all proud of their president. Many years ago, whilst in pursuit of meteorological science, he, in company with the celebrated Coxwell, the æronaut, left Woolwich for a trip amongst the clouds, and they reached an altitude little short of seven miles, the highest ever attained by living man. Coxwell became insensible, and shortly afterwards J. Glaisher had the greatest difficulty in opening the valve to descend. Fortunately, the record of their instruments and investigations were preserved, and had proved of the greatest value to meteorological science. He moved that a hearty vote of thanks to the Society be given, which was carried unanimously, as was also one to those gentlemen who had placed their slides at the disposal of the Association, amongst whom were T. Beasley, Jun., W. England, A. L. Henderson, A. Cowan, H. Smith, and others.

Dundee and East of Scotland Photographic Association.

A special meeting of this Association was held in Lamb's Hotel to witness an exhibition of magic lantern views, with descriptive lecture by J. W. M'Call. The views comprised choice bits from the rock scenery of Land's End, the Lizard, St. Michael's Mount, and along the coast of Cornwall, embracing the more notable features of the Scilly Isles, with a number of views of the coast of Devon. An interesting feature of the exhibition was the display of signalling apparatus used at Lloyd's signalling station at Land's End, with a description of how intelligence is conveyed between vessels and the shore by means of the code flags. The views were displayed with dissolving effects by means of the limelight, the oxygen gas being used in a compressed state, 40 feet of the gas being compressed within the limits of an iron tank not larger than a railway warming pan.

Hyde Photographic Society.

The usual fortnightly meeting was held on Wednesday evening, the 18th inst., in the Mechanics' Institute.

The minutes of the previous meetings were read and confirmed. G. A. Rattray was elected a member.

Edward McClean then proceeded to give a demonstration on his method of making transparencies, by using iodised gelatine, in the place of iodised collodion, in the silver bath. He said that he first coated the plate with iodised gelatine, and allowed it to set; then sensitized it in the bath by allowing it to remain in about thirty seconds. Immediately after being taken out of the bath, the plate was washed under the tap, in order to wash out all the free silver, after which it could either be exposed at once, or allowed to dry, and exposed within two or three days afterwards. He thought that the process was much simpler in manipulation, and gave warmer tones than the usual wet-plate transparencies.

Cartwright thought that the results shown were much nicer in tone than the wet plates, which were generally of a very cold and inky tone.

J. C. Cheetham thought the process was very similar to the collodio-albumen process.

After a warm discussion, the President announced that at the next meeting A. Batty would give a practical demonstration on the "Development of Dry Plates," which would be specially interesting to beginners.

The Photographic Society of Philadelphia.

Minutes of the stated meeting held Wednesday evening, November 4th, 1885, Joseph W. Bates in the chair.

The minutes of the last stated meeting having been approved, the Secretary read a notice in regard to the third annual exhibition of the Boston Society of Amateur Photographers, which, it was announced, would be held in the rooms of the Boston Art Club, from November 24th to 28th.

The resignation of C. H. Mann was read and duly accepted.

The Exhibition Committee reported that arrangements had been made to hold the Exhibition in the Galleries of the Pennsylvania Academy of the Fine Arts during the week beginning January 11th, 1886. It would be kept open day and evening, and it was proposed to exhibit the lantern slides sent to the Exhibition in the Lecture Room of the Academy upon one evening during the week. It was also stated that all restrictions as to including pictures of different classes in a single frame had been withdrawn. The pictures could not be hung by classes, but all of each person's work would be hung together without regard to class.

J. Coates asked for the experience of members in the use of paper negatives; but few of those present had used them to any extent. An objection to their use seemed to be the oiling that was necessary. There was considerable difficulty in doing this properly, and it was mentioned that re-oiling was sometimes necessary. Some prints had been made without oiling with good success, though, of course, more time was necessary.

The question was asked whether any harm would result if, when intensifying a plate with mercury and cyanide of silver, the blackening action was stopped before it had permeated entirely through the film, the under side being left as whitened by the mercury. It was thought that the film should always be blackened entirely through to prevent future injurious action of the mercury. If this made the negative too intense, reduction could be resorted to to bring it to proper printing density.

F. McCollin showed one of A. S. Barker's "focal plane" shutters. With this shutter the exposure is made through a narrow slit in a curtain passing directly in front of the plate. In describing the shutter, he said: Every point of the luminous image formed on the sensitive plate in the camera is the focal point or apex of a cone of rays whose base is the field of the lens. A little study of this optical truth will show wherein Barker's focal plane shutter has a great advantage over other exposers. It will be conceded that any exposing aperture will occupy a less time in passing a given point than it would require to traverse the field of the lens, and as the print thus exposed contains the concentrated volume of rays from the whole field of the lens, the time is shortened without loss of actinic effect. Some photographers do not grasp this wonderful fact of the innumerable cones of rays proceeding from one base to all points of the plate; but every one knows that if he has a small stop in his lens, and removes it, he immediately increases the brightness of the whole picture—of the whole focal plane. A small portion only of the plate being exposed at any one time, it is protected from the action of the diffused light always present in the camera to some degree, especially when a large stop is used. The plate is also protected from any motion in the object, except in that portion which is actually being exposed. One of the pictures exhibited by F. McCollin shows the method of discharging Belgian paving blocks from a vessel. An iron tub or bucket has been hoisted from the vessel with upwards of a ton and a-half of granite blocks, and is seen overturned in the air, with the blocks falling to the pile on the wharf. These blocks in the air are as sharp as those lying on the pile below; and the dust made by the grinding of these heavy stones together is a striking feature of the picture. Mr. McCollin also exhibited two plates secured by A. S. Barker during a thunderstorm on

Thursday evening, October 29th. The scene was illuminated by a single flash of lightning for each plate, yet there is a clear sky, details of the landscape both near and far, and altogether a fair photograph of the stable and surroundings, considering the circumstances under which it was made.

W. D. H. Wilson also had a new shutter to bring to the notice of the meeting, being the latest invention of D. Presce, known as the "Duplex Shutter." This shutter is made to work between the combinations of a rapid symmetrical or rectilinear lens, a special tube furnished with the shutter taking the place of the original lens tube, so that it is preserved intact or otherwise when desired. The original diaphragm of the lens can be used. One of the most valuable features is that by a simple adjustment the shutter may be opened by the pneumatic release, remaining open as long as desired, and then closed by pressing the rubber tube a second time. This makes it a very perfect exposer for either time or instantaneous work.

G. F. Walmsley showed a new camera made by the Scovill Manufacturing Co., for copying and for making photo-micrographs. A number of valuable features had been combined in the camera. It was provided with a double-shifting front, of value in making lantern slides when a certain part only of the negative was desired to be reproduced. By detaching the rear portion of the bed, and attaching the camera to a tripod, it answers well for landscape or other ordinary work. In the centre of the focusing screen a small disc of thin glass was cemented, forming a surface suitable for the delicate focusing necessary for microscopic work. A door in the side gave access to the lens in the middle of the camera when copying.

C. Bartlett, having noticed that the substances used in treating the sensitive film for isochromatic photography were generally fluorescent bodies, suggested that experiments be made with æsculum, the active principle of the horse chestnut.

Talk in the Studio.

South London Photographic Society.—The annual meeting of the above Society will be hold at the Society of Arts, John Street, Adelphi, on Thursday next, December 3rd, at 8 o clock, when the election of officers will take place, and the annual report be submitted. J. Traill Taylor has kindly promised some notes on "Negatives on Paper." Members and friends will oblige by exhibiting specimens of this class of work. The annual dinner is fixed for Saturday, December 19, at the Holborn Restaurant.

A Simple Printing Device.—Major C. D. Durnford is good enough to send for our inspection a printing-in arrangement in which the frame is suppressed. It is like the hinged back of an ordinary printing-frame, and is fitted behind with two metal springs, each spring-end being fitted with a rubber-clothed shackle which can be turned over so as to grip the negative against the hinged back, so that it grips and keeps the negative and sensitized paper tightly in position during the printing process. The idea is well carried out, and the apparatus is likely to prove practically useful.

Composite Photographs at the Anthropological Society.—On Tuesday last some of the composite photographs of skulls, made by Dr. J. E. Billings, of Washington, were exhibited. These photographs have already been commented upon in our columns.

Abstract of Chapman Jones's Lecture at the Birkbeck Institute, November 25th.—A very dilute solution of cyanide of potassium is a good reducer for silver prints; ferrocyanide of potassium is a good reducer for blue (ferro-prussiate) prints; and ferricyanide of potassium with hypo is, perhaps, the best reducer for gelatino-bromide or chloride plates, whether negatives or positives. Ammonium salts are uniformly less stable than potassium salts; the latter are therefore to be preferred. When ammonia gas is dissolved in water, the bulk of liquid increases so much that the stronger the solution is, the lower is the specific gravity. Ferric chloride in contact with organic matter, such as paper, is decomposed by light into ferrous chloride:—Fe_2Cl_6 becoming Fe_2Cl_4. The decomposition of the citrate or oxalate of iron is similar. Bichromate of potash is quite stable alone, but in contact with organic matter, like paper or gelatine, as in carbon printing, it is readily decomposed by light, losing oxygen.

Photographic Club.—The subject for discussion on December 2nd will be "The Working Apertures of Lenses."

To Correspondents.

*** We cannot undertake to return rejected communications

A. H. E.—1. We advise the former. 2. Any of the dealers will supply them; see the advertising column. Do not forget, however, that instruments sold at a low price are seldom, if ever, quite satisfactory. 3. Try Spooner's, in the Strand, London. 4. Absolutely nothing. 5. It is impossible for us to conjecture what improvements may be made, but we should not advise you to put off buying for the chance of improvements being reduced.

M. R. Clarke.—We can only suppose that the prints have been treated with wax or some other body of a repellent nature, or that your glasses are soiled with traces of some greasy material. Clean the glasses with a mixture of ammonia, alcohol, and jeweller's rouge. To remove wax from the surface of the prints, apply benzoline with a tuft of cotton wool, and repeat the treatment several times with fresh wool and benzoline, giving a final wipe with clean wool. Take care not to work with the benzoline in the same room where there is fire.

G. C.—1. Make some stiffish starch paste, add lamp black; mix well, and apply with a small piece of sponge. 2. Use the following, but take care not to poison yourself with the fumes of the arsenic:—Nitre, 17 parts; Sulphur, 6 parts; Orpiment (yellow arsenic), 2½ parts.

J. Jones.—See page 402 of our volume for 1883. You can refer to it at our office.

E. B. Stewart.—Send a Post Office Order for 3s. to Dr. E. Liesegang, Düsseldorf, Germany, and you will get it by post. Or you can order it from a foreign bookseller: Williams and Norgate, Henrietta Street, Covent Garden, for example.

A. C. Atcheson.—All materials can be obtained from the Stannotype Company, No. 116, Great Saffron Hill, E.C.

Light.—See article by E. Frewing on p. 439 of our vol. for 1884.

J. M.—They can be obtained to order from any dealer in fancy articles.

L. Pugh.—See the articles recently published in the News by Major Waterhouse.

The Difficulties.—You should obtain Abney's "Instruction in Photography," as it not only answers all your questions, but contains a large amount of other information. We have not space here to give detailed directions for working complex processes.

R. Blakenouge.—If it contains information likely to be useful to our readers, we shall be glad to publish it.

H. S. Bordeaux.—The suggestion appears to us a good one, although, at present, we cannot conveniently adopt it.

L. T. Haakman.—It is not too late, and we are obliged to you for sending it. 2. It does not follow that there is albumen present, the name being, perhaps, a mere trade device. 3. As far as we know, there are, at the present time, no English makers of the article.

J. F. Shew & Co.—As it went into our waste-paper basket last week, we cannot return it to you. If you wish to publish your views on trade matters, you should do so in one of the usual methods.

Thos. Gulliver.—Your remark about the frequent re-invention of old devices is to the point. Taking photographic patents all round, perhaps one in fifty is novel, and capable of being successfully defended in a law-court.

Copyright.—1. You have no right to do as you propose, whether the photographs are registered in this country or not. 2. If we knew of any method by which you might do as you propose without subjecting yourself to the penalties of the law, we certainly should not think of instructing you in it.

S. E. A.—A black bituminous varnish. That sold as Bates' black answers very well.

W. T. Wilkinson.—1. Thanks for the note, and memo calling attention to the misprint. 2. With respect to this matter you will hear from our publishers.

H. W. Bibby.—Your letter has been forwarded to W. J. Harrison, and it is to be hoped that many others will follow your example in assisting him in compiling his "Bibliography of Photography."

J. Howson.—1. As far as we know, there has not been any practical method of the kind introduced. 2. There can be no doubt as to the usefulness of such a method.

W. A.—An article on the subject shortly.

H. Austin.—A very small proportion at first, beginning with six or eight drops to the ounce.

W. G. Ebrac.—Dip it in a ten per cent. solution of bichromate of potassium, wash thoroughly, and dry.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1422.—*December* 4, 1885.

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SNOW EFFECTS IN PORTRAITURE.

Of all the days in the year least likely to attract clients to a photographer's studio, that upon which a heavy fall of snow occurs must take the palm. The reason is perhaps obvious enough, and therefore it is not necessary for us to enquire whether a more or less prolonged session of piercing winds have aided in inducing a stay-at-home feeling in the minds of the would-be subject, or whether a sudden temporary dejection has been brought about by the condition of the public thoroughfares. Whatever be the cause, there is but little doubt that very few portrait negatives are in request upon such occasions, and the photographer is allowed a period of rest, or rather, opportunity, to con over prospective novelties for more favourable seasons. It may be that on one of those interesting days we have alluded to, the plot was laid for producing the first photograph of humanity in a blinding snowstorm. Who can say? One thing is certain. Notman, of Montreal, was early in the field with work of this class, and he received much well-merited praise for some of his productions. More recently we have seen many good specimens illustrating the favourite pastimes of Canadians, the major portion of which were pictures that had much thought and care bestowed on them, especially from the neighbourhood of the celebrated Ice Palace.

In mentioning the Canadian efforts in this direction, we do not wish it to be inferred that snow effects have not been artificially produced by photographers in this country and elsewhere, or that there is any novelty whatever, in the modes of doing it, that an experienced photographer is not fully acquainted with; but the beginner is less fortunate in his knowledge of the past. Therefore, in the interest of the younger members of the craft, this article must be considered to apply, and we hope that it will afford agreeable pastime to many in the leisure at their disposal within the next few months.

The most important consideration is to secure a natural effect, and it will be readily understood that by paying due attention to the selection of dress and pose, more than half the battle has been won. Fur garments will at once be suggested as a valuable aid in choosing suitable costumes, and they have the further advantage of giving strength to the picture. In many cases, the three-quarter length is to be preferred to any other. Trees and tree-stumps form useful accessories, and an umbrella is by no means a bad piece of property; but it is better to hold it in a position that would cover the shoulders and back, rather than as an extinguisher of light to the head. Under the latter circumstances, even suppose it were held tolerably high above the head, only a flat uninteresting portrait could be obtained, owing to an entire absence of high lights, and consequently well-marked shadows in the face. Light backgrounds should be selected, since they materially aid in giving softness and harmony, while they also greatly assist in printing vignettes when such a proceeding is deemed desirable.

Those who have had some practice with chalks will find it an easy matter to sketch a charcoal outline of some winter scene, such as a snowscape with or without trees, and work a few lights in a rough manner. These are more effective in a general way than exteriors of buildings, &c. There are, however, several excellent designs expressly painted for this class of work, which can be obtained through the usual agents, who also supply foregrounds for use when taking full-length portraits in this manner. One or two sheep-skin rugs (undyed), and some light-coloured canvas, is also handy for the purpose.

Presuming a good negative of the chosen subject suitably posed has been made, and the size is cabinet, it should be varnished, and the flesh portions retouched in the ordinary manner. We should then place it, film uppermost, on a sheet of white paper, previously laid upon a flat table in a good light, in order to watch clearly the work as it proceeded. Daylight is preferable. An opaque colour is then applied to the varnished surface in a manner best calculated to resemble flakes of falling snow. There are several ways of doing this, but in the present instance we shall confine ourselves to one plan only, on account of its simplicity. We allude to the method employed by decorators in making imitation granite. Having roughly cut shields of paper, and laid them loosely on the face and other portions of the negative, which require more careful treatment, the colour is applied in the following manner. Charge a moderately hard tooth brush with an opaque water-colour—vermilion by preference, tolerably thick to avoid running—and draw it across the teeth of a comb, held a few inches above the negative; continue the work until a goodly number of splashes have been produced; the colour should be allowed to set before removing the shields to examine the negative, when, if found satisfactory, a few larger flakes and masses of fallen snow can be readily added with an ordinary touching brush, both sides of the negative being available for further manipulation. The face and other covered portions are completed by removing the shields, and springing small splashes of colour over some of those portions, to a less extent, from a touching brush sparingly charged with colour. When all the colour is thoroughly dry, a proof should be taken, and any necessary modifications made, after which the negative is ready for printing. In the event of failure at the last application of colour, or under any circumstances whereby it should become necessary to remove the colour, this can be easily done by a brisk rub with the hand in a vessel of cold water. Some varnishes quickly star under such treatment, but with a little timely care the negative does not suffer in consequence. It should, however, be observed that the negative must be quickly surface-dried with a soft cloth, and when quite dry immersed in strong methylated alcohol for a few minutes, dried spontaneously, and re-varnished, when, if expeditiously performed, no trace of the starring effect will be observable. This plan will also prove of service to anyone who accidentally gets a negative wet during rainy weather.

A FEW NOTES ON THE WINTER ART EXHIBITIONS.

BY WIDE-ANGLE.

Photography is very unkind to the painter, especially when it so happens the subject he selects is one which photography has made its own. I was much struck with this during a stroll round the Institute and Suffolk Street Galleries, just opened for the winter season. Take the sea, for example, as painted by the artist and as represented by photography. In a few cases the artist has got the true wave form, possibly assisted thereto by the study of photography; but in too many instances the sea is as unlike the real thing as it can possibly be. An ambitious study is that of Mr. A. Harrison, in the Institute (No. 48), entitled "A Wave." The picture is of considerable size, and contains nothing but the wave in question, which extends from end to end of the canvas. Such a subject must be true to nature, or it has no merit. But what has Mr. Harrison given us? A mass of pale, blue jelly, upraised some 7 or 8 feet, without the least semblance of motion. A sea which could cause such a wave would surely have some foam. But there is not a fleck in the picture. All is solid, transparent—too transparent, for the shore is sandy, and much must have been churned up by such a sea—unreal.

It is a pleasure to turn to Mr. Arthur Severn's "Breaking Waves" (No. 777). Perhaps the highest compliment which can be paid, is to say it suggests an instantaneous photograph. Here we have the turbulence of an angry sea finely rendered. The breaking waves have leaped up, their crests mingling and melting into two clouds of spray. You can *feel* that the apparently solid wall of water, between these two bursts of angry foam, will, the next instant, totter and be lost in the rush of the stronger wave behind. Photographers who have studied the sea with the camera will at once recognize the truth of Mr. Severn's observation.

Mr. Edwin Hayes' "Entrance to Great Sampson's, Guernsey," does not call for adverse criticism, save that in the sails of the fishing boat one misses that sense of breeziness to which the yachting pictures of Messrs. West have accustomed us. The flinging up of the water as the stem of the boat cuts it, is also wanting in that wonderful vigour which, in the photographs in question, is so suggestive of motion.

Mr. Fahey's "The Caistor Shoal" is worthy of commendation, if only for the glancing light on the right of the picture, which, from the tawny reflection cast up, distinctly shows the shallowness of the water, and indicates the sandy bed beneath.

Mr. Whistler, among his nine contributions to Suffolk Street, has several eccentricities supposed to represent the sea. The points of excellence in Mr. Whistler's peculiar work are, however, precisely those which cannot be criticised from a photographic point of view. They are "impressions" of colour, and as such depend upon the artist's idiosyncrasies.

It is curious when artists compare notes as to colour in nature as it appears to them, how they differ. It is only when they come to form that they agree, and here photography is a stern, unyielding critic. Judged by photography alone, the Suffolk Street artists are woefully wrong.

Just a few examples taken at random. W. C. Symons has given us, in "The Anchor's Weighed," a very pretty and interesting picture. The sailor, it is true, is more than a foot taller than the lass to whom he is bidding farewell, but this may be so with truth. I fail to see, however, why his boat should be so small that he must inevitably swamp it when he steps in. A. Ludovici's four panels of "The Seasons" (290) are attractive, but in one, at least, the lady is deformed.

"The Wood Nymph" (513) of J. B. Kennington is a study from the nude, very meritorious in some respects, but out of drawing in the lower extremities. R. E. Crompton, whose portrait has been painted by W. Carter, is obviously slipping off his chair, owing to the odd perspective of the latter. Photographers are not always happy in the selection of their models, but they could not be more unfortunate than W. A. Breakspeare, who, in his picture of "He cometh not," has painted a medieval maiden of such severe and forbidding aspect, that one is not surprised at the dilatoriness of the lover. As for Mr. Stott's "Portraits of my Father and my Mother," while I admire his filial piety, I can but sympathise with the unfortunate old people who have been, unconsciously of course, so caricatured. Photographs by moonlight are usually exhibited as curiosities, and for the same reason, I imagine, is hung Mr. Stott's "Moonrise" (292). The price of £300 is attached to the painting, to point the joke. Why these two pictures were admitted is one of the many mysteries attached to the Suffolk Street Gallery. Why is there not a photographer on the Council?

It must not be inferred from these remarks that there is not an abundance of good work in both exhibitions. But anything like a review of the fifteen hundred pictures they contain, is out of the scope of this article. The landscapes are by far the best; and, indeed, while so many of our figure painters continue to consider the picture of an old man or woman talking to a child—one gets quite tired of seeing this kind of thing repeated over and over again—as the limit of their ambition, landscapes are likely to remain so.

PRIZE SHUTTER COMPETITION.

The Chairman of the Society of Amateur Photographers of New York has issued the following Circular:—

Attention is called to the offer by Prof. W. D. Holmes, of the Photographic Laboratory, Lehigh University, of a prize of fifty dollars for "the best Instantaneous Shutter for Out-door Work," presented before February 1st, 1886.

The award will be made as soon as practicable after that date by a committee consisting of C. W. Canfield, Secretary of the Society of Amateur Photographers of New York; Prof. L. H. Laudy, of the School of Mines, Columbia College; and Prof. Randall Spaulding, Principal of the Montclair High School, members of the same Society.

Shutters already in the market, as well as those which are new, or are modifications or improvements of existing forms, will be admitted for competition.

The question of originality or priority of invention will not be entered into in making the award.

Only working models will be considered. These may be accompanied by explanatory drawings, if desired; but drawings alone will not be accepted.

Models must be sent, free of expense to the committee, before February 1st, 1886, addressed to C. W. Canfield, 1321, Broadway, New York, U.S A. They should be securely packed, and endorsed on the wrapper "Shutter Competition," and, so far as possible, should bear no distinguishing marks or names. A sealed envelope, containing the address in full of the person submitting it, should accompany each model. The models will be numbered as received, and will be known to the committee by number only, until after the decision is reached, when the accompanying envelopes will be opened.

It is a condition of the competition that the model to which the prize is awarded shall become the property of Prof. Holmes.

(Prof. Holmes' lens is a Beck "Autograph" Rectilinear; diameter of lens, $1\frac{1}{2}$ inch; outside diameter of hood, $2\frac{5}{16}$ inches;

size of plate, $6\frac{1}{2} \times 8\frac{1}{2}$; camera, ordinary "cone view." The committee recommend that the model submitted shall be adapted to the lens or apparatus specified. Further particulars as to sizes will be sent on application. If the model to which the premium shall be awarded is not of the proper size for this lens or apparatus, or cannot be applied at a distance, then a shutter, of the same model and fitting as the lens or apparatus specified, shall be sent to Prof. Holmes, or applied to his apparatus, free of expense to him, before the payment of premium is made. This condition in no way affects the title to or ownership of the patent; it is simply intended to secure for Prof. Holmes' own use a shutter of the chosen model.)

After the award is made the committee will re-pack the models and ship at the expense of the competitor to the address furnished.

Any models whose return is not required, or which are left at the disposal of the committee, will be placed in the collection of apparatus of the Society of Amateur Photographers of New York.

The committee will exercise due care in examining and testing the models, but will not be responsible for any damage which may happen to them while in their custody.

A copy of the committee's report will be sent to each competitor.

If printing blocks or cuts of shutters are sent with the models, they will be used in illustrating the report, and returned with the models.

For further information address as above.

* * *

PHOTOGRAPHIC APPARATUS AT THE ENGLISH PATENT OFFICE.

BY CHAPMAN JONES.*

Baths Attached to Cameras.

These are especially adapted to wet plate work, though, in many cases, the inventors state they are suitable for developing and fixing dry plates—that is, the old collodion dry plates. The main object is to be able to do without a dark room or tent, and so save trouble, and gain in portability. There is no need for such apparatus when using dry gelatine plates that will keep for months between exposure and development. The reflective mind will see in this section, the saddest chapter of the whole history. So much ingenuity and perseverance richly deserving success, though never successful; leading to nothing; suddenly blotted out by the advent of a radically different and far superior process. A quiet hour may be well spent in pondering the question—Is all this labour absolutely lost?

A dark tent may be reduced in size so that only the upper part of the body is enclosed in it; and still further reduction leads to a chamber into which the hands only are introduced, inspection of the operation taking place through windows of non-actinic glass. Such a chamber may be formed by continuing the camera backwards behind the plate-holder. Many inventors avail themselves of this idea. H. E. Palmer (November 26, 1856) appears to be the first who recorded this sort of apparatus in its simplicity, though more complicated modifications appear at earlier dates. Palmer manipulates by hand, as one would in the dark room.

The earliest attempt at sensitizing, developing, &c., abroad, without a dark tent, is by W. H. F. Talbot, (June 12, 1851), who has a glass cell in the back part of the camera, surrounding the plate, with a funnel at top, and a waste-pipe below. Exposure takes place through the wall of the cell, either while it is full of silver nitrate solution, or after the solution has been run off, and the developer, fixer, and water are introduced and removed as required. The invention applies particularly to the use of plates coated with albumen, in which is produced the almost insensitive iodide of silver by immersion first in a silver nitrate bath, and then in a ferrous iodide solution. Exactly the same method is described by F. Newton (October 2, 1852), and he applies it also to wet collodion plates.

The last-named inventor also gives a method whereby the baths required are pushed up through a hole in the bottom of the camera immediately under the sensitive plate, and immerse it as it hangs in a vertical position. E. Edwards (August 15, 1882) has two baths, one behind the other, that are pushed up through the camera bottom, for sensitizing and developing the plate respectively. The plate is supported so that it may be slid to and fro, to be over either bath, and the apparatus is worked in conjunction with a dark chamber extending behind the camera. Fixing and washing are done outside.

The majority of methods, however, move the plate into the bath, instead of, as above, bringing the bath to the plate, or keeping the plate in the bath the whole time. T. E. Merritt (August 1, 1854) allows the exposed plate to fall into a bath hanging from the bottom of the camera, under the plate-holder, by withdrawing a slide that closes a suitable aperture. The bath has a partition perforated at the lower part, and the compartment that receives the plate has a lid; the required liquids are poured into the open compartment, and drawn off by an opening below. A fixed time is allowed for development, as the bath is opaque.

The following inventors attach the plate to a rod that projects outside the camera, generally above, and so forms a handle to the plate, by which it is plunged into the baths. The baths are generally opaque. F. Newton (October, 2, 1852) holds the plate by its upper edge in a screw-clamp, and either has the baths outside the camera below, or inside the camera with a chamber above into which the plate is drawn to allow the baths to be moved. F. East (May 15, 1854) works a very complicated apparatus like a puppet-show. J. Purnell (April 9, 1857) sensitizes the plate in this way, but for development, he transfers it by hand to a closed bath, and removes it altogether from the camera. T. Lester (July 27, 1874) has three baths that slide under the camera, so that each in turn may be brought under the plate; and A. Malfroy, for J. B. David (May 14, 1875), has a similar arrangement, but moves the bath case by means of a rack-and-pinion, and has a reservoir to each bath, communicating by an india-rubber tube, so that it is raised to fill the bath and lowered to empty it.

F. Newton (October 2, 1852) and C. B. Gruner (July 8, 1862) hold the plate in a back or dark slide, that is removed from the camera and attached to the bath case. The operations are then exactly as described in the preceding paragraph. C. Pallu (December 28, 1860) carries the plate in a case with a sliding bottom, from which it falls into the sensitizing bath, is drawn up again by a wire, and then allowed to fall into the plate-holder of the camera.

Instead of a rod for pushing the plate down, W. Clark, for J. B. S. Blot (December 9, 1862), has a knob projecting from the screw-clamp that holds the plate, through a perpendicular slot behind the plate. The slot is covered with a strip of india rubber to keep light out. The clamp is caught at its highest position by a spring catch, that holds it up for exposing the plate.

Adhering to the same principle, the plate may be lowered and raised by a cord instead of a rod. P. M. T. O. C. Albites (March 2, 1860) has a cord passing over two pulleys, and uses baths of coloured glass to allow of safe inspection during development. J. Willcock for the same inventor (July 31, 1860) describes the same arrangement. C. B. Gruner (July 8, 1862) suspends the plate-holder by a pair of cords and pulleys, as a sash is hung. with counter balancing weights outside. R. A. Brooman, for J. J. L. R. de Lafarge (September 23, 1862, and February 11, 1863) has a developing bath of yellow or orange glass, and supports the plate in a frame that is lowered or raised by a piece of catgut.

A. M. Clark for W. A. Brice (March 10, 1876) and H. J. Haddan for J. Lefeuvrier (August 20, 1881) describe a plate-holder pivotted at the lower edge to the camera, so that it may be turned back to immerse the plate in a horizontal bath. A chamber behind the focusing screen is therefore necessary. The earlier inventor has strings fastened to his baths by which they are drawn into position from side cases.

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* Continued from page 760.

A horizontal bath is attached to the back of the dark-slide by B. J. Edwards (March 8, 1871) by sliding it in grooves. By withdrawing the sliding shutter that closes the back of the dark-slide, the bath is quite open to its interior. The sensitizing bath has a reservoir, into which the liquid flows when the combined arrangement is tilted, and the plate is transferred from the bath to the slide by pushing it with the flexible bottom of the dish, by inverting the apparatus to let it fall into place by means of wires, or otherwise. The back of the dark-slide is closed, and the dish is removed. The developing dish is attached in like manner, but has a bottom and sliding cover both of yellow glass, so that development may be watched in the open.

But the camera back itself may be so constructed as to serve for a bath. W. Clark, for C. G. Anthoni (December 10, 1860), has a reservoir at the lower part of the plate, holding arrangement for the sensitizing solution, and the liquid flows over the plate when the apparatus is turned into a horizontal position. The plate is held by hooks, and, after exposure, slides into a bath at the bottom of the camera for development. G. Haseltine, for A. B. Wilson (June 7, 1862), describes a similar arrangement, but the solution is poured in from outside through a crooked funnel, while the bath and plate-holder is horizontal, and it flows out again by putting the plate perpendicular for exposure. S. T. Stein (April 10, 1873) has simply a skeleton bath, and the plate itself forms the bottom of it. The plate is protected by yellow glass, and the arrangement, when removed from the camera, serves for developing in the open. And last, so far as boldness of idea goes, though not last in point of time, J. H. Johnson, for G. J. Bourdin (December 21, 1864), describes a yellow glass vessel open at both ends, which is camera, plate-holder, and developing, &c., bath, all in one. The plate fits close against the larger end, and forms the back of the arrangement while exposing, and the bottom during development, &c.

REMARKS ON DEVELOPMENT.

BY W. ENGLAND.

The importance of development, and the interest always attached to it, must be my excuse for again writing on the subject, and in relating a little of my experience on my last Swiss journey, will perhaps explain what I have to say.

The necessity of using pure water in mixing the developer is of great importance. On commencing my work at Chamounix I used glacier water well filtered, which answered admirably; but on removing to another locality, and using river water, my first plate showed transparent spots, and the developer became rapidly turbid; the only remedy, not being able to get distilled water, was to send some distance for water from the glacier, which at once effected a remedy.

On my next remove, which was to Vivey, one trial of the water used for domestic purposes again gave me the same spots, so having no difficulty in getting distilled water my trouble vanished.

I may here relate a little incident which occurred a few days ago in the studio of a first class photographer. Watching him developing a plate soon after the solution was poured on, a slight scum came on the developer. "A dirty dish,' I remarked." "Impossible," was the reply; you saw me well rinse it under the tap. "Very well," I said, "the next plate you develop try rubbing your dish with a stiff brush and a little dilute nitric acid, and you will not be troubled again with scum on your plates." He took my advice, and having since followed it, that trouble disappeared. Rinsing a dish with water is very little good without a little elbow grease as well.

METEOROLOGY FOR PHOTOGRAPHERS.

BY J. VINCENT ELSDEN, B.SC. (LOND.), F.C.S.

Chapter VII.—Atmospheric Moisture (*cont.*)—Amount of Cloud—Clouds in Photographs—Natural Skies.

In order to record the amount of cloud in the sky, the scale 0·10 has been adopted, 0 representing a clear blue sky, and 10 a sky completely overcast; but, from what has been said about the effects of perspective, it is evident that such a record will vary according to the position of the observer. Mr. Buchan states that an annual period can be traced in the amount of cloud in countries like Scotland, in which high ground lies across the track of the prevailing winds. Thus, in the west, the proportions of cloud in spring, summer, autumn, and winter, are 67, 69, 71, and 74. In the east, in sheltered districts, such as east and mid-Lothian, the proportions are 59, 63, 62, and 60 respectively. So that the west is more cloudy than the east, and the cloudiest season is winter in the west, and summer in the east. Spring is always the clearest season. In England, owing to the protection given by Wales and Ireland, there is less cloud than in Scotland, and the minimum occurs in spring, the maximum in winter and autumn.

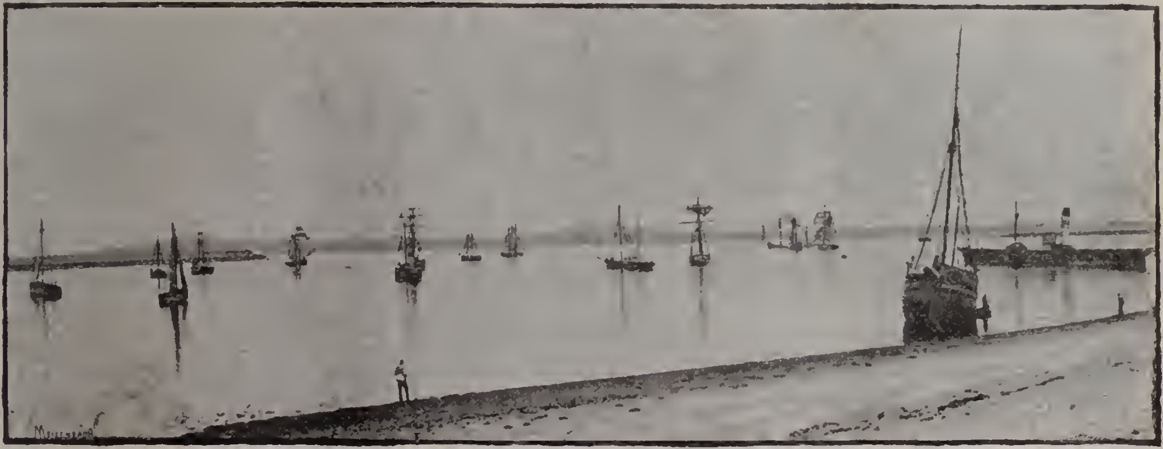
The colour of clouds is of great importance in photography, as upon it depends, in a great measure, the actinic value of the light reflected from them. These colours are chiefly the result of the interference of light, owing to suspended matter, the rays of small wave-length being more obstructed than those of longer wave-length. This subject will be more fully described in the chapter dealing with the optical phenomena of the atmosphere.

The representation of correct cloud effects in landscapes has hitherto been one of the great difficulties of out-door photography. It is but a few years, indeed, since nearly every landscape photograph exhibited a purely white sky; for, in the days of wet-plate photography, clouds were seldom depicted upon the negative, on account of the inaccuracy with which the correct range of light was represented. The next attempt at cloud effects was a simple tinting of the whole sky, by a short exposure to light after removal from the printing-frame. These tinted skies soon gave place to the printed-in clouds of the present day, and it is but reasonable to expect that the next advance will be to *natural* skies; for, since the more general employment of gelatine plates, the representation of clouds in the negative is much more often obtained. Since, however, in the majority of cases, it is still necessary to print in the clouds from a separate negative, it should be the aim of every photographer to procure as complete a set of cloud negatives as possible; for it is impossible to obtain true harmony unless the clouds are either taken simultaneously with the picture, or suitable clouds are carefully selected in each case. Many landscape photographs are completely spoilt by printing-in unsuitable skies.

In taking cloud negatives, it is very important to obtain a view of the sky close down to the horizon, which is best done either at the sea-side, or on a flat plain. Clouds should be obtained also at all altitudes of the sun, and at all angles of the horizon, for the lighting of clouds should be in harmony with that of the landscape into which they are introduced. Unfortunately, clouds near the sun always appear best suited for cloud negatives, and these are often used for landscapes which are lighted by the sun from behind the camera. Thus it sometimes happens that a landscape photograph shows perfectly impossible clouds, owing either to inharmonious lighting, or to being printed-in upside down. It has been pointed out, also, that printed-in clouds seldom suggest the receding of the sky in the distance.

Now, considering the importance of clouds in a landscape, photographers would do well to pay more attention to their correct representation. Earth and sky, it has been remarked, are complemental of each other, and the true representation of clouds, which forms one of the great difficulties in painting, should be the boast of photography. Yet, although much has been done in this respect since Leslie, the painter, complained that clouds were the only beauties of nature neglected by photography, natural sky effects are still rarely seen in photographs. Concerning this point, Mr. H. P. Robinson says: "What the photographer has to do, is to select and use a probable sky to increase the beauty of his work; but it must be such a sky as would render it impossible, not only for the carping critic, but also for the real man of science, to say it is not true." The same writer also gives some other important hints respecting clouds in landscapes. The sky should be employed as a background to the landscape, to throw it out in relief, and improve its pictorial effect; for an otherwise tame picture may often be made pleasing by a suitable sky. Another important use of clouds in photographs is to obtain a representation of sunshine and shadow, or of clouds passing over a sunlit landscape. For this purpose, unless a natural sky could be obtained, a second negative should be exposed for the sky alone, for it would be almost impossible to select a suitable sky from stock negatives. Mr. Neilson complains of the ordinary run of printed-in clouds that they are too solid, their natural characteristic being moving unsolidity, or, as he describes it, a vapoury nuance. He advises the employment of the cumulus cloud in the lower part of the sky for mountain scenes, but at the top of the sky for distant views. Then, again, clouds should not be too large, or of too stormy a type, except in very exceptional cases.

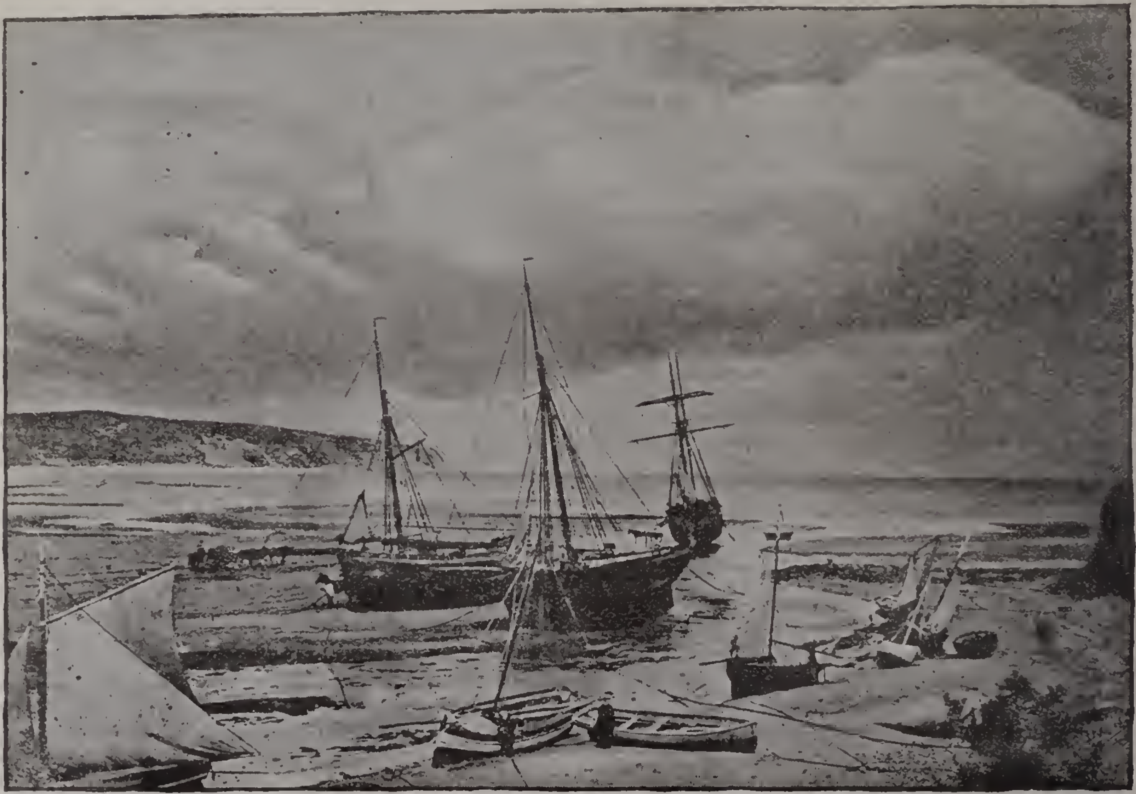
The kind of cloud which should be put into a photograph depends in a great measure upon the impression which is intended to be conveyed. The dark nimbus, which so often casts a gloom over what would otherwise be a pleasing picture, should be but rarely used. Cirrus clouds convey the impression of wind, and are important aids in conveying a sense of motion in photographs of sailing yachts, and in all cases where breeziness is intended to be represented. Stratus, on the other hand, is a fine weather cloud, usually characterising the calm stillness of early morning or evening. The cirro-stratus gives a damp, watery appearance to a landscape, for it is seldom seen except on the approach of wet weather. The cumulus is essentially a summer cloud, and should, therefore, not be used in winter landscapes. It is not usually met with over the sea, unless blown out from the land. Cumulus has been called the "cloud of the daytime," and stratus, the "cloud of night." The importance, therefore, of selecting suitable clouds for every landscape is evident. It is difficult, as a celebrated artist says, to name a class of landscape in which the sky is not the key-note, the standard of scale, and the chief organ of sentiment. But it is not every picture that requires clouds in the sky. In the accompanying view of Holyhead, which was taken during a calm following a severe storm of wind and rain, clouds would not add, in the smallest degree, to the calm transparency of air and sea, undisturbed as they were by breeze or ripple.



Mr. Robinson, in his "Pictorial Effect," is rather opposed to the employment of natural skies in all cases. He says, that to advocate the employment of only the natural sky effects present at the moment of taking the picture, is to assert that any landscape is equally beautiful at all times, and, notwithstanding it may be seen under various aspects, a photograph of it, if absolutely accurate, will, in virtue of its accuracy, be a work of the highest art; so that art becomes no more than a mere servile copying of nature. But although no one would question the advantage of using cloud-negatives in special cases, it is evident that, when we remember that landscapes are generally taken at times when they look their best, and under atmospheric conditions which could, perhaps, scarcely be improved, every photographer would hail with delight any method of procuring natural cloud effects, and doing away with the trouble of employing a second negative. For this reason, many plans have been adopted to diminish the sky exposure. Sky-shades are undoubtedly useful for this purpose, and the flap-shutter is a convenient way of combining the sky-shade with the cap of the lens. Mr. Burton suggests that the cap of the lens should be fitted with a cabinet mount, perforated for its reception. On exposure, the cap and mount are raised, as if it were hinged by its upper edge to the highest point of the hood of the lens. Mr. Baynham Jones advises that on developing a negative, the developing dish should be tilted so as to make the developer course along the horizon, leaving the sky quite out of the solution when it has attained sufficient density. To prevent markings, the developer should be kept moving about on the horizon by means of a camel's hair brush.

Another plan is to reduce the density of the sky by applying any of the reducing agents, by means of a camel's hair brush, for gelatine plates usually represent the clouds, but far too dense to print from. In my own experience I have found that clouds may often be obtained of a printing density if a very small stop is used. Even dense skies may be made available for printing by development. Thus the fine bank of clouds in the view of Porth Abersoch (p. 774) is from a negative in which the clouds can scarcely be seen in an ordinary silver print. In making the print from which the view has been reproduced, the sky was submitted to a longer exposure by covering up the rest of the negative with a screen. To prevent any hard line appearing on the horizon, the screen was kept moving rapidly up and down within short limits. In this way the sky can be made to receive at least double the exposure of the rest of the picture, and will generally develop evenly, and of sufficient density to give a very pleasing effect. This method could not be adopted in ordinary silver printing, on account of the length of exposure necessary; but with the new rapid printing process, many natural cloud effects, otherwise impossible, can easily be produced. By the combined influence of increased exposure, and prolonging the development of the skies, any required amount of sky density can be obtained in developed prints.

(To be Continued.)



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ON A NEW METHOD OF PHOTOGRAPHIC ENGRAVING.

BY J. R. SAWYER.*

If we examine a photographic print in pigmented gelatine produced by the autotype process, we shall find that the effect is produced by varying thicknesses of gelatine and pigment corresponding to the lights and shades of the original negative. It necessarily follows that a picture of this description must be in relief, the deep shadows consisting of masses of gelatine and pigment fixed by the action of the light through the more transparent portions of the negative, whilst the pigmented gelatine in the half-tones and high-lights, being partially or wholly soluble, has been to that extent got rid of in the process of development. It is a picture of this kind, developed upon the rigid surface of a metal plate, that forms the basis of the mode of producing printing surfaces that I propose to call your attention to this evening. In order that you may easily follow me, I will preface my remarks with a short summary of the necessary conditions:—

First, there must be a photograph in relief developed upon a rigid surface.

Second, this photograph must have a tooth or grain given to it.

Third, the surface of this photograph must be rendered a sufficiently good conductor of electricity as to make it possible to deposit upon its surface, without the least injury to the picture, a coating of copper.

With respect to the first condition, a picture in relief is easy to obtain if a carbon picture is developed upon a rigid surface; as colour is of no consequence, there is a considerable choice of material to work with, and that particular tissue can be chosen which gives the proper amount of relief. To ascertain what is the proper amount is by no means an easy matter, and many experiments made with tissues varying in their proportion of gelatine and colour have had to be worked out to settle that question.

The amount of relief in any given picture may depend on either of two causes, one being the quality of the negative, the other the proportion of pigment to gelatine in the tissue; a tissue containing a large proportion of colouring matter with respect to gelatine will give a low relief, whilst if the gelatine is increased without altering the quantity of colour, a high relief will be the result. The quality of the negative also affects the amount of relief, prints from weak, thin negatives having but little relief, whilst prints from vigorous negatives, even with the same tissue, show very much more. This fact will quite explain why pigment prints from negatives having different densities appear to be of different colours, although made in the same tissue.

One of the principal difficulties in this mode of photographic engraving has been the question of relief, and I hope to show you presently how it has been successfully combated, and the whole process so simplified as to enable photographic engraving to be carried on with comparative ease, and with every chance of successful results.

Let us now consider the question of obtaining a tooth or grain in the picture sufficient when electrotyped to give the plate the property of holding printing ink.

It is quite possible to develop a picture in relief on a metal plate, and when dry to make its surface conducting by means of plumbago; a copper plate can be obtained from this, which, reproducing accurately all the lines and details of the original, seems as if it might be made to print; it is placed in the hands of a copper-plate printer, who inks it with his dabber, and then proceeds to wipe out the superfluous ink. But here the trouble commences; not only does he wipe out the superfluous ink, but *all* the ink, and the plate is useless, because it has no ink-holding grain.

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* Read before the Photographic Society of Great Britain.

Many methods have been tried to overcome this difficulty, but the only successful one as far as I know is one invented by my friend Colonel Waterhouse, and worked out with him by Mr. Foxlee and myself at the Autotype Works. This method consisted of covering the gelatinous image, whilst still wet, with very finely-powdered glass. As this powdered glass is laid upon the moist and yielding surface of the picture, its minute points and angles penetrate it, and as the gelatine contracted in drying it became still further embedded; the glass being then brushed out of the film, a series of minute holes was left, which, when reproduced in the process of electrotyping, gave the necessary ink-holding grain.

The third requirement that our relief picture must possess, is a surface that can be rendered sufficiently conductive of electricity, to enable a coating of copper to be deposited upon it before the solution in the depository vat or trough has had time to act upon the gelatine image, for it is evident that if the smallest disturbance of the gelatine surface takes place, it will be fatal to the result. This has been sought to be accomplished by rubbing the surface of the gelatine picture with finely-powdered plumbago, but great care has to be taken not to block up the delicate portions; the picture being developed upon a silvered-copper plate (in itself a good electrical conductor), the deposit of copper occasionally takes place in a satisfactory manner, and very good work can be produced, especially if the subjects have not any very deep shadows, the heavy masses of gelatine forming which are difficult to coat, and if the fluid attacks them before the coating of copper becomes continuous they will break up, and the plate will be useless. Another difficulty arises if every particle of the powdered glass, used to form the grain, has not been thoroughly got rid of, showing itself at this stage by marks across the plate, beginning wherever a little particle of glass has been left in the film.

We have thus seen that the requirements for the easy and successful practice of this mode of photography are—

A picture in pigmented gelatine having the proper amount of relief, having also a grain which can be varied to suit different kinds or sizes of subjects, and in addition be in itself a good conductor of electricity. To meet these requirements I have invented and patented a new tissue, containing amorphous graphite or plumbago in grains of different sizes, and the quantity of this material so proportioned to the vehicle as to give the amount of relief calculated to produce good effects with negatives of the usual kind. Specimens of these tissues will be handed round: No. 0 being the finest, No. 1 the medium, and No. 2 the coarsest grain. Thus, the reproduction of a small portrait or landscape, or copy of a drawing or line subject, will be best done in the tissue having the finest grain; larger sizes of plates, say up to 15 inches, will be better suited by No. 1 tissue, whilst for large copies or pictures and subjects, in which a great range of tone has to be represented, the comparatively large grain to be found in the No. 2 tissue will be desirable.

By the use of the graphite, not only do I obtain the amount of relief and the quality of grain required, but this material has the advantage of being one of the best conductors of electricity, and as it is present in comparatively large quantity in the picture—most of the gelatine being washed away in the act of development—it forms a very suitable conductor for depositing copper on the surface by means of the electric current.

In previous methods of forming a printing grain it has always been found that the graining material did not take sufficiently in the deepest shadows, probably because the grain was *outside* the film, and not in it. By having the grain *in* the film it is present in larger quanties in the shadows, and thus gives depth and richness to the prints.

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THEORY AND PRACTICE OF PHOTOMICROGRAPHY.

BY MAURICE N. MILLER, M.D.*

The introduction of polarized light affords a method of producing beautiful results, especially in photographing rock and mineral sections. The polarizing Nicol is placed between the water and the blue cells. It should have a diameter of at least 1¼ inches, and had best be made after one of the modern formulas producing short prisms, as there is always sufficient loss of life in this work without the introduction of unnecessary elements of absorption. The analyzer should be as large as is possible to use comfortably, certainly sufficiently so to cover the posterior combination of the objective completely; if it be smaller the field is much reduced. The small polarizing attachments usually supplied with observing microscopes are totally inadequate to our present needs. The field is too small, and the amount of light passing through the combination insufficient.

Respecting photographic processes adapted to photo-micrographic work, it becomes me to say little. The factors that produce the full detailed portrait negative are only necessary. The rapid working gelatine films will enable the present worker to enter a field that has been entirely unexplored by our predecessors, armed with the silver bath alone.

It may not come amiss to say something just here about the microscopic objects themselves. Each worker will select a field for himself. Diatom pictures, so far, take the lead. It is probable that the great value of photo-micrography in the future will be exemplified in the production of illustrations in the minute structure of living organisms, both in their healthy and diseased states—that is, normal and pathological histology. The one great feature of our productions in this line is their absolute truth to nature. The pencil of the retoucher is not here available. The pictures are not always beautiful; there is no opportunity to select a fragment here and there, and with perhaps a slight draft on the imagination, as in the composite picture for the wood engraver. For this reason, rather than the great expense, photo-micrographs have never been very popular as general book illustrations; several beautiful volumes so illustrated on anatomical subjects have, however, been widely distributed among scientists. The inestimable value of our art is already seen in the domain of bacteriological investigations; and already do we look with suspicion upon the engraved illustrations of these minute though potent organisms.

The same conditions that produce a beautiful view are necessary in our microscopic object. If we have an object affording plenty of clear, sharp detail in proper colour, we may reasonably expect good pictures. And just here presents one of our most serious difficulties. Microscopic objects are, as a rule, artificially coloured. As a rule, however, we are not limited in the selection of our dyes; in certain work we are so hampered. Tissues are dyed or "stained" in order to sharpen the differentiation. The dye attacks one part of a minute animal of vegetable structure very strongly, while other portions are only slightly coloured. The dyes most commonly used are those made from carmine and logwood. The aniline dyes are also used almost exclusively so in bacteria staining. Carmine-tinted specimens are tolerably well adapted to our work, although the contrasts are feeble. The very best staining for photomicrographic reproduction for tissues in general, there being no universal process, is that obtained with properly prepared logwood solution, the sections having been subsequently tinted slightly with eosine. Many complaints come to me regarding the logwood staining, and as often employed it is valueless, inasmuch as the resultant tint is blue. This is a fault of the operator, the proper staining containing sufficient non-actinic colour to give good differentiation. For fresh tissue, especially epithelial structures, the lithocarmine with the yellow of picric acid will give good photographic contrasts. Insects, and parts of the same, are usually unstained, and present sufficient contrast. The most striking popular productions will be obtained in this direction. In micro-organisms we are, unfortunately, sometimes unable to select our tint. Certain peculiarities of composition render them amenable to peculiar dyes, and we have little choice. Certainly strong contrasts are not to be expected with extremely minute translucent points or lines of a faint blue tint on a white ground.

America has so far taken the lead in photomicrographic work. Indeed the late Colonel J. J. Woodward, by whose death the scientific world lost an enthusiastic, indefatigable, and highly intellectual worker, was almost the father of high-class photomicrography. His publications have done more than all other causes combined to stimulate endeavour in this important branch of illustrative art. May I not be allowed to hope that you are not willing to be satisfied with simple mediocrity, but that those now commencing this work will aim, not only to equal what has already been done, but to secure results far in advance?

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* Continued from page 766.

Notes.

A photographic museum of permanent interest is that recently established at Chalon-sur-Saône. There are more than a dozen specimens of the early work of Nicéphore Niepcé, and several pieces of apparatus which were used by this pioneer.

It is also gratifying to know that the historical collection of photographic objects which has just been founded by the authorities of the South Kensington Museum has made an excellent beginning, as nearly the whole of the historical collection exhibited by the Photographic Society has been transferred to South Kensington; in fact, only three exhibits have been withdrawn.

The earliest photographs of a battle-field were probably those taken during the American Civil War. We recollect, many years ago, seeing some stereoscopic slides printed from negatives taken, not indeed during the fight, but immediately after—so soon, indeed, that it could be easily seen that the wounded had not been removed. More painful pictures than these we do not remember, and were they available for exhibition now, they would be more convincing of the horrors of war than all the arguments of the Peace Society.

Truth has an interesting account how Major Macneill, with expeditionary force in Burmah, managed, some years ago, to obtain a plan of the defences of Mandalay. He visited the country simply as "Mr. Macneill, the photographer," and though at first viewed with suspicion, soon managed to ingratiate himself, no doubt through his skill in photographing the Burmese ladies. We are told "he photographed ambitious Burmese belles for a small sum" during the day, and in the early morning occupied himself in making a plan of the city; and he appears to have been as successful in taking observations as he was in taking portraits.

If photographers want to revive the rage for being photographed, let them turn their attention to the devising of novelties in which to display the photograph. The latter, now-a-days, is simply an adjunct, a trifle to set off its surroundings. It no longer occupies the place of first importance. Witness, for instance, the latest idea—a fan, in which there is an arrangement by which the owner's photograph, or anybody else's if she chooses, can be attached, and so form a part of the ornamentation!

A recent law-case shows that photographers do sometimes make a little profit. The plaintiff, Mr. Cooper, of Birmingham, had secured a very pleasing portrait of Lord Randolph Churchill, copies of which went off freely at four shillings each. This being the case, he was naturally displeased when, on a visit to Blackpool, he found that the picture had been pirated, and that others were sharing in his profits. During the hearing of the case, the following episode occurred. Judge: "And how much profit did you make on each four shilling photograph?" Plaintiff "3s. 7½d." Judge: "Yours must be a good trade."

The other day a fine wild elephant descended from the hills and went rampaging through the fields surrounding Chittagong, the second part of Bengal. By the aid of a small herd of tame elephants, the wild specimen was speedily captured and subdued. The official report adds: "The executive engineer has taken two very good photographs of the animal—one as he lay conquered, and the other with his harness on." It is pretty clear that photography is proving of service to every profession.

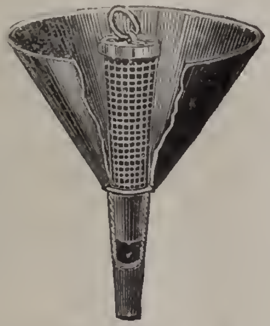
A recent action in the Probate Division of the Divorce Court has disclosed the fact that, but for a photograph, the case in question would never have come before the Court. The evidence disclosed a curious picture of a double life. A commercial traveller, married, and having one child, fell deeply in love with a second woman, and arranged to pass as her husband. The connection was kept up twelve or fifteen years, and it was only upon the man's death that the wife was made aware of it, as, shortly after proving the will made in her favour, another will, in which the lady already alluded to was spoken of as deceased's "dear wife," was brought forward. Notwithstanding the unpleasant discovery, the two ladies would have come to an arrangement but for an unlucky circumstance. Wife No. 2 happened to fall ill, and wife No. 1, paying her a visit, saw attached to the wall her husband's photograph, and the sight being too much for her equanimity, she tore the photograph down, threw it on the floor and sat upon it. No doubt high words followed, at any rate an action at law did, and the lawyers, of course, benefitted accordingly. The moral clearly is, that if you are tempted to enter on a double existence, never be photographed.

Nitrate of potash—common nitre—is so easily procurable and common a substance, that one hardly thinks of it as a virulent poison. In a recent case in Edinburgh it was proved beyond doubt that a child of three years of age had been killed by a dose of this substance, although no crime could be proved. Dr. Littlejohn, who gave evidence in the case, remarks that "the wonder is, that with the unusual facilities for the purchase of such an active poison, we do not hear of nitre being more frequently employed." As this salt is to be found, we imagine, in every laboratory, chemists and photographers will please note.

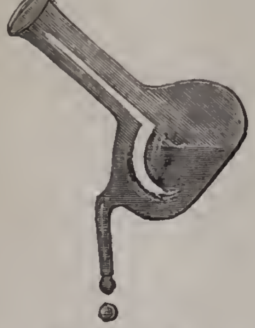
The readers of the Photographic News are now so thoroughly accustomed to seeing well-known contrivances and methods made the subject of patent claims that it will scarcely surprise them to note that an American, who is called Orrin Luther Hulbert, has gone to the expense of obtaining an English patent for postage-stamp portraits (see page 778). We may now be prepared for such claims as the exclusive right to make cabinet or carte-de-visite portraits; or, perhaps, some more enterprising individual may claim the cementing of a paper photograph upon a cardboard mount; or the making of a print on albumenized paper. In each case there is but little doubt that the Patent Department would take the fees, and go through the formality of granting a patent.

One of the sights likely to attract considerable attention at the Indian Exhibition to be held in London next year will be the models of the native soldiery. For this purpose twenty-two men of the Native Indian Army have been selected, and models will be taken from them, and furnished with arms, accoutrements, and uniforms. The men will also be photographed, and a copy attached to each figure. It is to be hoped that these photographs will be on sale. Artists are insatiable in the matter of costume, and every figure draughtsman worthy of the name has his collection. It is impossible to say when a particular costume may be wanted, and what appears to be trivial to the ordinary observer is treasured up by the artists.

Butterfield's funnel strainer is shown in the cut. It is an American contrivance, and we do not know whether it is to be obtained in this country. The strainer is made of wire cloth rolled into a tubular shape to fit tightly in funnel tubes of different sizes, the upper or larger end of the strainer being closed by a metal cap, which is provided with a ring or knob, by which the strainer may be conveniently handled when not in use. The lower end of strainer is open. For photographic purposes it may be made of silver, and may be wrapped round with fine muslin or lawn.



Another American invention, for the cut of which we are also indebted to the *American Druggist*, is Salleron's drop counter. No description, other than the drawing, is required.



In America, where a week's railway journey is by no means an uncommon episode in a citizen's life, a travelling photographer ready to "fix up" a passenger at any moment is, as a rule, to be found "on the cars." English railway journeys, however, are, comparatively speaking, what a Yankee would call "one-hoss" affairs, and the most enterprising of perambulatory photographers has not hitherto thought of making a crowded railway carriage the scene of his labours. But this season, we hear, passengers going north have on several occasions had the chance offered them of relieving the monotony of their long journey by being taken *en route*, though it is difficult to see how the "operator," unless a "stowaway," could develop enough business between Euston and Carlisle to pay his fare, much more to make a profit.

In one case, however, if our informant is correctly informed, the travelling artist used his wits as well as his camera; for it was only on emerging from the first long tunnel that was passed through, that he introduced himself as a photographer, adding that, by way of amusement, and practice with a new patent process, he had been busy in the darkness in taking pictures of all the occupants of the carriage—a long, open, third-class one. "Of course," he went on, "if any party or parties would like me to develop the negatives I have secured, I will do so; but if they would rather have themselves taken in the daylight fair and square, I don't mind rubbing out any picture I have taken in the tunnel, on payment of sixpence, just to cover the cost of the chemicals wasted." It is on record that the number of sixpences forthcoming, especially from the middle-aged ladies with reticule baskets, and the more self-conscious of the young couples in that railway carriage, was encouragingly large.

A journal representing the printing trade, in its issue for this month, says:—"From Bury comes a very lovely handbill of a cheap photographer—full of wrong founts, mis-spelt words, and makeshifts. The pressmanship is quite in keeping with the composition, and the paper is just as bad as can be got." For the sake of the reputation of photographers for grammatical accuracy, it is as well to say that the "composition" which the critic finds fault with is that of the printer, and not of the "cheap photographer."

Young ladies deeply in love will do well to insist upon their swains having their photographs taken upon a material not less durable than enamel. Mdlle. D'Imécourt, lately married to Prince Frederick William of Hoenlohe, was, some four years ago, the chief actor in a famous trial arising out of a run-away marriage with Paul Musurus, son of the Turkish Ambassador in London. It was urged that M. Musurus had entrapped the young lady's affections by means of unhallowed spells, and the Pope annulled the marriage. Whether M. Musurus really did enlist in his assistance the arts of the magician, we, of course, are unable to say; but there cannot be a shadow of a doubt that Mdlle. D'Imécourt was over head and ears in love, for we have her asking him to send her a second photograph because she had almost worn out the first with kissing it! If there were many such ardent natures, we should certainly recommend photographers to adopt some such announcement as this: "Cartes-de-visite mounted on stout durable Bristol board, suitable for engaged people of sober temperament. Ditto, cemented between glass; may be carried in the pocket and looked at a dozen times a day. The fire-proof, water-proof, everlasting enamel portrait, for the especial use of very romantic couples: may be kissed to any extent without showing signs of wear."

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Patent Intelligence.

Applications for Letters Patent.

14,371. William Barry, 7 and 8, Park Street, Hull, for "Printing photographs, whereby a large number of impressions are procured from one negative on one sheet of paper, named "A repeating printing frame.' "—24th November, 1885.

14,468. Thomas Bolas, 8, Grove Terrace, Chiswick, London, for "Decorating or imprinting devices upon glass, metal, stone, pottery, enamel, asbestos slabs or sheets, or other materials which will withstand the action of fire."—25th November, 1885.

8,990. Oscar Ney, 34, Wilhelm Strasse, Berlin, Germany, for "Improvements in magnesium lamps."—25th July, 1885.

Specifications Published during the Week.

2699. Leon Warnerke, Silverhowe, Champion Hill, S.E., for "Improvement in the preparation of the sensitive paper or other fabrics applicable as substitute of glass in photography." —(*Provisional Specification.*)—Dated 2nd October, 1885.

My invention consists in rendering paper or other transparent or semi-transparent tissue or fabrics sensitive to light on both sides. Material so prepared is then used like ordinary photographic plate or paper either in the camera or otherwise. The light during exposure, acts not only on the front sensitive surface, but penetrates the paper or semi-transparent fabric used, and acts on the back sensitive surface also. After exposure development follows, either of both, front and back surfaces simultaneously, or one side first and the other after, so that two images, one on the front and the other on the back of the paper or fabrics, are produced. Advantages of thus acting are as follows:—1st, any texture or irregularity of the transparency of the paper, or other supporting fabrics is rendered harmless, because any such imperfection is counterbalanced by its action produced on the back sensitive surface; 2nd, greater brilliancy and softness in the ultimate prints; 3rd, easy adaptability to produce negatives with lines or grain for engraving processes. My claim is in rendering the paper or other transparent or semi-transparent fabrics sensitive on both surfaces.

11,146. Orrin Luther Hulbert, of the City of Saint Louis, in the State of Missouri, one of the United States of America, photographer, for "Improvements in photographic sheets."—Dated September 25th, 1885.

The Patentee says—

My invention relates to a sheet of photographs, and my invention consists in features of novelty hereinafter fully described and pointed out in the claim.

Lines of perforation are made between the pictures to allow of their easy detachment, in the same manner that a postage stamp is detached from a sheet. These pictures are reduced at one operation from a large one, by an apparatus not herein claimed, and therefore not herein shown and described. I prefer to gum the back of the sheet, so that the stamps can be readily attached to any object. Before perforating or gumming the sheets they may be burnished, to give a fine and finished appearance to the pictures.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—

1. A sheet containing a number of photographic pictures, which are separated by intervening rows of perforations, substantially as set forth.

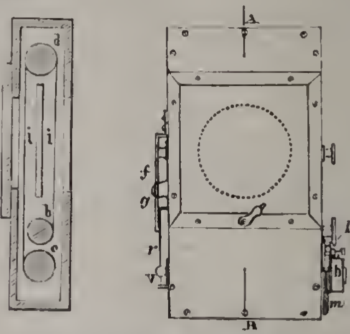
2. As a new article of manufacture, a sheet of *fac simile* photographs, perforated and gummed as set forth.

3. As a new article of manufacture, a sheet of *fac simile* photographs, perforated and gummed as set forth.

4. As a new article of manufacture, a sheet of *fac simile* photographs, made and prepared ready for attachment and use, substantially as set forth.

Patents Granted in America.

330,775. Walter Damry and Alfred Leduc, Lille, France. "Instantaneous Shutter for Photography. Filed April 22nd, 1885. (No model). Patented in France November 8th, 1884. No. 165,194.



Claim.—1. The combination of the rollers *a*, *b*, and *c*, with the curtain *i*, said curtain being passed from roller *b*, over roller *a*, and down to roller *c*, forming a double fold, each fold having a circular opening, with mechanism for winding the curtain on or off the rollers *b c*, whereby the openings pass each other in front of the lens, for the purpose set forth.

2 The combination, with the rollers and curtain, of the barrel *d*, the spring, the pin *d′*, and the graduated disc *m*, for the purpose set forth.

3. An instantaneous shutter for the use in photography, consisting of a box or casing containing a double curtain, *i*, mounted on three rollers, *a*, *b*, *c*, the roller *b* being provided with a handle, *h*, by which to operate the curtain, and the roller *c*, having a spring-barrel, *d*, and powl *n*, as set forth.

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POSING.

BY GEO. G. ROCKWOOD.*

To formulate or explain the art or methods used in posing the human figure is no easy task. Circumstance, place, and subject are ever varying, and need ever-varying consideration. Since subjects are thus versatile in their presentation, we cannot consider rules, but should discuss principles. Rules are arbitrary, and, if applied to art, are met with innumerable exceptions, while principles, if understood, are always flexible, and certain guides to successful results. So, in speaking of methods in portraiture, one can only make suggestions, which are covered in the phrase "principle."

In the application of photography to portraiture, we exercise very much the same methods in lighting as would give good results in preparing sculpture for photography, every effort being made to present the most graceful forms and lines, and to avoid that which is commonplace or ungraceful. Form, expression, and characteristics should be considered. It is my own habit to diagnose as carefully the temperament of each sitter as his personal comeliness. To place the quiet, phlegmatic temperament in startling, dramatic action is as discordant as to pose the nervous, active, sanguine subject in a library, reading a book. It is, therefore, the province of the photographer to present the strongest characteristics of his subjects, avoiding caricature and seeking the most favourable aspect. However plain a person may be, every face has its more or less favourable aspect, and from some view, and in some light, is comely.

All things in the way of accessories or backgrounds should be subordinated to the subject of the picture. If, then, we are making a portrait, nothing in the way of dress, background, or furniture should be of sufficient prominence to divide the interest with the sitter. It is sometimes difficult to manage these subordinate portions of the picture artistically, as the camera copies everything before it with equal distinctness if on the same plane; so it is manifestly the aim of the photographer

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* A communication to the Society of Amateur Photographers of New York.

—or artist, if he be one—to so place and light, or subdue the lights on the accessories, as to make all subordinate to the principal effect in the picture. Dress has much to do with this. If one is robed in a garment full of strong, geometrical figures, the result may be a good picture of the dress with female accessory; or, in other words, the minor part of the picture becomes more prominent than the subject.

As a rule, the light should fall at an angle of about forty-five degrees upon the subject, and from as near a northern sky as possible. If the source of light is distant, or the skylight is high, it is often necessary to use a reflector to throw a little light into the shadows, which may otherwise be too opaque, and thus render them more transparent. This should be done with great moderation, and only when absolutely necessary. Better get transparency of shadow by "timing out" than by reflectors. Many otherwise excellent pictures are spoiled in this way. The work of one of our most famous photographers is distinctive from the almost audacious use of direct light, and disuse of the reflector. Posing and lighting so supplement each other that I treat them together. Pose means, in a degree, balance; so, as we place our sitter under the light, the first effort would seemingly be to so pose or balance the head as to remove all fear of the head tumbling off—or, as another puts it, rolling out of the picture. Then so adjust the camera as regards both light and distance from the subject as to preserve the perspective of the head. Such an element exists in portraiture as well as in architecture, and a distortion of perspective in the human figure is almost as disastrous, although not as apparent, as in inanimate nature. A well-considered judgment should be exercised in selecting the height of the camera. As a general guide, the camera may be placed in the same relation to the head as is occupied by a painter or artist when painting a portrait—usually on a perfect level with, or slightly below, the subject. If the neck is short, this habit adds a little height to the sitter, and avoids the appearance of the head sinking into the body, as is so often the case in photographs. The custom with most photographers is to place the camera too high, and with this disastrous effect. Of course, if the neck is abnormally long, lowering the camera would emphasize the peculiarity, and such a happy medium should be selected as would avoid this error.

The size of the head in the picture is, at times, an important question. In the high foreheads, long, thin faces, large heads, and often small bodies, of a certain type of American women, the large head is peculiarly disastrous; and yet it is almost invariably asked for by this class of sitters. Probably the hope is that they may appear larger. The result is usually a masculine effect. Only the round, full face can bear the least exaggeration in size; hence young children can often be photographed with very large heads, and to their advantage.

Now, while truth should be sought in portraiture, lights can be so managed as to temper justice with mercy; for the thin can be made plump, and the stout person free from grossness. To secure the first, an arrangement of light which might be called a broad Rembrandt effect is the most favourable—viz., arrange the light so as to fall on the short side of the face, with the broad side in half-tint, or shade (not shadow), and let the light come from as low a point as will retain the modelling or delicate forms. On the other hand our plump friend can be placed in the usual portrait light with strong shadows, and thus the full moon be reduced to the more comely oval. Hence we may say that all form is defined by means of light and shade; without contrast all objects would appear flat. There is no other means of distinguishing form in nature or portraiture than by light and shade—a light object is contrasted by a dark, and a dark by a light one.

It is said that "Fools step in where angels fear to tread!" So, often, persons volunteer to accompany friends to the photographer with the design of posing them, evidently thinking that nothing could be easier or simpler than to pose a head, and that there was very little to learn or be taught on the subject; but, if, as Mr. Robinson says, we are to judge by the majority of specimens we see, the art of setting a head properly on its shoulders is not given to all men.

Axioms in art are often more euphonious than truthful. So, having no rules or trustworthy axioms for portraiture, I may summarize my few suggestions as follows:

1. Study both the faults and grace of your subject, and endeavour to conceal the one and emphasize the other.

2. Endeavour by the arrangement of light to secure effect. Audacity in the contrasts of light with shade is not the unpardonable sin.

3. Study variety of both pose and effect. Mannerism is as objectionable in photography as in any branch of art, while originality in treatment is as practicable and interesting as in painting. A recent writer says: "Our subjects and our treatment of them must be emphatically our own; but, nevertheless, every student of art owes it to himself to get what help he can from the study of the works of the great painters who have gone before. His object should be to notice, not only how natural appearances have been modified—or, as it is technically called, treated—by painters of acknowledged fame, but also why this was done. No artist who has in him any spark of originality will directly repeat any effect that has already been painted, but an earnest student can only benefit himself by trying, in a measure, to look at nature from the point of view of the masters of his art."

THE APPEARANCE OF THE IMAGE DURING DEVELOPMENT.

BY F. C. BEACH.*

Those who commence the practice of photography are frequently puzzled over the problem of the proper development of the plate, and such questions as "How am I to tell when the development is complete?" "What is the proper time to stop?" "How am I to judge when the details are fully out, and to know when the plate has sufficient density?" are heard on every side.

With a view to enlighten those of you who are in need of information on these questions, I will relate the manner of working which I have adopted, knowing that it is not perfect, but at the same time I have reason to believe it may be of some benefit.

By consulting the various guide books relating to photography much useful information can be obtained regarding development; but how is a person who never saw a plate developed going to know when to stop? He is told, as soon as the details appear well out, then to stop; but he cannot judge correctly on this point until he has developed and lost several plates. To his mind the details might be out with the shadows all white, or the entire plate might be dark brown, and the film one mass of fog. Either case could consistently occur, and he not be the wiser as to whether they were right or not. Therefore, it seems to me the study of the appearance of the image during development is of special importance to beginners, and more specific details regarding it should be put in our guide books.

Experience is conceded to be the best book. At the same time it is possible to give certain prominent hints, which are sure to be useful to any one. Having been accustomed to develop, some years ago, under a liberal quantity of yellow daylight, when using the wet process, and then experiencing no trouble whatever in quickly flashing out the image under the old iron developer, I was naturally cautious when I was told that the new gelatine plate would fog under that brilliant light, and that the development must be carefully watched, and certain strict injunctions about admitting white light through the crevices of doors, &c., be heeded. So I obtained some of Carbutt's ruby paper, and covered it very carefully over my yellow window. I was then working under a great abundance of diffused red light, which, according to some of the latest experiments, must have been quite non-actinic, coming, as it did, through yellow and red combined.

To take the exposed plate out from the holder, lay it in the tray (for I had always developed the wet plate by holding it at one corner with my hand), and pour on the prepared developer of iron and oxalate, seemed novel to me at that time. I soon found patience was a prime necessity, and after waiting for five minutes, the image commenced to appear. I imagined the exposure had been too short—that I had overrated the supposed extraordinary speed of the plate—hence I added more iron. But when I had the plate well developed, the question arose—how am I to tell as to its density? The ordinary advice is to hold it up to a lamp and look through it, but I was using ruby daylight, and had no need of it, and I found it impossible to look through the plate; hence I was all at sea as to density, and only judged from the surface opaqueness of the blacks, or what is commonly termed high lights, that it would be right after fixing. And here comes another uncertain element in gelatine plates if the development has been too short—the plate will fix out too thin, and the supposed intensity will disappear. How must we develop to know when the plate will fix out right? One person will tell you, continue the development until you can see a greater portion of the image on the back of the film when you look at it by reflected light on the glass side.

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* Read before the Society of Amateur Photographers of New York.

I have found this a very good guide in many cases, even superior to looking through by transmitted artificial light, for you are certain then that every portion of the film that has been affected by the actinic light has been acted upon by the developer, and will remain after the plate comes out of the fixing bath.

You ask:—"When this condition is reached, what is the surface appearance of the film?" In a majority of cases, if pyro is used as a developer—which is what I advise—the film will have a slaty-brown colour all over, not quite as dark in the deep shadows as in the other portions, but it will be perceptible to the eye. Furthermore, the unexposed edges of the plate behind the rabbet of the holder will perhaps be a very light brown. Much depends upon the length of the development as to this and the quality of the plate. Ordinarily the edges should remain white throughout development, but when they do slightly turn, you need not fear but what you will turn out a handsome, clear negative.

Another will say:—"You cannot judge this plate by looking at the back." When the whole surface of the film is well brought out, development should cease, though it appears all white on the back. I have had plates of which this statement was true, and have found them more difficult to judge by reflected light regarding their density than any other. Viewing by transmitted artificial light is here a necessity, and is the only way to tell when the development has been carried far enough.

By holding the negative up to a certain standard oil or gas lamp, distant about three inches, for a moment, the eye can quickly judge whether there is any solid detail in the shadows or sufficient opaqueness in the high lights; and for anyone using a brand of thickly-coated plates, where diffused ruby day light is preferred during development, I would advise the employment of a lamp, which could be kept burning low, and turned up only as you wished to examine the state of the negative. By this means you can familiarize yourself with the appearance of the plate in the different stages of development, and soon learn when to stop.

One manufacturer has told me to continue the development, in using his plates, until the white rabbet edges of the plate commenced to turn slightly, reasoning that all the detail that it was possible to bring out was out at that stage, regardless of the appearance of the back of the film. I found this a good guide, but by continuing the development further, though the surface appeared quite dark, I obtained a negative more dense and just as clear.

It takes some experience to tell by the ruby light as it is reflected upon the negative in the developing tray, whether the details fully appear on the surface, for the reason that the light itself is so poor in illuminating power. Consequently, beginners are often deceived.

The moment the prominent objects appear to be fully out, the plate is at once removed, and, after fixing, the operator is disappointed at finding so much that is missing. My experience is that it is better to have the image appear at least one-third darker by the ruby light than you think it ought to, in order to secure a good negative afterwards. Sometimes we are deceived by the apparent turning of the rabbet lines on the edges, which is really due to the reflection of the red light from the sensitive film, and to the red colour of the developer.

In the development of paper negatives, it seems to be much easier to tell by the surface appearance when it is time to stop, for we have a white background, as it were, similar to the effect of a ground or opal glass behind a transparency, which tends to bring out more the delicate details in the shadows, causing them to be more easily seen than with the ordinary plate. Furthermore, the coating of the sensitive film on the paper is thinner than that usually put on glass, and as the developer acts upon both sides of the film at once, through the paper on one side, and direct on the other, a considerable portion of the prominent details of the picture can be seen by looking upon the back of the paper by reflected light when the development is completed. The developor also acts very evenly upon the paper. There is no danger of air-bells or frilling, and it is remarkable with what ease and safety from four to half-a-dozen or more negatives can be developed in one tray, with one developer at a time.

Supposing from ten to fifteen instantaneous exposures have been made in one day, and it is desired to develop them rapidly, cut off half-a-dozen sheets at a time and immerse them, one by one, over each other in a pan of water, then turn the film sides up, drain off the water, and pour on the developer—weak in the alkali, increasing it by degrees until the development starts. You have the whole matter then under your control, and can examine each negative as leisurely as if you were toning, and you have plenty of time to manipulate the developer to obtain any effects you desire. It was not until I actually tried it that I realised the pleasure and satisfaction to be obtained in developing these paper negatives.

I made three successive exposures on the same object, using the smallest stop, giving exposures of five, ten, and twenty seconds, developing all in one developer in one tray. I commenced by using a small amount of alkali, and when the *twenty-second* negative was finished I added more alkali, and brought up the other two to good density. I was, therefore, surprised and delighted to notice the latitude allowable. Paper negatives can be dried very easily, so as to leave as smooth a surface as glass, after the hypo has been eliminated, by first putting a drop of any kind of oil on the glass and apparently rubbing it off clean with a piece of cloth or paper, then laying upon this prepared surface, face down, the negative, pressing out the air-bells with the finger, or squeegeeing the back with a velvet rubber squeegee, leaving the negative to dry. In place of glass, hard rubber can be used without oil.

Both sides of the glass or rubber can be utilized. When dry, the negative is seized at one corner with the fingers, and pulled or peeled off the glass. It presents a beautifully polished surface, which will remain until the paper is either oiled or mounted. I have one or two specimens to show you. I have recently experimented further with developing with two solutions. I put two plates in a solution of pyro, four grains to the ounce, for three minutes, then poured back into the graduate, putting on the alkali. When the development was complete, the plate was too thin in the high-lights, so I poured off the alkali, washed the plates with water, and put on the original pyro solution, strengthened up to about eight grains to the ounce. I simply let the plates soak in this pyro solution for half-an-hour, and, to my surprise, the density had greatly increased, and I obtained two soft, clear negatives. This experiment leads me to the conclusion that, in developing with two solutions, it is better to soak the negatives for two or three minutes in a very strong pyro solution—as much as twelve grains to the ounce—than a weaker one.

But in case sufficient density is not obtained after the alkali has acted in bringing out the image, we have the satisfaction of knowing that it can be produced, without in the least fogging the plate, by simply soaking the latter for a long time afterwards in the pyro solution. We thus have a means, perfectly under control, of improving the negative and rectifying the errors which might have been made during the first part of the development.

In conclusion, let me say that the development of the negative is to me, as I know it must be to every sincere amateur, the most fascinating part of our work. Under, or too short, development is usually the difficulty beginners have to contend with. My advice to them is, commence with a weak alkali solution; increase it as is necessary; and take plenty of time to bring out the picture; you will then, allowing that the exposures have been within bounds, undoubtedly succeed.

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THE DROP SHUTTER.

BY PROFESSOR LAUDY.*

I PROPOSE to speak on a very familiar subject, that is so well known that it seems almost idle occupation to explain anything relating to instantaneous exposures and the intervals of time. The every-day world uses language after its own fashion, and with little reflection and less science, often transfers the same term to different objects, from a fancied similarity, which has little, if any, foundation. Many errors and inaccuracies are to be found in every occupation in life, and especially so is the word instantaneous as used in photography. It is simply a conventional term to express an interval of time without stating what that interval may be. In every-day discourse the word is used to express something rapid, not stopping to reason out a conclusion or qualify it, but using it in an automatic manner, the result of past experiences.

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* A communication to the Society of Amateur Photographers of New York.

What, then, is instantaneous? The definition found in Webster is adequate enough for all uses in daily life, and reads as follows:—"A part of duration in which we perceive no succession, or the part that occupies the time of a single thought." As thoughts are always accompanied with impression, and that interval cannot be less than one-eighth of a second to produce upon the retina an image of external objects, the definition requires more time than is usually occupied in making photographs of moving objects.

This analytical definition is simply one of judgment. What we want is the synthesis that builds up and gives you an idea of the word and meaning. The word instant is from the Latin (I am present); and instantaneous therefore means a part of time of small intervals. There are three intervals: *Temporary, Natural,* and *Rational.*

The first is a part of time immediately preceding another; the second relates to cause and effects; and the third, not a real interval, but a point which the mind conceives to exist before. The word instantaneous, as used in physical measurements, relates to extremely small intervals—from a second to the millionth part—and in this connection is all that may be desired, and has a near approach to a proper application; and as I hope to explain by some brief statement of measurements that are used by physicists, how these small intervals are expressed. Any attempt to express fractions of a second must be made in a way that our limited conceptions of figures may comprehend, and be able to judge of an interval of time that lies within a certain limit.

All our measurements of time or dimensions are relative, without which all figures fail to convey an idea. The astronomer states the distance of stars, not in miles, but tells you they are so many times the distance of the sun from the earth. The physicist measures a wave of light, and expresses its length for a certain ray at $\frac{1}{37000}$ of an inch, and tells you that the undulations to produce violet light are 727 millions of millions in a second.

Further experiment gives the duration of the electric discharge at $\frac{1}{30000}$ of a second. Thus the electric discharge, as compared with the figures in light, cannot be called instantaneous, for it has a longer duration than light, however small that fraction may be. To go still farther into motion and time, molecular physicists gives figures that would require light ages to catch up to. Prof. Crookes says that if we take a bulb 13·5 c.m. in diameter, it contains more than 1,000,000,000,000,000,000,000,000 molecules. Now, when that bulb is exhausted to a millionth, we still have a trillion molecules in the bulb.* These figures the mind cannot conceive of, and it is not important that it should, as they are only used as a basis of minute calculation. In all these cases there has been used either time or dimensions as a relative term.

Now, when we come to divide or speak of the hundredth part of a second, as compared with these figures given above, the most rapid animate objects are comparatively at rest. We speak of a negative taken with a certain size diaphragm, and the time is stated in so many seconds or minutes. This is understood by all for the reason that we have qualified by stating the unit, which is familiar to every one. When the exposure is less than a second, all that is necessary is to know the speed of exposers, and then express the time in a definite fraction. When the word instantaneous is used, unless the fraction is expressed, it is as indefinite as shortly, soon, perhaps, by-and-by, &c., as is used in ordinary language.

Let us try and at once abandon such terms as were formerly used before the introduction of gelatine plates, and replace them with expressions which are individually distinct, and distinguished by some quality. I might add that I think there is hardly a word used in photography which more urgently calls for a substitute than instantaneous.

I submit this for the careful consideration of members of this Society, and I hope your attention may be excited to this important subject, for, as photographers, we have a particular interest to use intelligent and practical terms of expression. I have noticed with pleasure that some of the leading photographic journals have ventured to use "so-called instantaneous," showing that the term is taken with a great deal of faith, and carries with it a ray of suspicion, if not ridicule. Whatever doubts may exist on the use of the term, there can at all events be no dispute that the word instantaneous, as used in photography, is a misnomer. A question, therefore, now arises of great moment, namely, what can be used in place of instantaneous? I will not venture to propose a name this evening, as the views I have advanced are only preliminary, and will be treated of more fully at another time.

My apology for having introduced this digression, which, though adding nothing to the strength of the argument, may be useful as illustrating, and thereby enable others to appreciate the value of methods of determining, small intervals. The determination of small intervals of time has attracted the attention of investigators for many years.

To be concluded.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 26th ult., C. Heinrich Trinks in the chair.

A. Cowan exhibited a model of his new "Levelling and Setting Machine," whereby freshly-coated emulsion plates traversed a refrigerating tunnel on two cords working over a series of wheels. In the larger machine, as in the model, the cord was in one piece, which necessitated only a single join, and by suitably splicing the strands, no uneven-set plates had been found. Mr. Cowan recommended keeping the ice in bars, with provision for the water to pass below, which he found more economical.

J. Barker drew attention to a couple of cabinet mounts of a light colour, the surfaces of which were imperfect, and led him to suspect this as a cause of fading. A sample of chocolate mounts stored under the same conditions had not changed.

The Chairman and others were of opinion that the marks in question were due to a fungoid growth accelerated by damp.

The following question was then read:—"What is the simplest form of artificial light suitable for taking portraits in an ordinary room of an evening?"

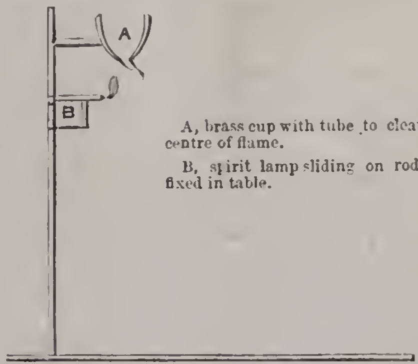
W. E. Debenham said that magnesium was the simplest. Nothing was better than an electric light, but the installation was expensive. Pyrotechnic mixtures containing arsenic gave off highly poisonous gases, and were therefore bad.

A. Cowan had seen Mr. Brittlebank take very good pictures with six strands of magnesium wire.

W. E. Debenham had succeeded very well with the magnesium powder, and he also spoke of photographing interiors of mines with twenty to fifty strands of wire arranged on a couple of sheets of tin.

The Chairman described Dr. Fol's plan of photographing some caves in Egypt. He used two magnesium lamps, and flashed the light on the walls at short intervals.

W. H. Harrison detailed some of his experiences in photographing with magnesium; he had used two lamps, but these gave hard shadows. He then constructed an arrangement similar to that shown in the diagram, which was supported on a table in order to obtain a high-light. He usually put a thimblefull of sand and another of magnesium into the cup for each exposure; the exact quantity, however, would have to be determined by practice. The plan answered perfectly, and it did not matter whether he let the powder through slowly, or fast, as it depended entirely upon the amount of magnesium used. There was no difficulty in getting a flame a yard and a-half long by this means.



A, brass cup with tube to clear centre of flame.

B, spirit lamp sliding on rod, fixed in table.

A discussion followed regarding the methods of burning magnesium, and it was generally considered that the result would be the same in either case, whether a large quantity was burnt at once, or a similar quantity spread over a longer period. It was, however, pointed out by Mr. Debenham that there were advantages in the former plan, on account of the comparative absence of smoke during the period of exposure.

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* Phil. Mag., vol. 36, page 141.

Manchester Photographic Society.

The usual monthly meeting of this Society was held at the Memorial Hall, Albert Square, on Thursday, November 12th, Arthur Coventry, President, in the chair.

The minutes of the previous meeting were read and confirmed, after which the following were elected members:—J. Hall Brooks, A. H. Hall, Montague B. Copeland, J. W. Young, and John J. Arnold.

The President said the subject for discussion was "Defects in Gelatino-Bromide Plates," and asked those who had any defective plates to bring them forward. He (the president) exhibited several home-made plates in which distinct straight lines across were visible much thinner than the other part of the plate. These, he said, were due to the moving of the plate before the emulsion was properly set. On one of the plates there was a transparent line at the edge. The emulsion in this case was partly congealed, and a smaller quantity of bromide of silver in the defective portion of the film. He had observed the same defect in commercial plates, but, perhaps, not so decided.

J. Schofield wished to have the experience of others in the matter of backing plates. He had some curious experiences, one of which was, that when using a backing composed of burnt sienna and water, he had applied it in a very moist, or what might be said a wet state, just before the plates were put in the dark-slides, and before the backing had had time to dry, he had noticed that where the backing had been so applied the plate developed with a thin image; but the backing not being carried to the extreme edges of the plate by an irregular line, that portion unbacked developed beautifully dense, and the irregular line of backing could be observed in the finished plate by full and deficient density. He had observed this effect in more than one kind of plate, but he had also observed the absence of it in others, and had purposely tried the experiment to produce it at will, but had not been successful. Mr. Schofield called attention to some plates he exhibited some years ago to which he had applied a wetted gum ticket on the back, and which, when developed, showed the outline of the ticket by the thinness of the film opposite that spot on which the ticket had been fixed.

The Hon. Secretary said he remembered the circumstance, but had not been troubled with this difficulty for years, and now used the tickets in the manner described.

J. Greatorex said that a short time ago he was called upon to take a few photographs, and in the hurry had not time to dry the backing, which was black varnish, having turpentine as a solvent medium; the plates were put in the slides before the varnish was dry, and no ill effects were produced; notwithstanding, he understood turpentine to be very deleterious to gelatino-bromide films.

The Chairman said in that case there appeared to be as much moisture in the dark-slide as was the case with Mr. Schofield's backed plates.

Allan Garnett said he had found commercial plates in which the emulsion had run in streaks over the back, and which often settled in a strong line, producing a corresponding thin mark in the finished negative.

J. S. Pollitt said he accounted for this in the following way:—It was admitted that a plate which had been slower in drying was less sensitive than those more quickly dried, and where the emulsion had run over the back the corresponding portion of the film would be slower in drying than the rest, therefore, would be less sensitive, and consequently develop thinner.

S. D. McKellen said he would like to ask if dull brown paper was not as effective as a backing in optical contact with the plate. He said he had taken some trouble in this matter, and when looking into a plain sheet of glass, no particular reflections were visible, but when the back was coated with varnish or other medium in optical contact, the reflections were greater.

The Hon. Secretary said that was not an analogous case; we had then the front surface to contend with.

T. Schofield said the best medium he had found for backing plates was a paste sold at the india-rubber stores; it could be obtained in black, brown, or yellow.

F. Wood said he would like to know if it was necessary to back plates at all; he had not found much necessity for so doing.

R. Atherton said probably he used very thick or dense films, in which case it was less important to back them.

J. Pollitt said he had been in the habit of backing his gelatine plates for a long time, and could speak to the absolute necessity for so doing in many cases; he never took the trouble to dry the backing, frequently dabbing the moist medium on the back as he put them in his slides; and, moreover, it was usual for him to apply the backing in portions of the plate only, as, for instance, when he knew a certain church window would occupy the centre of his plate, he simply applied the backing to that particular portion, and had never experienced the slightest unevenness in density, as had been described by Schofield. He used a mixture of brown umber and glycerine; sometimes it would not be dry for two or three days. He thought, perhaps, Schofield's plates must be in a state of premature decomposition, and the damp on the back might have accelerated the decomposition, and could account for it in no other way. Mr. Pollitt said that by backing his plates he was now able to get better results than a short time ago he ever expected, and mentioned several instances where the backing had prevented blurring in church windows on plates that had been exposed two, three, and four hours.

The Chairman said, on the subject of halation, there were two different effects, one caused by reflection, and the other by lateral development. This might be noticed in many plates where the sky occupied the top portion of a plate. The extreme edge of the plate, notwithstanding it had been protected from light by the rabbet of the dark-slide, nearly always showed a dark deposit, this effect not being noticed in the bottom part of the plate, which was equally protected by the rabbet of the dark-slide; because the light admitted to the foreground of the picture was not so intense, there lateral development would not take place to the same effect as the portion near the sky. The same effect is produced when the fine branches of trees are jerking up into a bright sky.

Mr. Pollitt said, providing the films are of sufficient thickness, and a backing be used, there would be little objection in such a case; but where the films were thin, a filling-up, as stated by the Chairman, was often the result.

S. Garnet said he had been experimenting with paper negatives of late, and, although it was stated they were not subject to halation, he had been troubled with it quite as much as with glass plates, and mentioned an instance in point.

Mr. Pollitt said this was contrary to his experience in paper negative work.

To which the President replied in favour of the theory of lateral development.

J. Pollitt said the experience of Mr. Garnet was in opposition to his own, so far as he had worked paper negatives.

J. Kershaw exhibited on behalf of Messrs. Wilson and Co., of Aberdeen, six very beautiful sea ships, with boats, in full sail, in which the finest ropes, &c., were most distinctly shown against a bright sky, not the faintest trace of halation being visible. These were taken by means of a "Kershaw" instantaneous shutter.

The Chairman said they were a good proof of the possibility to produce pictures without halation, and they were quite as free from it as if they had been produced on ground glass.

A general discussion then took place on the best fog-removing solutions, and various formulæ were given, the most generally adopted being alum and citric acid, or alum and hydrochloric acid.

C. Greatorex asked for a formula for good varnish, suitable for transparencies for the lantern; he had tried almost every known commercial sample, and whilst some were too long in drying, others were not transparent enough.

Mr. Wood said Canada balsam in ether was the best he had used; and, after various other samples and formulæ had been given,

The Hon. Secretary said he rarely varnished his lantern transparencies; he usually made them by the collodio-bromide process, and coated them with albumen, and coagulated it afterwards by heat.

C. Greatorex said he had used Canada balsam in turpentine, and it took weeks to dry.

F. Wood said the varnish made of Canada balsam and ether dried in a few seconds.

J. Rainor showed a negative of an interior where the windows were produced as a negative.

The Chairman said this was due to the reversed action of light.

The lateness of the evening prevented any further discussion, and the meeting was adjourned.

The subject for discussion at the next meeting would be "Development of Gelatino-Bromide Plates."

The second meeting this season of the Lantern Section took place on Wednesday, the 25th inst., at the Memorial Hall, Albert Square, when about 400 members and friends were present, under the presidency of Mr. W. I. Chadwick, who said that making good lantern transparencies was one of the most difficult branches in photography, for many amateurs who excelled in producing paper photographs failed entirely at this class of work. The slides, which had been sent in two days previously, complying with conditions that they were to be of the standard size (3¼ inches square), with two white tickets affixed at the top corners on the face side, accompanied by a list of names of subject and process by which they were produced, amounted to about 160. Amongst those deserving special mention were a few by J. W. Leigh, produced on gelatine-albumen plates, characterized by fineness of grain and freedom from fog. Next came a beautiful series by Mr. Edwards, prepared on collodio-bromide plates, the fine artistic composition of the subjects being marred in many cases by the unshapely mounting.

Mr. Storold exhibited three photographs of a waterfall and bridge in Yorkshire, copied from 7½ by 5 negatives.

Otto Muth then showed a large collection of pictures taken during the last summer—"Holiday Rambles in Various Parts of England." These were all produced on wet collodion plates, camera printed, and toned with gold and platinum. They were bright and vigorous without being hard, and uniformly good.

After all the members' slides had been shown, a series were exhibited by H. S. Starnes, produced by a gelatino aceto-chloride process, which that gentleman has recently published, and is still working at, with a view to further improvements. It is only just to say the slides exhibited a variety of colours, which, it is understood, can be produced at will; and the fineness of texture or absence of grain, and the transparency in the shadows, was appreciated.

J. G. Jones was the lanternist for the evening. The disc was sixteen feet diameter, the lenses used being nine-inch focus, of the single achromatic form, with a diaphragm in front; the light was bright without being dazzling.

The next ordinary meeting of the Society will be Thursday, December 10, at which there will be a demonstration of "Developing Gelatino-Bromide Plates," and a general discussion on the subject; and the next Lantern Meeting will take place December 23.

Birmingham Photographic Society.

The first annual meeting was held on Thursday, November 26th, the chair being taken by the President, who gave his address.

The Hon. Sec. read a letter from W. J. Harrison, resigning his position as Vice-president of the Society, but a resolution was passed that Mr. Harrison be asked to withdraw his resignation.

The election of officers for the ensuing year then took place, with the following results:—

President—Dr. Norris.

Vice-Presidents—Dr. J. C. Huxley, and W. J. Harrison.

Treasurer—G. M. Iliff.

Honorary Secretary—W. J. Joyner, and B. Karleese.

Librarian—E. J. Cox.

Council—J. P. Healon, J. H. Pickard, J. Lewis, H. Lucas, R. P. Taylor, S. Delicate, F. Birkett, and E. Middleton.

In the report, the Council congratulated the members on the progress of the Society since its inauguration in April of the present year. The members and associates now number 92.

The custodian of the albums and exchange portfolio reported that the portfolio had been well patronised. Since its commencement a few months ago, one hundred and fifty-three prints have been subscribed.

Dr. Norris's Presidential address was the more interesting from the fact that he is one of the oldest workers in photography, his acquaintance with art commencing somewhere about 1848. At that time the photographers in Birmingham could be counted on the fingers of one hand, a contrast when compared with numbers at the present time. In 1856 he took out a patent for the production of collodion dry plates, but they have been superseded by the present gelatine film. In conclusion, the Doctor offered a donation to the Library of his work, "Pathology of the Blood," which is illustrated by means of photo-micrography.

Cambridge University Photographic Club.

A meeting of the above Club was held in Emmanuel College on the 21st inst., when an exhibition of photographs was held. About forty prints and negatives were shown, of distinctly good quality. Among other business transacted by the Club, it was decided that it should be affiliated with the Camera Club.

A paper was read by Mr. Jenkin, of Trinity, on the Eastman process, which was evidently interesting to the members present.

Liverpool Amateur Photographic Association.

The annual meeting of this Association was held at the Free Library, on Thursday, November 26th, the President, J. H. Day, in the chair.

The Secretary raised a question of having a studio in the centre of the city for the use of members.

The matter was seconded by the President, and supported by Messrs. Ellerbeck, Kirby, and Banner. A discussion arose on this subject, and members were invited to hand in their names as subscribers to the scheme; and twenty-one names were at once handed in, and the matter stood over for further consideration.

Mr. Watts and Mr. Hartley seconded a proposal, that a certain number of Camera Club tickets be applied for the use of the members. This resolution was carried.

The Secretary then read the annual report.

The next business was the election of officers for next year, as follows:—

President—P. H. Phillips.

Vice-Presidents—E. Twigge and G. H. Rutter.

Treasurer—J. H. T. Ellerbeck.

Members of Council—A. W. Beer (who declined the President's post), J. H. Day (ex-President), and J. W. Kirby, F. T. Paul, B. Boothroyd, and W. Rogers (*vice* Mr. Forrest resigned).

These nominations were unanimously confirmed, as was also the re-appointment of H. Norwood Atkins as Honorary Secretary.

The Secretary then read the revised rules for the next year's competition as proposed by the Council at a meeting held on the 23rd inst.

I. That pictures for competition be sent in not later than half-past six p.m. on the day of the meeting of the Association in October, addressed to the Honorary Secretary. That the Judges award the prizes during the following week, in writing, and that the Secretary advise the winners at once; the prizes to be handed to them at the November meeting.

II. That each picture shall bear a private mark or motto only, and be accompanied by an envelope bearing a similar mark or motto outside, and containing within the proper name and address of the competitor.

III. That the subjects for the annual competition be chosen by the Council, and announced to each member at the November meeting.

IV. That the certificates of honour and prizes be awarded by three Judges, to be selected by the Council.

V. That each picture for competition or for exhibition be mounted on a separate mount of any size deemed suitable by the exhibitor.

VI. That only one picture be submitted by any member for competition in each subject.

VII. That the competing pictures must have been taken during the year preceding the adjudication of the certificate or prize, and that the development, printing, toning, and clouds (if any) must have been the *bona-fide* work of the competitor.

VIII. That a certificate of honour and prize be given to the producer of the best picture illustrative of each subject.

IX. That all exhibits become the property of the Association.

X. That a competition in lantern slides be inaugurated at the March meeting, each exhibitor sending in three slides on the evening of the meeting in that month, the successful exhibitor receiving a prize, and all the slides becoming the property of the Association.

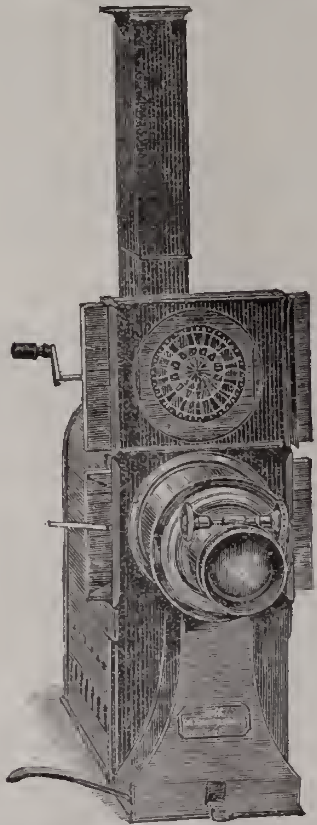
The judges handed in the pictures of the late competition, and gave their awards as follows:—"Cottage Door," Percy G. Hall; "Rocky Shore," Paul Lange; "Animal Study," W. H.

Kirkby; "Marine," W. P. Riley; "Farmyard," Percy G. Hall; "Instantaneous," Paul Lauge; "Interior," A. W. Beer; "Stereoscopic" (one competitor), no award; "Best Picture of Year," Percy G. Hall; "Best Series," Percy G. Hall; "Own Emulsion," W. H. Kirkby.

Talk in the Studio.

Photographic Society of Great Britain.—The next ordinary meeting of this Society will take place at 5a, Pall Mall East, on Tuesday next, December 8th, at 8 p.m., when papers on "Focal Lengths of Lenses" will be read by G. L. Addenbrooke; and on "Gelatine Tissue on Cardboard," by G. L. Addenbrooke and F. Ince.

Wrench's Metamorphoser Lantern.—Our attention has been called to a lantern constructed by Messrs. Wrench and Son, of Gray's Inn Road, in which there is an ingenious contrivance for rapidly changing one slide for another by means of a double changing slide working vertically. The general appearance is illustrated by the accompanying cut.



Ulster Amateur Photographic Society.—This Society has been founded to meet a want which has long been felt among the numerous amateur photographers of Belfast and the North of Ireland, who hitherto have had no opportunities for interchanging their experiences and information, and for discussing the numerous advances which have recently been made in photography. Amateur Photographic Societies have sprung up in many parts of the kingdom, and have been of signal service in promoting an interest in the art, and it is felt that North of Ireland should not be behind-hand in the matter. The committee of the Ulster Amateur Photographic Society, having carefully considered the means by which the Society can be of most service to its members, have decided on the following programme:—1. Meetings will be held once a month in the Museum, College Square North, Belfast, from October to April, for the reading and discussion of papers, the exhibition of views, portraits, new apparatus, and lantern slides, and the demonstration of new processes, &c. 2. Excursions will be made at stated periods during the summer for field work. 3. It is hoped that a dark room will be secured for the use of members of the Society. 4. A collection will be made of books, photographs, lantern slides, and other objects of interest connected with photography. Members of the Society will have access to this collection, and are invited to contribute towards it. The committee also wish, if possible, to arrange for the loan of certain apparatus—such as full-plate and copying cameras, &c.—to members of the Society for short periods. They hope that a system of prizes will be inaugurated for the best work done by members of the Society in certain branches of photography. Finally, they wish it to be understood that all amateurs, whether ladies or gentlemen, are cordially invited to join the Society, and to co-operate with and assist the committee in furthering its aims. The following are the officers:—*President*—Professor Letts. *Vice-Presidents*—James Stelfox and James Wilson. *Committee*—William Gray, John H. Greenhill, Cecil E. Shaw, Dr. Ward, Thomas Workman, J.P., and W. F. Coates. *Hon. Treasurer and Secretary*—George G. Ward, Clonaver, Strandtown, Co. Down.

Photographic Club.—The subject for discussion on Dec. 9th will be the Annual Dinner. Applications for tickets should be made at an early date.

To Correspondents.

⁂ We cannot undertake to return rejected communications.

T. S. L.—Thanks for the interesting specimens, concerning which we shall have something to say next week.

F. C. R.—Soak them in a saturated solution of alum after fixation.

G. A. Viny.—Under the circumstances you should use the new paper for development. It can be obtained from Marion, 22, Soho Square, London.

N. Macbeth.—See our answer to E. B. Stewart in our issue of last week.

Jim.—Trim the picture before mounting it upon the glass, and then squeegee down upon it a sheet of paper bearing any title or device that may be needed; after which build up to the required thickness with sheets of paper, finishing off with a printed back if this is required. Before applying each sheet of paper, the plate should be flooded with moderately strong gum-water.

Anon, Jun.—Clean by the cautious use of methylated spirit, and then varnish.

W. J. J. Lord.—There is no book specially devoted to the subject, but much information is contained in the back volumes of the News, and in the Year-Books.

J. F.—Because its essential feature is the organization of a series of exchanges through the post.

R. F. Dixon.—On the whole it seems to us that No. 2 is to be preferred. 2. Under the circumstances their removal will be difficult, if not impossible. 3. The angle included makes no difference as regards the exposure, it being merely a question of the relation of aperture to focus.

R. B. (Solgraph Co.)—We cannot undertake to do what you ask.

N. Layton.—You have neither thoroughly fixed your plates, nor thoroughly washed them, and there is but little probability of saving them now. The best thing is to make the best contact transparencies you can, and then to fix afresh, and thoroughly wash the originals.

Beginner.—There is no maker of the name, as far as we know, and we should imagine it to be a cheap French instrument.

Printer.—Test the cardboard for hypo after this fashion:—Soak some cuttings in enough water to cover them, and filter off the liquid. Then add to it a solution of iodide of starch, made so dilute as to have only the faintest tinge of blue. A discharge of the colour indicates hyposulphite. To make the iodide solution, boil a dozen grains of starch in an ounce of water, and when cold, add sufficient of a saturated solution of iodine and water to strike a bright blue colour.

Express.—It is not sufficient; at least ten drops must be added, but generally much more is required.

C. Thompson.—Read the account once more, and you will probably see in what way you have misunderstood the matter.

The Photographic News.

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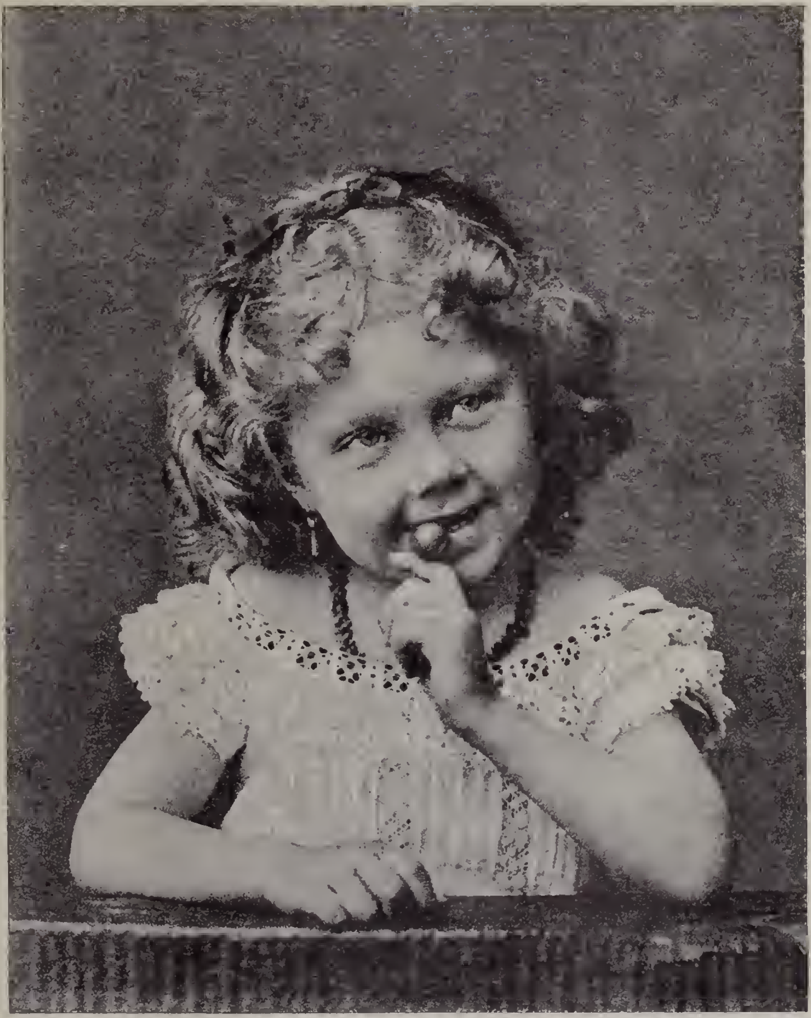
SUPPLEMENT TO "THE PHOTOGRAPHIC NEWS" 4TH DECEMBER, 1885



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THE PHOTOGRAPHIC NEWS.

Vol. XXIX. No. 1423.—*December* 11, 1885.

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REDUCING THE DENSITY OF NEGATIVES WITH THE VIEW OF OBTAINING CLEAR SHADOWS.

Of the several methods of reducing the density of gelatine negatives which have from time to time been suggested, there is probably none so efficient as the "ferricyanide of potassium" reducer. This acts rapidly and evenly, reducing the high lights as rapidly, or almost as rapidly, as the shadows. Although the action of this reducer is so good, it appears to be less known than it should be, whilst it sometimes appears to be worse than unknown. By some it is *mis*-known. More than once we have seen it recommended to use ferrocyanide of potassium in place of ferri-cyanide. Perhaps it would be better for photographic purposes to replace these two so inconveniently similar names by the more popular ones, and to call ferrocyanide of potassium yellow prussiate of potash, and ferricyanide of potassium red prussiate of potash. It is the latter salt which must be used, and the following is the manner of using it.

A solution of hyposulphite of soda of such a strength as is commonly used for the fixing bath is made up, so also is a saturated solution of red prussiate of potash. Twenty or thirty drops of this latter solution are dropped into each pint of the hypo solution, and the negative to be reduced is placed in the mixture. Almost immediately a slight but quite perceptible reduction of density will be seen. The action, however, very soon ceases, and if a greater amount of reduction be desired, a few more drops of the ferricyanide solution are added, and this operation is repeated till the desired effect is produced, when the negative is thoroughly washed and dried. By this means negatives "as black as one's hat," which would not print in days of bright weather, may be altered to thoroughly good and rapid printing negatives.

There is a direction in which the use of the reducer we have been describing might, we think, be greatly extended. We got the first hint of the matter from a recommendation made by A. Cowan some time ago. It is well known how difficult it is with any process to get, in the case of lantern slides, that *absolute* clearness of the high lights which is necessary if the brilliancy of the picture on the screen is to be the greatest possible. The difficulty has been experienced with the gelatino-chloride process as well as with others. Mr. Cowan's suggestion was to slightly over-develop the transparencies, and afterwards to reduce them by the use of a little red prussiate of potash added to the fixing bath. We have used this method, and can state that it certainly is one whereby the most brilliant clearness can be got with gelatino-chloride plates; but why should the same means not be used to produce the same result in the case of negatives on gelatino-*bromide* plates?

It has been, since the first introduction of these, a matter of great difficulty to get perfectly clear shadows. Indeed, it may be said that, except in the case of very slow plates, it is impossible to get, by the ordinary method of working, a good printing negative which has perfectly clear shadows. Not that it is impossible to develop any good plate so that a totally unexposed part will remain quite clear; but, as a rule, it is necessary if we wish to get printing detail in the shadows, to so push both exposure and development that there is a slight veil over the whole film. This state of affairs is very different from that in a wet plate, where we may have strong detail in the shadows, and at the same time small portions of glass on which there is no perceptible deposit.

Although this very desirable state of affairs appears to be unattainable in the case of rapid dry plates when development is conducted in the ordinary way, and is followed by no after process, recent experiments have led us to believe that in the use of the ferricyanide reducer we have a means of reaching it. We have taken several dry-plate negatives which had had correct exposure, but had been somewhat over-developed. They were full of detail, veiled in the shadows, and capable of giving brilliant—almost hard—prints with time enough allowed. These were treated with the red prussiate of potash reducer. The action was continued till the very deepest shadows were represented by absolutely clear glass. By this time the highlights were greatly reduced; but it must be borne in mind that a negative with perfectly clear shadows gives a brilliant print when the lights appear by no means very dense. The shadow detail retained the density necessary to print satisfactorily, and, in short, the negatives printed after the reduction in a fourth to a fifth of the time they required before, whilst they gave brilliant prints which appeared better in every way than those got from them before treatment.

From this it would appear that there is a chance of getting, with gelatine plates, negatives which will print as quickly as those on wet plates, by pursuing the course of prolonging the development a little farther than we otherwise would, and afterwards adding a few drops of a saturated solution of ferricyanide of potassium to a second fixing bath. When we have further experimented in the direction indicated, we shall probably have a few more words to say on the subject.

Another point where the reducer is most useful is in the case of over-exposure. It is pretty well known that where we have over-exposure, to a not enormous extent, it is only necessary to get a negative which will give a brilliant print to continue the development. But if we do nothing more than develop and fix the negative in the ordinary way, although we get a negative capable of giving a brilliant print, it is one which will take an inordinately long time in printing. Now, if we only bear in mind the ease with which we can reduce and clear the negative after it has been developed and fixed, we need have no fear of pushing development till the image is buried in fog. We will, by this means, probably get a better negative than we would by stopping the action when we had merely a phantom image with a view to subsequent intensification, or by attempting to compensate by the addition of large quantities of bromide to the developer. It must be borne in mind that we speak here of over-exposure which is not enormous. If we expose thirty or forty times the normal extent, we cannot, as a rule, get contrast enough, develop as we will.

A FEW NOTES ON THE WINTER ART EXHIBITIONS.

BY WIDE ANGLE.

The Dudley Gallery has one inestimable quality: it is not large. Consisting of only one room, it is possible to examine the pictures without the fatigue which usually accompanies the task. As a whole, the collection does not present a very prominent "mark to the foeman," though there are not a few pictures which might have been benefited by the exactitude which an acquaintance with photography would have given. A. M. Rossi, for instance, is a rising artist whose pictures have been engraved, yet we find him painting seas which are like nothing in nature. In "The Little Anglers" (No. 188) he has represented a number of "Society" children seated on rainbow-hued piles fishing in a pink substance which looks far more like that material once known as shot silk than water. In the foreground is a toy boat, but so curiously is the aerial perspective managed, that at first sight it looks as though the spectator, instead of being on a level with the little craft, was looking down from a height upon a real boat. This is the kind of picture which print-sellers would call "popular," as it contains a number of pretty children fashionably dressed; but if it be engraved, as it very likely may be, the engraver will have to supply much that is wanting.

W. G. Daffarn surely must have been to the cheap photographer to inspire him in his picture to which he has appended, instead of a name, the quotation—

> "Roses are her cheeks,
> And a rose her mouth."

It would be difficult to find a painting which answers more to "our club portrait, coloured in oils, life-size, for one guinea." There are the gaudy colours which the club portraitist affects to the life, for Mr. Daffarn has not only given the young lady the reddest cheeks and lips he possibly can, but has put a flaunting yellow handkerchief on her head. Crudeness cannot go much further than in this combination.

There are always pictures in every gallery which puzzle one. Why should Miss Emma Magnus select a tumbler of punch, three flabby, clayey looking oysters, their shells, and a cut lemon, as a subject for her brush? The oysters have not even the merit of looking appetising; and what has the pepper done that it should be left out? One can only imagine the ridicule which would be cast upon a photographer were he to exhibit such a subject.

Blair Leighton's pictures are always conscientious, and he has the faculty of telling a story dramatically. In his "Cut Off with a Shilling" (No. 56) he has been no less successful than with his more ambitious work "The Secret," exhibited in the Academy. The figures are very carefully drawn, and in the expression and attitude of the handsome but relentless old man who is making his will, in the pleading face of the girl, and the unconcerned, business-like expression of the lawyer, he has nowhere overlapped the modesty of nature. C. B. Yate's "Wanted, a Governess," is also a meritorious piece of figure painting.

Mr. Mendoza's exhibition of black-and-white at the St. James' Gallery is of especial interest to photographers, since, being in monochrome, comparison is more easily made. Miss B. Newcombe's series of pictures of the lake district, for instance, makes one think how much time has been spent on drawings, the subjects of which could have been so much better treated by photography. The drawings are about seven inches by four and a-half, and are mounted three in a frame—exactly as photographs are. But though the scene in each drawing is supposed to be brightly illuminated, they are very inferior in effect of sunlight to (say) Mr. Gale's work. T. R. Macquoid's drawing is laboriously painstaking, but wanting in spirit. When you look at such minutely finished, but cold and colourless, productions, as is "Porta Eburnia, Perugia" (No. 43), and "Bronze Statue of Pope Julius III. at Perugia" (No. 58), and others of the same class, one is tempted to ask what good purpose is answered by such drawings? The utmost attention to details which the artist can bestow can never make his picture equal to a photograph, always supposing that the latter is artistically taken. G. J. Pinwell has a high reputation for careful drawing, but it is impossible not to help wishing that he would not see nature perpetually in bas-relief; excepting on one of those grey leaden days with which London is blessed just now, shadows can easily be found. But with Mr. Pinwell the day is ever dull, grey, leaden, and cheerless. He has some half-dozen drawings in the Gallery, but they are all in a monotone, which is very depressing. It is curious to note how artists who do much work for books or periodicals fall into mannerisms, and imitate each other. Just now the fancy is to draw figures as though they were standing on ice, or on a very highly-polished floor. This peculiarity is combined with a feebleness and indecision of touch, which suggest that the lines are drawn by some one who is either paralysed, or suffering from delirium tremens. At a distance, with their brilliant lights and deep shadows, they have a sort of attractive flashiness, but the moment they are looked into, the badness of modelling, the ugliness of the faces, and the poverty of draughtsmanship, are apparent. It is gratifying to find that none of the best artists in black-and-white go in for this kind of meretricious drawing, and no examples can be quoted from the St. James' Gallery. Hal Ludlow's "A Winter's Night" (No. 40) is the nearest approach to the "periodical" mannerism that I noticed. Mr. Ludlow drew a pretty face some few years ago, and he has been going on drawing the same face ever since. In "A Winter's Night" he has been over generous, for he has given us three—all white, ghostly, and doll-like. This is really too bad; but Mr. Ludlow is not alone to blame, for Mr. Du Maurier does the same thing. Harry Furniss is an exception, but then he is an experienced photographer, which may be the reason. I am sorry, by the way, I cannot speak highly of his drawing, "The Infant Academy" (No. 118); it is not up to his standard.

It may be considered fastidious to find fault with Miss Kate Street's picture of a lady violinist because of the high-shouldered violin she has placed in the lady's hand, but the faulty drawing of the instrument will perhaps point the lack of observation which many artists exhibit, as well as anything else. As the violin is so popular an instrument just now with ladies, it was worth while drawing it accurately. Reverting to the Dudley for a moment, while on the subject of music, is not Mr. Hobden, in "A New Piece" (No. 70) guilty of an anachronism? He has placed a young lady in the high waist and sash of the Queen Charlotte period at a harpsichord, and has crossed the left hand over the right, suggesting mechanical difficulties which I do not think occur in any of the music written for the harpsichord.

It cannot be said that the St. James' Gallery is deficient in novelty. To Mrs. Whitmore belongs whatever credit is attached to what may be called the smoked paper process. Paper, I am informed, is blackened by smoke, and then manipulated so that the smoke becomes a cloud, a shadow, or whatever the artist may choose. The outlines and figures are of course filled in with the brush. It cannot be said that this is a very high form of art, and its range is certainly very limited, being confined entirely to "fancy" pictures. But it is cheap, though whether this is an advantage, may be doubted. On the whole, the smoked paper process is not, I fancy, destined to make its mark. It belongs to the Book of Beauty period, and will, like all that is unnatural, pass away and be forgotten.

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ON OILING PAPER NEGATIVES.

BY COLONEL W. L. NOVERRE.

Although a great advance has been made towards the perfection of a paper negative process, chiefly through the Eastman Company's inventions, there are certain drawbacks which must be overcome before the process can seriously compete with gelatino-bromide films on glass. Foremost of these is the oiling operation for rendering the negatives transparent.

The Eastman Company are now using a compound, which they apply cold to the dry negative; this is set aside for several hours, to absorb the mixture. The results are in every way equal to those obtained by the use of hot oil, and the method is an undoubted improvement. I find that castor oil, applied in a similar manner, produces the same effect. The oil may also be applied to the wet negative, in which case the time taken in drying the negative on a glass or ebonite plate is saved. The wet negative should be laid down evenly on a glass plate, gelatine side next the glass; a pad of blotting-paper is then applied to smooth it down and absorb surface moisture. The oil is next applied rather plentifully, and the negative is carefully removed from the glass, and laid on a sheet of paper for a few hours till the oil is thoroughly absorbed and the moisture has evaporated.

Other oils—linseed, for instance—give perfect transparency. It is, however, not a question only of getting transparency; what is required is some substance that will not leave the paper or undergo change when once applied, and in this respect none of the substances that have been tried are quite satisfactory. A thick oil, like castor oil, is preferable to a thin oil like linseed, and the Eastman preparation is, perhaps, an improvement on castor oil. If pressed, however, for a few hours between blotting paper, the negatives saturated with any of these substances will be more or less covered with opaque spots, which shows how readily the oil leaves the paper. When not in contact with an absorbent surface, the oils seem gradually to sweat out of the paper, and may be detected on the surface. The use of vegetable oils is objectionable, on account of their drying properties, and a tendency to turn yellow by age. It seems likely that a negative saturated with a vegetable oil, and put aside for a time, would develop opaque spots, that the oil would become dry, and that the paper would refuse to absorb fresh oil; a negative in this state would be useless. The use of animal oil or grease would probably prove a remedy, and the necessity for re-oiling might be prevented by keeping the negatives between sheets of paper freely oiled. Possibly, the preparation of vaseline proposed by the Editor of the News may be free from the drawbacks referred to.

Until we know more about the matter, perhaps it would be wiser to print from the negatives without oiling them, the only objection being the increased time occupied in printing; in some cases this would be compensated by the possibility afforded of retouching the negative. To avoid the necessity for oiling, the use of very thin paper, similar to the *papier minerale*, has been attempted; but the impossibility of making it lie flat in the printing frame seems to preclude its use; besides which, the texture is not so fine and free from grain as that of a somewhat thick paper.

Reviews.

Manuel du Touriste Photographe. Par M. Leon Vidal. Seconde Partie. (*Paris, Gauthier-Villars, Quai des Augustins*, 55).

Not long ago we had occasion to point out the excellent features of the first part of Vidal's Hand-Book for the out-door photographer, and the second part deserves, if possible, still higher praise.

Although a second part, the work now before us is complete in itself, and we cannot give a better notion of its value to the amateur tourist than by outlining the nature of its contents.

In the first chapter the working details of carbon printing and Platinotype are treated of in a concise, but very intelligible fashion, and stupid indeed must be the amateur who would fail to bring his work to a successful issue by following these directions. Enlargements and projection is the subject of the second chapter, after which follow practical directions for mounting, retouching, and burnishing. The reversal of negatives—whether on glass or pellicle—is next treated of; while in the fifth chapter we find a comprehensive treatise on the sources of failure in the gelatino-bromide process, and M. Vidal tells his readers how to do better for the future. Instantaneous photography has a chapter to itself, and next in order comes a capital little treatise on the dark-room, its arrangements and fittings.

Among other matters treated of, we may mention that the beginner is instructed as to what pieces of apparatus he should buy, and the approximate cost is given, so that one commencing to practise photography has only to settle on the kind and size of work he desires to do, and on referring to M. Vidal's book he can learn what to buy, and the approximate cost. The various developers are fully treated of, while paper negatives and the production of positives by development, are also treated of.

The book is one which should not only be in the hands of the beginner, but also in the library of the advanced practitioner.

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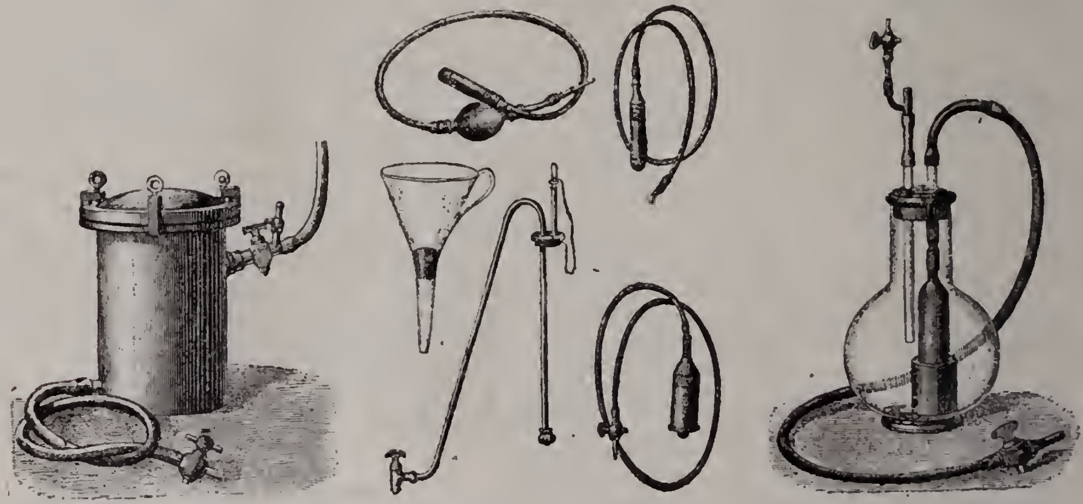
FRENCH CORRESPONDENCE.

Photographic Society of France—Brazilian Photographs—Cellulose Syphon Filters—Concentrated Ferrous-Oxalate Developer.

Photographic Society of France.—A great want is still felt in the matter of instantaneous shutters, no less than seven being exhibited at the recent meeting of the Society, none of which fulfilled all requirements. On this point, therefore, I should like to remind any who are tempted to invent new shutters that rapidity in action is not the only desideratum, but they must be capable of acting slowly and their progress well graduated, so that their successive series of exposures, varying from one second to $\frac{1}{500}$ of a second, may be calculated. For these reasons MM. Thury and Amey, of Geneva, have succeeded best with their break shutter. I have adapted it to a little No. 1 Steinheil aplanatic lens in my pocket camera, and have never required any other, no matter how strong the light. The shutter is set going at the given number, indicating the suitable, lengthened, or rapid exposure, and its action is always certain. I therefore recommend inventors to see that they use an apparatus giving at will a series of different known exposures, for very often one has to work at random. New cameras also formed a special feature at this meeting. That shown by M. Picq was capable of taking on the same plate a certain number of negatives of different sizes and exposures. This result is obtained by four curtains drawn across the sensitive plate, and by moving them further apart or approaching each other, so the shape of the exposed portion of the plate varied. A system of graduated grooves cause the dark slide to be raised or lengthened, so that the part of the sensitive plate should always be placed between the opening made by the four screens or curtains. With this camera a plate 18 by 24 (7 by 9½ inches) may serve for ten or fifteen subjects of different dimensions and exposure at the will of the operator. An automatic shutter is required with this kind of camera. MM. Marchand and Company showed a camera having an arrangement for placing the plate in relation to the axis of the lens. It has only one double dark slide and a spring box containing twelve plates, framed in pairs with sheet brass, so that two drop together into the dark slide. Were pellicles used, three times the number could be accommodated. The thin brass framing between the plates prevents scratching and other injuries. M. Mackenstein, one of our cleverest constructors, exhibited a camera having a double swing movement without increase of weight or volume.

Brazilian Photographs.—M. Marc Ferrez has brought from Rio de Janeiro an admirable collection of views of the country of very large size, about 3½ feet long, taken with M. Brandon's panoramic apparatus. The plates weigh nearly 18 pounds each, and the camera more than 100 kilogrammes, that is, a little over 220 pounds! Rather beyond the pocket apparatus! Other large photographs taken direct were shown, and also albums of very successful platinotypes. The sensitized paper was prepared by M. Ferrez, in the manner described by Pizzighelli and Hübl in their work.

Filters.—A number of filters were presented in the name of M. Heyland, the filtrating matter being composed of fibre of the nettle. This is a sort of cotton, coarser and less compact than ordinary cotton, made into a kind of sponge, which thick liquids can run through easily, such as syrups, saturated solutions of salt, gelatine, and various gums. The advantages these filters possess is that they constitute syphons at the same time, set in action not by the mouth (both a disagreeable and dangerous practice), but by atmospheric pressure. A glance at the illustration of these filters will show their working by means of compressed air acting on the substance to be filtered.



The syphon A receives the filtering fibre in the tube *b*, pierced with holes at its base. This tube is plunged into the liquid to be filtered, and by compressing the india-rubber ball, *d*, a partial vacuum is produced, the tube is squeezed, and by force of exterior atmospheric pressure the syphon is filled with the liquid, and a continuous stream flows from *e*. I recommend this little apparatus in photographic or chemical laboratories, &c. It is needless to add that the spongy material may be used indefinitely; after using, take it out and wash thoroughly in hot or cold water, let it dry, and then put it back ready for use again. The form shown at B may be procured in glass or metal; C may be introduced in any bottle, and is very portable. The maker is F. Heyland, *via* S. Ragonda, 12, Milan.

Concentrated Ferrous-Oxalate Developer.—Dr. Eder recommends a concentrated ferrous-oxalate developer. This formula is 100 grammes boiling water, 60 grammes neutral oxalate of potash, and 20 grammes sulphate of iron dissolved together, filtered, and placed in well corked bottles. With a slight addition of tartaric acid this liquid keeps up for a long time. I have tried it in this state, but it brought out the image very slightly; to use it with success it must be diluted with two or three times its volume of water, or for over-exposed plates immerse them first of all in the concentrated solution, and gradually add the water until fully developed. Several litres of this developer may be prepared beforehand, so as to have it always ready and in good condition. LEON VIDAL.

COLOURED MEDIA FOR THE PHOTOGRAPHIC DARK-ROOM.

Contribution from the Physical Laboratory of the Massachusetts Institute of Technology.

BY WILLIAM H. PICKERING.[*]

SINCE the advent of the gelatine dry plate, many photographers have complained that their eyes are injured by the dark red light generally used in development. Considerable discussion of this subject has been aroused of late, but the only experiments made, as far as can be learned, have been to determine how much plates fog when exposed at the same distance to the various media tried. The experimenter then examines some object at that distance, and if he thinks he can see about as well, and the plate is less fogged, the medium is pronounced an improvement.

In order to obtain more satisfactory results the following problem was proposed :—For a given distinctness of vision, what medium, or combination of media, will give the least fog on a gelatine plate? In order to determine at what distance from the lights equal distinctness of vision was obtained, a negative having some fine markings upon it was held at such a distance from the various sources that the details were just distinguishable from one another. Different portions of a sensitive plate were then exposed at these distances, one after another, to light coming through the different media, and the plate was then developed. Exposures with both daylight and gas-light as sources were made on the same plate, and, as was to be expected, those made by daylight were much the most fogged. If more coloured glass was used, the daylight was too faint. So, for this reason alone, gas-light would be preferred. Add to this, that, if the gas-flame be placed at the bottom of a properly-constructed flue, it will serve to ventilate as well as light the dark-room; and also that it can be used in the evening and on dark winter afternoons when daylight is out of the question. Moreover, since the gas-flame is much more uniform in brilliancy, it is correspondingly easier to determine when a plate is properly developed, and fewer plates are lost in this way.

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[*] Communicated by the Author.

Experiments with the following media have been made, and are numbered in the second and third columns in order of their desirability. It will be noticed that there are five media which with gas-light give better results—*i.e.*, less fog—than the best medium with daylight. In the second series, the third column gives the distance in inches in each case at which the fine details were visible from the gas-flame. No medium is wholly satisfactory with daylight unless it contains red glass or paper. The window used with the gas-light measured six by seven inches, and was situated fourteen inches from the gas-flame. The window used with daylight measured five by five inches. Direct light from the clouds was used. The plate was developed in the first series with oxalate, and in the second with pyro and soda developer.

FIRST SERIES.

Coloured Media.	Gas.	Sky.
Red and yellow glass	1	12
Red and ground-glass	2	6
Post-office paper	3	14
Red glass	4	8
Yellow glass double	5	16
Yellow and violet glass	7	18
Carbutt's red paper	9	10
Red glass double	11	13
Yellow and green glass	15	17

SECOND SERIES.

Coloured Media.	Gas.	Inches.
Canary paper double	1	8
Golden fabric double	2	29
Red glass	3	38
Golden fabric single	4	58
Red, yellow, and ground-glass	5	11
Red and yellow glass	6	22
Canary paper single	7	19
Post-office paper...	8	15
Yellow and green glass	9	41

It was found that ground glass transmitted fifty-five per cent of the light from a gas-flame coming through the red glass, while it transmitted only about nine per cent. of daylight under similar circumstances. Its effect is therefore similar to yellow glass. The fact that the yellow-violet combination was so satisfactory with the gas-flame was probably due to the capacity of the yellow to cut off the small amount of violet emitted by this source, while it was quite inadequate to destroy it in the case of daylight, as is indicated by the figures. The precise order here given is not insisted on, but only the general sequence, as in the case of most of the media there was very little difference in their desirability, and sometimes the position of two media on the list would be reversed by a negative. One fact was brought out, however, with great distinctness in all the series, and that was the great inferiority of the yellow-green combination. This was of course to be expected, but as many photographers still use this medium in their dark rooms, it was considered desirable to include it in the list, merely to show its inferiority.

Although in the second series canary paper double seemed to give the least fog of any of the media, the light transmitted by it proved to be so faint that it was quite inadequate for satisfactory illumination of the dark room; and owing to its opacity, some doubt was cast on the accuracy of the observation The second medium on the list has therefore been selected as the best practical one to employ with gas-light illumination. Its colour is very pleasant to the eyes, and, being translucent, instead of transparent, it lights the whole room in a very satisfactory manner. It is advisable to place it behind the sheet of glass, in order to protect it from being soiled by the chemicals employed. If one is obliged to use daylight as a source of light, it is probable that a sheet of red glass in connection with one or two thicknesses of golden fabric would form as satisfactory a combination as any.

Experiments were next made to determine how bright a light is permissible with the medium adopted. The fish-tail burner which was used on the gas-lamp was placed fourteen inches behind a double sheet of golden fabric, measuring twenty-four by sixteen inches. An extremely sensitive gelatine plate was placed at a distance of twelve inches in front of the medium, and a portion of it exposed for one minute. It was found that if the gas-flame measured only one inch in height, not the least trace of fog was produced by the exposure. This is too faint a light for satisfactory use, however, and as a very minute amount of fog does not injure a negative perceptibly, and the direct exposure to the light in actual practice is much less than a minute, the flame is turned up to a height of an inch and a-half or two inches for ordinary development. By this light one can readily see to read the finest type, and the light pervading the whole room is very satisfactory. After a short exposure to it, in fact, it seems almost like white light.

In this connection may be mentioned a device which has proved very useful as an auxiliary in enabling one to judge of the proper development of a negative. A square hole measuring an inch and a half on a side is cut in the upper portion of the golden fabric, and a piece of red glass inserted between the two thicknesses. If a negative be now held near this hole, a red square of light will be cast upon it. This square can be seen even when the lights of the negative are quite intense, and, by noting its distinctness, one can judge of the opacity of the high lights as accurately as he can of the details of the shadows of the picture. If the high lights reach their proper intensity first, he develops for the shadows, and *vice versa*.

As the whole question of the proper medium to use resolves itself merely into what part of the spectrum to employ—red, orange, or orange-yellow—and all three of these yield nearly equally good results, it is evident that no important improvement can be made in the future. But as the orange-yellow is much the pleasantest light of the three, and seems to give rather less fog than either of the others, it is the colour to be recommended. Any medium which will transmit this colour will be found satisfactory, but golden fabric is perhaps as convenient as any.

A very portable form of lantern to be used when travelling consists of a strip of golden fabric, a foot wide by two and a-half in length. When one wishes to use it, it is rolled into a cylinder a foot long, and five inches in diameter, and pinned. A kerosene lamp with the wick turned down low, or a candle, is then placed inside, and the lantern is complete. The circle of white light formed on the ceiling is not bright enough to do any harm. The lantern is set several feet away from the exposed plates, and they should in general be protected as much as possible from direct illumination. There is then plenty of light, and yet not the slightest danger of fog.

PAPER NEGATIVES.

BY J. TRAILL TAYLOR[*]

I IMAGINE I shall have to treat my subject on the "Then and Now" principle, in order to elucidate the stages of advancement that have been made since 1840, when paper negatives were first introduced. *Then* each man prepared his own sensitive paper; *now* he buys it ready prepared. *Then* the image was in the texture of the paper; *now* the paper is employed merely as a flexible support for the pellicle containing the negative. *Then* the exposure required was long; *now* it is reduced to instantaneity. *Then* the photographer had it in his power to control the results sought to be obtained, seeing that he prepared the paper himself; *now* he is at the mercy of the manufacturer. *Then* he could produce admirable artistic negatives—doubly admirable when the infantile state of the art is taken into consideration; *now* he cannot do much better. And here let us drop these sharp contrasts.

By way of showing what was done in olden times—what I may term the primary paper era of photography, when as yet collodion or glass had not been introduced, I shall submit for examination Talbot's "Pencil of Nature," a work so exceedingly scarce as to be very seldom seen anywhere. Although the volume was published forty-one years ago, I know from personal information from Mr. Talbot that some of the negatives from which this invaluable volume was printed were taken much longer ago than the period indicated. From a sketch of the life and labours of Mr. Talbot, written by myself in 1864, and during which time I was brought very much in contact with the deceased *savant*, and had the unspeakable advantage of being made conversant with many details in connection with his invention of negative photography, I give the following extract :—

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[*] Read before the South London Photographic Society.

> "It was on the 7th of September, 1840, that the great discovery was made. The process then discovered, to which Mr. Talbot gave the name of the 'Calotype,' quite changed the aspect of photography. He found that when paper was impregnated with iodide of silver, and excited with nitrate of silver, and then placed in a camera, it was not necessary to wait until the view had become plainly visible and strong enough to print from ; but that if it were quickly removed from the camera in a state even of apparent blankness, and without the appearance of a trace of an image upon it, it would, if washed with gallic acid, disclose that image, which during several minutes acquired more and more force, until it became strong enough to print from."

Having submitted for inspection prints from these early paper negatives—proofs printed on plain paper and untoned by gold, for these antecede either albumenized paper or gold toning—I now submit a few of the negatives themselves, some of which are by Mr. Talbot, the others being by various experimentalists who at once rushed into the field, including myself. And having thus submitted the negatives for your most critical examination, let me ask you, as the photographic experts of 1885, whether very much superior work can be done even at the present day ? I think not.

About the time of the formation of the Photographic Society of Great Britain (then the London Photographic Society), improvements on Talbot's original process were introduced both by himself and others. To expedite printing, the paper was rendered translucent by waxing after the image had been developed. It was subsequently found that the paper might be waxed previous to being iodized and sensitised, with some advantage.

It was also found that instead of iodising the paper by impregnation with iodide of silver, a wash of alkaline iodide sufficed, followed, of course, by excitement with silver nitrate solution, and in this way were produced negatives possessing a degree of crispness of definition which satisfied all the requirements of portraiture on a moderately large scale. The portrait (by Hill and M'Glashon) of the late Alexander Bryson of Edinburgh, taken when he was President of the Royal Physical Society, and which I now submit, testifies both to the excellence of the negative and the endurance of the print.

Collodion on glass then came upon the scene, and paper as a means of producing negatives was laid aside.

But who is there who has had occasion to travel with a—say—12 by 10 camera, who has not had occasion to wish that his *impedimenta* could be reduced in weight, and his fragile glass plates supplanted by a material more flexible and pliant, and less bulky ? This causes us to jump at once from the pre-collodion times to the present year. Gelatine having done so much for photography on glass plates, why should it not be impresssed into the service upon paper ? This has been done, and a great future is rapidly being opened up for its application.

Before altogether dismissing the men and things of the past, let us pay our tribute of honour and admiration at the shrine of those who do did so much for us. They laboured ; we enter into their labours. We admire their genius, and tender them our gratitude. But we live in an age of progress—nay, of revolution—and aspire towards greater things than have yet been achieved.

I have spoken of the *impedimenta* of the tourist. An old favourite camera in my possession is made for 8 by 5 plates ; if I take it to the country with twelve dozen plates, these alone weigh fifty-five and a half pounds. But if instead of glass plates I take twelve dozen sheets of paper, their whole weight, including packing case and spool on which they are wound, weighs only two and a quarter pounds. Hence, as two and a quarter is to fifty-five and a half, so is the gain in the matter of negatives for the number of plates mentioned. My most recently-acquired camera, which will be shown to you on another occasion, is for 10 by 8 negatives. I here submit, packed up in a strong, good case, sensitized paper representing twenty-four plates for this camera, the total weight of paper spool and case being precisely ten and a quarter ounces. Just contrast this weight with that of twenty-four strong 10 by 8 glass plates ; while, as for portability, I could carry four such cases in my coat pocket without inconvenience. You will concede that as regards the application of photography to the requirements of the tourist, I am making out a strong case on behalf of paper : no breakage, small bulk, and little weight.

But what about quality ? Having no modern paper negatives myself—for ever since I arrived from America there has been one almost unbroken succession of fogs and days of drizzling rain here in London, so much so as to have prevented me from taking my camera out of doors—I have laid Mr. Walker under contribution, and so successfully as to have obtained from his firm a sufficient number of specimens to serve my purpose, which is to show that as good negatives in every respect whatever can be made upon paper as upon glass, and with a brevity of exposure equalling the glass. These specimens I now submit for examination. One of these, it will be observed, has one half quite translucent, while in the other half the paper possesses its original opacity. That negative was treated, in half, with a few strokes of a brush charged with some kind of saponaceous or oleaginous material contained in a wide-mouthed bottle, by which the effect now observed was produced. It is quite dry, and free from stickiness, hence we may now soon say good-bye to either waxing negatives or treating them with castor-oil, to convert them into quick printers.

Seeing it is possible that some may raise an objection to paper because it does contain a certain kind of texture—although it does not show it in the prints—I am happily placed in a position to meet such an objection. In America we have what we designate stripping films—that is, gelatine films which are spread either upon glass or paper, and are commercially supplied on both. After the paper negative has been developed, fixed, and washed, it is squeegeed upon a glass plate (or vulcanite slab), warm water applied to the back by a sponge, and the original supporting paper stripped off. A sheet of flexible gelatine is now applied with the pressure of the squeegee. and when it is lifted from the glass, the negative film is found to be in intimate adhesion. I submit a number of specimens. It will be understood that, if a reversed negative were wanted for the purposes of the engraver or the mechanical printer, the transferring process need not be carried beyond the stage at which the film is left upon the glass.

But, concerning texture, I would here raise the question : Is it so very desirable that, in large work in particular, the texture of the paper should be entirely obliterated ? On the contrary, may not such texture, especially in a large portrait intended for being framed, impart a charm peculiarly its own ? I remember several years ago being impressed with this when I tried an enlarging process introduced by Valentine Blanchard, in which an ordinary untoned enlargement was first made on plain paper, from which was obtained a paper negative by superposition in a printing frame, this, in turn, serving to produce as many prints as were desired. In my estimation, the texture of the paper, delicately shown in these enlarged prints, so far from proving objectionable, was most charming.

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THE DROP SHUTTER.

BY PROFESSOR LAUDY.*

As early as 1675, Romer, a Danish astronomer, first deduced the velocity of light from observations of the eclipse of Jupiter's first satellite, and found that light travels 190,000 miles in a second. Different kinds of apparatus have been devised from time to time to measure fractions of a second. They are the chronoscope, chronograph pendulum, and tuning-fork.

Notwithstanding this great velocity, mechanical means were devised by Foucault to measure, by means of a rotating mirror, and determine the velocity of light and electricity, which are so near in velocity that, in round numbers, they are expressed as having a velocity of 200,000 miles in a second. They were dealing with velocities unknown to any photographer, and they divided seconds into 200,000 parts. Our fractions all lie within the $\frac{1}{500}$ part, and by far the greater number come within the $\frac{1}{100}$ of a second.

The latter I have selected, for it can be so arranged that a tracing of each wave can be taken and made the basis of calculation. The principle of the apparatus may be described in this way :—If a tuning-fork vibrates 256,512, or any given number of times in a second, the time of each vibration must be the $\frac{1}{256}$ or $\frac{1}{512}$ part of a second. If now, by any means, we make the vibrating-fork record on a smoked surface, parallel to the wavy lines of the fork, its duration may be estimated by counting the recorded vibrations, and then dividing the number of waves into the distance the body moves.

Prof. Laudy said further : There are a few facts that we must commit to memory. One is that velocity is the length divided by time. A gentleman asked me some time ago what was the time of the shutter, and how fast it moved ? Unless you specify the distance the shutter moves, you have no basis of calculation. You must have some divisor, and that is the distance a body moves in a given time; therefore, the velocity is the length divided by the time. The methods of the pendulum, the chronoscope, and the chronograph are, to some extent, objectionable. The principal objection is the expense of the apparatus. The chronoscope depends upon a reed, giving a certain number of vibrations per second, producing a musical note, and the least variation in that note alters the speed of the chronoscope. The apparatus itself is expensive, and it requires an electrical attachment. The tuning-fork is the most simple and the least expensive. There have been some objections made to this process—two in particular. One is, that it is impossible for the photographer to secure a tuning-fork and to determine the pitch. The fork is arranged to the pitch and vibrations as you purchase it, and a fork that will do very well can be purchased for about five dollars. The other objection is, the friction of the style against the body that it comes in contact with, whether it is mica or glass. Thinking there might be some degree of friction that would affect it, I made this experiment: I took a piece of glass and smoked it in the usual way, then I took a hair from my moustache and attached it to the fork, and in place of an ordinary style I had been in the habit of using, and those are the results produced. I carefully measured the waves and found that there was not the slightest difference due to friction. Besides these mechanical means, there is the photographic method. There are many of those which have been devised from time to time, the earliest of which was to photograph the hand moving over a clock-surface or a circle. In that case it was necessary to have a uniform motion, which is a very difficult mechanical contrivance. Another method was to photograph a body falling. You marked off feet and inches on a white surface, and then let an object fall in front of that, and photograph the body as it falls.

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* Continued from page 781.

The others are comparative methods, where, to test the speed of a shutter of unknown rapidity, you have a glass ball revolving, illuminated by a strong light. Then you have a shutter of known velocity, say one-tenth or one-twentieth of a second.

You expose the ball in its revolution simultaneously with the two exposures, and in this way you can measure the time of the two exposures by the trail of light from the silvered ball.

In all these cases by the photographic methods, you are obliged to make for each determination a negative, which requires, of course, that the light shall be suitable, the illumination be proper, and that the object shall move in a certain position, and at each time a negative is required, which involves time and expense. I was prompted in this matter to make this investigation, and reduce the possible errors existing, and at the same time to make a piece of apparatus which would be simple in construction, and which it would be possible for every individual to procure if he thought necessary. When I first started I commenced with a simple tuning-fork, and then I thought that one vibrating by electicity would be a good thing, so I had one constructed, and this is the apparatus I wish to show you first. I commenced with a C fork, making 256 vibrations per second; then I had the 320 vibration and the 512 vibration. You may use a fork making any number of vibrations it you only know the number. I selected these because they have this advantage; they have a certain tone. You see this fork is quite rich and full in tone, and at any time it can be very readily determined whether its pitch is altered, by comparison with any standard musical instrument, as, for instance, the organ-pipe. But the variation of the pitch of these forks is so trifling, even when the style is attached with wax, that they can hardly be taken into consideration. These are mounted, you notice, with a small style on the end, made of a very delicate bristle attached with wax. The ordinary drop or gravity shutter is the one that I have selected for this evening's exhibit, for the reason that it is more easy to manipulate than the curve shutter, with which the determinations of area are a little more difficult to make, and the calculations not quite as simple. Here is an ordinary drop-shutter, on which is a smoked glass. On this shutter is a piece of paper, smoked over an ordinary kerosene lamp, and attached by four common tacks. In some cases I have found it advisable to use isinglass where we have a very high speed. I have experimented using three elastics. Unless you wire the shutter in this way it will break to pieces Here is one with two elastics, which can be used with success without injury to the instrument. The large fork that I have arranged here on the table, gives 512 vibrations per second. The larger the number of waves produced the less will be the error. If we only have two or three waves, it is very difficult to decide where the first one starts and the last one stops; but if we have eight, or ten, or twelve, there is no difficulty.

I will illustrate the principle by a little piece of apparatus I have here, which is nothing but a Duhamel's cylinder in a rough way. Most of the apparatus, you see, is rather rough. I have constructed considerable part of it myself, and a carpenter the rest. I have utilized everything I could to make it as inexpensive as possible. The greatest expense is attached to the forks themselves, but a commoner fork than these will answer the purpose. You could hardly tell the difference between these two forks unless you examined them, but that fork cost twenty dollars and this five dollars. There is not the least variation in that fork. The other is not as reliable for very delicate work, but for all the ordinary work that a photographer is called upon to do, a fork costing five dollars is good enough. I start the vibrations of the fork with an ordinary bow. Now as the fork is vibrating, I bring it contact with the cylinder. You see I give the cylinder different speeds. If I revolve it very fast, as I will show you, the greater the speed the less the number of waves in a given space. You will notice from that, that where the cylinder moved rapidly you have long waves, and where it moved slowly you have a series of short waves. I can illustrate that better to the entire audience by a simple experiment in the lantern. Here I have a large fork, making sixty-five vibrations per second. In the vertical attachment of the lantern I have a piece of smoked glass. I will make the fork vibrate and throw the vibrations on the screen. In this connection let me mention that there are three curves, one upon mica, another upon glass, and another upon paper. The question was asked me some time ago, whether it did not make a difference whether mica, glass, or paper was used. It does not. All bodies, practically speaking, for the first 16 feet, fall with the same velocity. If you examine these in the sunlight you will find that they all register, illustrating the fact that all bodies fall the first 16 feet with the same velocity. Now, upon this end of the table, let me mount one of these forks. We will take the 256 fork. I place it in a little stand that I have here arranged, and make it rigid in the post. We have the shutter arranged here on this little board.

The light is not as good as I wish it might be here, so I will bring the style in contact with the fork with a little more pressure than if I was working in daylight. I vibrate the fork in this way till I get a good amplitude. Now let me make two or three of these plates, because I want to project them in the lantern, so I can show the uniformity that exists. I will show you a record made when the elastic was used. I made the ordinary waves first without the elastic. This is a mica surface. Now I will use a single elastic. Now I will use the two elastics. You see the difference in the curve. Now I will take this shutter, and try it first with one elastic, now with two elastics. Now, three elastics will take any ordinary lens off the camera, so I would not advise you to use three elastics of this size. The speed of that I have determined. and the curves are attached to this piece of white cardboard in front here, and the greatest possible speed that I can get on an ordinary shutter with three elastics, the opening being three inches, gives me $\frac{1}{108}$ of a second. I have arranged these posts so that you can put the fork in horizontally for determining the speed of shutters moving in arc of a circle. I will put on the 512 fork, and you will notice by the sound produced that there is considerable difference in the tone—the pitch is much higher. Of course, for shutters moving with the speed that this is, we must have enough to get at least five waves in a given distance, and with this fork we can do it. As the pitch of the fork increases, the amplitude decreases. The fork we have on this stand now makes 512 vibrations per second, therefore the amplitude is small; but I think, if we have patience enough, I can use it this evening. Well, it missed in just the part I wished to show you. I will try it once more. I will make the contact a little more perfect with the style on the fork. That was done with the two elastics. With three elastics it is attended with more difficulty, and I will not undertake to experiment with three to-night, Now, I would like to project some of these curves that I have in the lantern. Here we have the entire waves on mica. You notice the recoil of the fork. By the way, I have found the most adhesive material for fastening blackened surface to shutter is paraffine. Glue and gums have failed, but a little paraffine melted secures the glass or mica to the shutter with a very good contact. I will take those to the lantern and we can project part of them. I would like to call your attention to another particular, which is, that when a shutter first begins to move, we have the zero point. That shows a series of lines close together. You see how the shutter increases in speed as they get to the opposite end. The measurements usually taken are not from the time the shutter begins to start, but at the time the exposure begins, so that determinations are made from the start of exposures to close of same three inches. I wish to call your attention to the similarity of these curves. One has a little more amplitude than the other, but the curves are the same in number. The last curve is with one elastic band, and the other with two elastic bands.

I will call your attention to the waves on the shutter, made with the 512 fork. You see the wave is inclined to be nearer straight, showing the great velocity with which the shutter was moving and the fork vibrating. This is a picture of the chronograph. It is a somewhat complicated piece of mechanism. This cylinder holds a piece of blackened paper. This cylinder makes a turn in one minute exactly, and at each two seconds the pen comes in contact with the paper. It is attached to a pendulum clock, and usually breaks contact every two seconds, but the velocity of this can be so increased, that instead of marking 1 inch it will mark 3 inches. This is an exposure slide used by Prof. Mayer at the transit of Venus. What I wish to call your attention to is the size of the opening, which in the original was $\frac{22}{1000}$ of an inch. By the use of this shutter the exposure was $\frac{1}{300}$ of a second, though the shutter was going but a little faster than the one exhibited here with three elastic bands; but the opening is much smaller.

Professor **Laudy** then exhibited and commented on several exposures and pictures made about two years ago by Mr. Guberman, and also explained a table, given below, showing the speed at which objects move per second, and made an experiment showing the duration of the electric spark.

Minutes per Mile.	Feet per Second.
300	29·333
250	31·059
245	32·195
240	33·000
235	34·065
230	35·200
225	36·414
223	36·923
221	37·447
218	38·261
215	39·111
210	40·305
200	44·000
155	45·913
140	52·800
135	55·578

Notes.

Among the phases of photographic business which may be quite right and above board, but which have a slightly discordant twang about them, may be mentioned the rapidly-extending system of special privilege prices. On the same day we received two circulars, one telling us that as a member of the Cyclists' Touring Club we could get any number of orders for portraits at something like half the usual rates; and the other pointing out that a similar advantage attended membership of the Society of Arts.

A queer story comes from Russia. His Imperial Majesty the Czar, or at anyrate someone standing high in the Palace, wished to commence the practice of photography; and hearing that the best of everything photographic is to be had in the British Isles, he had orders sent for the Russian agent in London to immediately send the very best that money and influence could obtain.

The Imperial Agent over here, being a diligent collector of fiddles, but knowing nothing of photography, reasoned from that to this, and managed to collect together many of the great photographic inventions of the past. One of Archer's cameras, it is said, was sent in the same case with a globe-lens apparatus of Sutton; while a giant camera by Ottewell, on which was fitted a Ross's portrait combination of nearly seven inches in diameter, was secured, and sent by express a few days after.

Why is it that we islanders affect pyro development so much, while the inhabitants of the more solid land generally use ferrous oxalate? An Italian told us the other day that it is because we, as islanders, are less civilized than Continentals, and, as a consequence, are less mindful of staining our fingers; but it must be remembered that Continentals, and especially Italians, have often an exaggerated notion of the immense dignity of being of *terra firma*.

"It is no uncommon thing to be bored by a photographic friend who will persist in each one of a long series of photographs being looked at, and almost every long series is a bore to look through—that is to say, when one has not been to any of the places." A correspondent who is not a photographer himself, but among whose friends there are many far-wandering viewists, writes as above in a note to us. We can sympathise with him. It is indeed difficult to get up much enthusiasm about photographs of entirely strange places; but how different when looking at pictures of far-off but familiar scenes! Similarly, how different are one's feelings in reading those Cantos of Childe Harold describing places one has visited, and those describing strange places.

The question whether a photographer may allow the contents of his show-case to be visible to the public on Sunday is still a vexed question in Germany, and another case in which punishment was inflicted has been quashed on appeal.

It is sometimes made matter of complaint that our caricaturists, in drawing their cartoons, are too apt to adhere, year after year, to fixed likenesses of the various statesmen and politicians, &c., they represent. That this is partly due to the fact that it is thought well not to vary too much the portraits which the general public is expected to recognise, is no doubt true; but it is also a fact that public characters might secure a much more faithful representation of their physiognomies if they would only take the trouble, from time to time, to send copies of their latest photographs round to the offices of the papers which represent them pictorially. Cartoons have often to be drawn in a great hurry, and there is no time for the artist to go about London hunting up the latest carte or cabinet of the "man of light or leading" he may have to pourtray, and so he is obliged to take his likeness from an old photograph, or, still more probably, from back cartoons. If, however, public men of all kinds, both those who have attained a right to a place on the cartoons and caricatures of the period, and those who hope to get a place in them ere long, would only, as we have said, make a point of keeping the editors of the comic and other picture papers "posted close up," so to speak, with their portraits, the result could not fail to be satisfactory alike to those who naturally desire pictorial fame, and to the critical portion of the public, which likes cartoons and caricatures to be accurate as well as amusing.

The suggestion sent to us by a Red Hill correspondent should be forwarded to the Speaker—as soon as there is one; or possibly the Sergeant-at-Arms might, in the *interim*, take it into consideration. Meanwhile, we will briefly state what the novel proposal in question is. As most people know during a session of Parliament, the fact that the House of Commons is actually sitting is signified to the outer world by the lighting of a bright lantern projecting from one side of the top of the Clock Tower. This lantern throws out a brilliant ray of light, which is visible on clear nights for many miles. But why not go further? says our correspondent, and use the brilliant light in question not only to show the House is sitting, but to display to the metropolis the portrait of the member who is at the moment addressing it?

Surely, he says, a large white screen could be easily rigged up, on which, by means of an "oxy-hydrogen lantern," portraits of the various M.P.'s could be reflected. By this means the public would not only be educated in political physiognomy, but it would come to pass, as night after night the same faces were seen projected on the screen, that optical demonstration of the way certain members monopolize the time of the House of Commons would be forthcoming. Who can tell, indeed, that the fear of being seen too often on the tell-tale screen by the passing public would not, at last, have a salutary effect on even the most aggressive and reckless obstructionist? This, at any rate, briefly put, is our correspondent's notion, and we have no doubt it will receive due consideration.

The weather during the elections has been so wretched that it was useless to think of immortalising the scenes at the polling booths by instantaneous photographs. So far as we know, the only London photograph of the event was one 10 by 8 in size, taken for the *Pictorial News*, of the crowd which had gathered every day during the dinner hour in front of the daily newspaper offices in Fleet Street. The photograph in question is that of an excited crowd eagerly reading the returns posted up in the windows of the *Daily Chronicle* office. The weather was far from favourable, but the photograph was quite good enough to enable an artist to draw a picture with much more fidelity to nature than he could have got from a sketch.

Why do not photographers include a violin among their properties? It is scarcely possible to go to a picture gallery now-a-days without seeing three or four portraits of ladies with violins. The violin is, in fact, the popular instrument with the fair sex just now, and a photographer with a "Society" connection would find that a goodly proportion of his lady sitters claim some knowledge of it; at all events, sufficient to justify it being placed in their hands with some degree of propriety.

With white light as the source of illumination, the "limit of resolution" when the human eye is applied to a microscope is found to be the distinguishing of lines as distinct when they are ruled so closely as 146,543 to the inch. With monochromatic light the eye can distinguish 158 845 lines per inch. But the photographic eye can surpass this. It is found that lines can be photographed, and seen separately in the negative, which lie as closely as 192,037 per inch. Dr. Maddox states that "he had always thought he could detect in a good negative details which he was unable to make out by direct vision; and Professor Koch, some six years ago, mentioned the case of a bacterium in which he could not see the flagella with the eye, but he was able to photograph them with a microscope and camera.

Those famous French opticians—the Brothers Henry, of Paris—have completed the object glass for the great telescope which is to be erected in the Observatory at Nice. It is thirty inches in diameter, and is the largest object-glass yet made.

The Royal Microscopical Society, some time back, resolved to give in its journal photographic portraits of all those who had been Presidents of the Society. These have been executed under the direction of J. Mayall, Jun., and proofs were exhibited at the last meeting of the Society. Sir R. Owen (the first president) and Mr. Glaisher (who was president when the Society obtained its charter) are given each a full-page plate; the other presidents being arranged in ten groups of eight each. In presenting the pictures, the Hon. Secretary remarked that in view of criticism as to the general effect of the groups, he might mention that the trouble which had been required to get them into order was beyond anything that could have been supposed, arising from the very various character of the originals and otherwise." We fully agree with you, Mr. Crisp; the composition of a harmonious group from a number of indistinct portraits is a task that usually calls forth the utmost resources of an operator.

Professor Stas, of Brussels, takes the Davy Medal for 1885, as a recognition for his researches on the atomic weights of the elements. Prof. Stas' name is known widely among photographers, from his classical investigation into the molecular modifications of silver bromide.

F. Galton's system of composite photographs has been applied to skulls. At the last meeting of the Anthropological Society, a collection made by J. E. Billings, of the United States Army, as already mentioned by us, was exhibited by Mr. Galton. The collection numbered twenty photographs, comprising four series, referring respectively to Sandwich Islanders, ancient Californians, Arapahoe Indians, and Witchitaw Indians. Each composite photograph is the mean of six adult male skulls.

M. Braun has obtained another victory. He has had granted to him by the French Government a concession lasting thirty years, permitting him to copy the pictures in the Louvre. In matters of art, the French do nothing by halves, and to enable the photographic work to be done with greater facility, an ingenious contrivance has been arranged by order of the Minister of the Interior, by means of which any painting, with the easel it rests upon, can be bodily transferred from the Gallery to the room above, which has been fitted up as a photographic studio. An exhibition of photographs of these paintings was thrown open to the public about a fortnight ago. The photographs, after having been approved by the Department, are offered for sale.

It is not easy to say what an artist may want in the way of "properties." We were in company the other day with a well-known artist engaged on an equally well-known illustrated paper. He wanted a bishop's shovel hat for a special picture, and together we journeyed to a clerical hatter. "Have you a bishop's hat?" he inquired of the shopman. "Oh, yes sir," replied the latter, and was moving away to get the article, when the artist unfortunately added, "I want to make a sketch of one if you will allow me." The expression of the man at once altered. A customer who wanted to *buy* a bishop's hat must be somebody; an artist who only wanted to *look* at one, was nobody. "Ah! we have not got one in stock," coolly remarked the shopman. What could be said in reply to this? Of course we could not contradict the man, so we had to make the best of our way to the nearest photographic dealer's. But bishops, apparently, do not like being taken in their hats, and we turned over a pile of photographs without finding one. The artist was in despair, when luckily he remembered he had bought a photograph of a hatted bishop for a penny several months before from a dealer in the street. "Odd, isn't it?" he remarked; "I recollect now when I bought it I thought I was wasting a penny; but I have since learnt that every verification of detail in costume, no matter how trivial, is of value, and a photograph is almost as good as the real thing."

Patent Intelligence.

Applications for Letters Patent.

14,714. William Cheffins, Holbeach, Lincolnshire, for "Improvement, 'The active hinge for double swing back camera.'"—1st December, 1885.

14,850. Louis Edmund Perken, 34, Southampton Buildings, London, for "Improvements in focussing screens of photographic cameras."—3rd December, 1885.

14,867. Olaf Varing, 33, Chancery Lane, London, for "Improvements in photographic cameras."—(*Complete Specification.*)—3rd December, 1885.

14,914. Charles Wells, 177, Great Portland Street, London, for "Improvements in the construction of rolls of photographic sensitized paper or tissue."—4th December, 1885.

Patent which has become Void through Non-payment of the Fourth Year's Renewal Fee.

3664. 1881. P. M. Justice. (*Dewe*).—"Photographic pictures."

Specifications Published during the Week.

9288. Ernest Edward Pickard, of 89, Malpas Road, Brockley, Kent, Electrician, for "Improvements in apparatus for carrying and exposing photographic dry plates."—Dated 14th October, 1885.

The apparatus claimed bears considerable resemblance generally to the Archer camera—which those of our readers who were engaged in photography about a quarter of a century ago will remember. It is a sort of tent and camera combined. The specification is voluminous, and accompanied by four diagrams; but the following are the claiming clauses:—

1st. In constructing a camera for photographic purposes, the making the same in the form of a flat rectangular box, the lid of which, when open, forms the front, and the bottom, and back end of the bottom of the said camera.

2nd. In the bag used in connection with the aforesaid box, using two cords in two places in such a way that the hand can easily be inserted and withdrawn without admitting light.

3rd. The whole design and construction of the plate-box and its frame, by which it is possible to carry inside the camera, when closed, any number of plates of various sizes, and to expose them inside the camera, and replace them at pleasure, without danger of admitting any extraneous light to them, by more simple means than has hitherto been done.

PICTORIAL COMPOSITION.

BY THOMAS KYLE, C.E.*

Composition I take to be the art of arranging the component parts of a picture so as to secure the following results, which I will make the divisions of my subject—namely, Interest, Harmony, and Concentration.

First, then, as to *interest*. I need not tell you that if a picture does not interest the spectator, he goes past it and thinks no more about it. It is therefore of the first importance to the artist to make his picture such that it will be well-nigh impossible for visitors to pass it unnoticed, and the ways to secure this are numerous and varied, legitimate and otherwise. I will confine myself to describing legitimate methods.

1. The first method, obviously, is a *skilful choice of subject*, on which little need be said. If the subject is interesting in itself, and is fairly dealt with by the artist, all that is wanted is fair play in the exhibition. As to what constitutes an "interesting" subject, the artist must settle that matter for himself. All that I could say upon this matter would, in fact, be merely telling you what kind of pictures *I* like—a species of information neither definite nor desirable.

2. The second method I would mention, for securing the interest of the spectator, is to give the picture brilliancy, and what is technically known as "depth." Here it is that the photograph is apt to be wanting, and as it is of the greatest importance, care should be taken accordingly. What gives brilliancy and depth to a picture more than anything else is the judicious arrangement of light and shade. Whatever will give the feeling of nearness to the foreground, distance to the background, and a proper connection between them, will give *depth* to the picture. For example, the shadow of clouds falling across the middle distance; dark woods, with lighted ground or water in front, and the dim distance or faintly-lighted landscape in rear, will secure the last-named result. Then, if the foreground be well lighted, and the shadows in it sharp and clear, and if the distance be sufficiently subdued without losing its definition, the picture will have depth, and will attract the eye to study its details.

Brilliancy is generally secured by strong lights in the sky or in the landscape, or in both. Of course this implies the presence of dark patches of sufficient intensity to give effect to the lights. There should, I think, where brightness is desired, be at least one well-lighted portion of considerable extent and of irregular form, about the middle of the picture, and either high or low, as the nature of the composition may require. When the picture requires to be dull and sombre in tone, of course the above remarks cannot apply. To obtain justice to pictures of this class in an exhibition, as far as the general public is concerned, everything will depend on the hanging.

(3.) A third method of giving interest to a picture is to make it suggestive in its details. I am not aware to what extent this can be done by the photographic artist, and I presume that I need not do more under this head than mention methods which I think are available to him. If trees or other suitable objects are found in the vicinity of the subject of the picture (say that it is an interesting building of some sort or other), then by allowing these objects partially to screen the building from view, the imagination of the spectator is at once excited, and his interest in it is aroused, provided only that due separation, in point of perspective, is maintained between the subject and the intervening objects. Again, the shadow of an object, not contained in the picture, falling upon it in a prominent manner, is another way of being suggestive, and may serve the purposes of the composition in other ways at the same time. Figures also in a picture may often be used to suggest—for instance, by their appearance or employment—something which the picture does not actually contain, but which the imagination of the spectator himself is thus made to supply or to speculate upon. Figures, also, are continually used to suggest, by comparison, heights of important objects, which might otherwise fail to be duly appreciated.

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* Abstract of a communication to the Glasgow and West of Scotland Amateur Photographic Association.

The second main division of my subject, namely, the question of *harmony*, although quite as important as any other, is one that need not occupy us very long, considering that colour is left out of our consideration.

If the leading subject of a landscape be picturesque, the surroundings should be in keeping. I do not mean that they should be equally picturesque, but that there should be nothing stiff, formal, or unnatural about them. Straight walls, trim hedges, neat fences, and square and level fields will not harmonise so well with a venerable ruin embowered in a grove of ancient forest trees, as rough, undulating ground, and few signs, or none, of modern cultivation.

Similarly, if the subject of the picture be common-place—whether it be a village in its every-day attire, and with ordinary characteristics, or a group of people gathered together in some pretty nook to form a picture, as a memorial of some day's out-door enjoyment—it would be advisable to choose an ordinary and peaceful condition of sky in preference to a lowering and threatening one. I do not mention this as covering the whole case, but merely as one item in the account.

I will only add, in concluding this division of my subject, that any of the following objects will, in my opinion, mar the beauty of a landscape, or any other other pisturesque subject whatever: New works in progress; railway bridges or stations, and, indeed, modern buildings of all kinds, with a few exceptions; modern vehicles, such as cabs, carriages, and racing yachts; groups of persons in stiff and ungraceful costumes, or dramatic and unnatural attitudes; and, generally, whatever is prosaic, formal, or unnatural.

Concentration is of two kinds, according to my view, namely, *visual* and *mental*. Its object is to secure repose to the eye when the main subject of the picture is looked at, and it is obtained by various methods of balancing the various pictorial effects of the picture on either side of the central point of interest. This central point, by the way, is, as a matter of taste, generally chosen a little to one side or other of the middle of the picture, and that I believe to be the true method. Some artists, indeed, place their central figure very near the edge of the canvas (see, for instance, the engraving of Mr. Orchardson's picture of "Napoleon on Board the *Bellerophon*" in last February's *Art Journal*). But this method, I think, is not a happy one, and is apt to have the effect, as in the instance I have named, of causing the artist's work to look less like a picture than a picture and a half.

(1.) As regards *visual concentration*, that must be secured by making the one side of the picture as strong in tone as the other, not only in its general effect, but in its details, and by having a perspective of tone as well as of drawing. I need scarcely say that I do not mean that the components should be equal in size, opposite in position, and similar in tone; on the contrary, there should be variety, but that, however you place your components, the result should be a balance right and left of the centre. There is no objection to equality of size and similarity of object if the positions are considerably different in perspective, and so arranged as to secure equal strength of tone. Thus, a comparatively small and distant object on one side may be made to balance a large object in the immediate foreground on the opposite side.

Then, again, a patch of light will balance a mass of shade if the pictorial effects are equal in strength, and, unquestionably, variety is as charming an ingredient in a picture as it is in almost "all things here below." So that in balancing a picture, it shows skill in the artist when he gets two things totally dissimilar in character to balance each other.

In addition to balancing of the various parts of a picture just described, there is the adding to it figures, or other objects, more or less striking, to give sharpness or interest to the composition, and to guide the eye in the required direction. These objects must be balanced by equivalents on the other side of the composition, and great care requires to be taken to have them in the proper places, and so as not to detract from the general effect already described, and so as to be in harmony, not only with their immediate surroundings, but also with the main idea of the picture.

The tendency of most young artists is to put in too many figures, in the expectation of increasing the interest of the composition. It unquestionably has that effect with people who are deficient in artistic taste, but it ruins the artist's work in the estimation of competent judges.

Not one single figure, or other feature, should be added to a picture for the purpose named after that purpose has been attained. One such superfluity may—and almost certainly will—be an unsightly blemish, and destroy what previously was a pleasing composition. If a picture is such that it cannot be injured in this way, depend upon it that it is worthless as a composition, whatever its other merits may be.

A very simple method of testing the balance of a composition was suggested to me some time ago by a young friend, and I have found it to be an excellent plan. It is simply to look at a picture upside down. There is nothing novel in the plan, for I think most of us have been advised to test our penmanship in that way. And the explanation, I think, is that when a picture is turned upside-down, the eye is free from the effect of that mental impression, self-deception, which is a stumbling-block to the artist continually, as well as to other people.

It will, I think, be plain from the foregoing, that if these principles be carried out from the immediate foreground to the extreme distance of a picture, whether of landscape, or of figures, or of the seashore, there will be no tendency to a side glance in the eye of the spectator, but the sides of the picture, with their gradually diminishing tones or effects, will act like the tube of a telescope, and prevent the eye of the spectator, if he has an eye at all, from seeing anything at the first glance but the central figure or point of interest, unless he, by an act of will, overcomes this natural tendency, and deliberately looks at the secondary parts of a picture for their own individual merits.

2. *Mental concentration* is a method somewhat analogous to the former, and is obtained by making the one side of the picture as interesting as the other. This is by no means so easy of accomplishment as the former, for it is unfortunately true that what is interesting to one man may be uninteresting to another. The theory, however, is, I think, a correct one, and worthy of being considered at all events, and kept in view, however difficult it may be to practice it. Another means of securing concentration, mentally, is of immense importance in the grouping of figures round a central point of interest. In such a picture a sufficient number of figures on either side of the central figure should be made to show, by their looks and attitudes, not only their consciousness of the presence of the central figure, but their relation to it and the extent of their interest in it. And here again the figures should be arranged in position, not in order of their relative rank and importance, but regardless altogether of such vulgar modes of composition. This is a matter, however, on which it is very difficult—perhaps impossible—to frame any general law. Ordinary groups are generally best for artistic purposes when they are *left to arrange themselves*.

Where a historical subject is the object of ehe grouping, the difficulties to the photographic artists must be of the most arduous character. Each individual in the group would require to be a most accomplished actor; and this being the case, I fear we are driven to the conclusion that the effective accomplishment of historical pictures by photography must be left to those who are able to get accomplished actors for their models.

SPIRIT PHOTOGRAPHS.

BY H. D. GARRISON.

A few days since we saw what purported to be a genuine spirit photograph, taken by a Boston artist. The chief part of the picture was the bust of a lady acquaintance, which was fairly good, but around it were the dim outlines of divers and sundry gentlemen peering over her shoulders, and in various angelic attitudes.

I am, however, certain that I can easily duplicate any spirit pictures I have yet seen, and excel many of them. To do this it is only necessary to make a reduced positive from a negative of the person who is to play angel, and then, in the dark room, by the aid of a faint light, submit the new plate to one or more short exposures behind it, great care being taken that no light strikes the remainder of the plate. Of course the ghost should be placed in some natural positions for a ghost, as over the head, or a little off to one corner, and it should be right end up, although we fail to see what real difference this would make to a ghost. It is customary to have the outlines of a spirit a little indistinct and hazy, which might be effected by avoiding close contact with the positive. Probably the glass side of the positive should be placed against the new plate to secure this effect. Plates thus prepared might be set aside for use when occasions requiring them arise. I would suggest that a diminutive view of the old nick—you know who I mean—should be impressed on a few plates for use in the case of bank cashiers, railroad magnates, &c. As a joke, one of these plates might occasionally be used in the case of a clergyman. The savage visage of a bearded Italian bandit or count might be used in plates for ambitious ladies. An exceedingly emaciated face would become the picture of a doctor or lawyer. A few dogs' or horses' heads would appear very natural about the visage of a sporting man. But why proceed further, since the ingenuity of the craft is more than equal to the task of putting the right ghost in the right place.—*Photographic Times.*

Correspondence.

LEVELLING TABLE FOR GELATINE PLATES, EXHIBITED BY A. COWAN.

Dear Sir,—In your report of the last meeting of the Photographic Society of Great Britain, I noticed a description of an apparatus, exhibited by Mr. Cowan, for levelling and setting gelatine emulsion plates by means of an endless band or cord carrying the plates through a cooling chamber.

Will you allow me to inform your readers that the above method of setting and cooling is part of my patented invention for coating plates with gelatine emulsion. The arrangement is fully described in my specification, No. 8643—84, and constitutes one of my claims, therefore it cannot be used except under license from me.—I am, dear sir, yours very truly, B. J. Edwards.

[Our correspondent has misread our report (page 766) in a way altogether incomprehensible. We make no mention of any band, neither do we say anything about plates being carried through a cooling chamber. There was no cooling chamber to the apparatus shown, although it is "an arrangement by which plates can be successively carried under a cooling chamber." If our correspondent will send us that portion of his specification in which the exhibited arrangement is described, we shall be very pleased to insert it.—Ed. P.N.]

Proceedings of Societies.

The Photographic Society of Great Britain.

The ordinary meeting of this Society was held on Tuesday, the 8th inst., at the Gallery, 5a, Pall Mall East, J. Spiller, F.C.S., in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected as members of the Society :—Gilbert E. Bicknell, Lulu Farini, Henry Forsyth, Triese Greene, Charles Mavius, E. Maxwell, Thomas Samuels, G. Scamell, Harry Tolley, and F. Whaley.

The Chairman then announced that, in accordance with the rules, it was customary to state at the December meeting the names of the retiring officers, which were as follows :—*President*—James Glaisher, F.R.S. ; *Vice-President*—J. Spiller, F.C.S ; *Hon. Treasurer*—Walter L. Bird ; *Members of Council*—W. Ackland, Valentine Blanchard, T. Sebastian Davis, Payne Jennings, H. P. Robinson, and J. Wilson Swan.

These gentlemen were eligible for re-election, and the Chairman said it was his duty to ask the members to send in their nominations before Monday, January 18th. The Chairman having intimated that there were three papers to be brought before the meeting, called upon F. Ince to read a paper on "Gelatine Tissue on Cardboard," by G. L. Addenbrooke and F. Ince.

F. Ince commenced by explaining that the process was invented by M. Thibout, and was one in which cardboard was substituted for paper or glass, as a support for films of silver bromide in gelatine. For the purposes of experiment they had obtained samples from a commercial source, but had somewhat modified the treatment recommended by the inventor. They had employed ammonia pyro development with a small proportion of sodium sulphate added, and after developing and fixing, the film was stripped from its cardboard support, instead of drying it first and stripping it afterwards. They preferred adding a little gold chloride to the fixing bath, in order to get a blacker image ; but the presence of alum with the fixing salt they deemed undesirable, so did not use it, and trusted to soaking the film in methylated spirit to counteract the stretching which took place in the course of washing. They found the films became one-fourth larger after being stripped, but this was lost again in the spirit. The films were then transferred to a sheet of ebonite to dry ; they would then peel off with a smooth, glass-like surface, very suitable for printing from.

The formula given by M. Thibout was then quoted, which recommended potassium carbonate as the alkali, and a larger proportion of sodium sulphite in pyrogallol development, or ferrous oxalate could be used. It was stated that the pellicular films, when stripped, weighed 20 grains, which was a strong argument in favour of their introduction.

The Chairman, having thanked Messrs. Ince and Addenbrooke for bringing the result of their experiments before the Society, intimated that he strongly disapproved of the system of adding common alum to the fixing solution, which, being as a rule slightly acid, caused a liberation of sulphur ; it should therefore most decidedly be avoided. He imagined that it would be preferable to strip the film immediately after development, instead of leaving it upon its support during fixing, which would shorten the process materially.

W. F. Donkin (Hon. Sec.) suggested that if the support had to be removed at any stage, it should be previous to development.

W. E. Debenham said that if the support were removed before development it would be better, as density could then be judged. One of the examples shown was much too dense, while another was not dense enough. He also noticed one of the transparencies was shorter and another longer than the negative—due, most likely, to an unequal amount of stretching.

Capt. Abney did not approve of the plan of stripping films from their cardboard support until dry, because they were impervious to water in that condition. When the film was stripped stretching occurred, which, as mentioned by W. E. Debenham, was undesirable. He had tried manufacturing cardboard films, but found considerable difficulty in getting a flat surface, and he should have been very glad to have been told how this, drawback was overcome.

T. Sebastian Davis would have preferred full details of the method of preparation. He thought a coating of gelatine on the under side of the support would lend material aid in coating.

A. Spiller remarked that the process was patented, and, if he remembered aright, the abstract of specification stated it to be enamel paper coated with emulsion.

T. Samuells noticed that the samples differed from some he tried months ago, inasmuch as the cardboard was very much thicker ; he thought this was an advantage in some respects, but entirely prevented the negatives being judged of as regards density. He showed samples of the thinner make, and said there was a difficulty in keeping the films on the supports. He thought there was no question about the convenience of films over glass plates, but the stretching complained of precluded their employment for architectural purposes, or in any case where accurate measurement was a necessity. He hoped before long a flexible support as transparent as glass would be used, and he thought the late Walter Woodbury's invention of making transparent mediums would help them.

Capt. Abney had recently been making 9 by 12 negatives on glass and paper, and, when dry, were accurately measured at various points, the result of which showed that there was no appreciable difference. The paper, however, was waxed before measurement took place, and he did not believe any alteration occurred after waxing.

W. E. Debenham said the reason why paper showed distortion was because it was attached to a support while stretched, and dried in that condition.

B. J. Edwards remarked that it was easy enough to stretch or contract a gelatine film; the difficulty was to know when to stop it.

G. L. Addenbrooke, in reply to the various speakers, said they had no intention to rival glass as a support. If one of the films was stripped from cardboard before soaking in alum, it would very soon increase from a half to a whole plate. If it goes into alum first, it stretches one-quarter its size, and the alcohol brings it back that much. Drying the films on cardboard took much longer than on a sheet of ebonite. Regarding intensity of image, he might say that if he wished to do very successful work, he should not employ the process. They had no information on the manner of coating, but they imagined the sheet would be damped before coating. The cardboard lies quite flat before it is put in water; after that there is a tendency to curl up.

The Chairman having thanked Messrs. Addenbrooke and Ince for their paper, a conversation took place in reference to the next paper by G. L. Addenbrooke, the result of which being that it was decided to take the paper as read, and adjourn the discussion thereon until the January meeting.

A long communication from Constant Glissenti, of Brescia, was next considered, and Captain Abney gave a brief outline, which dealt with a large number of substances said to be capable of destroying the effect of light upon a sensitive plate. Among these substances may be mentioned most of the acids, formiates and acetates, as well as oxalates and tungstates.

W. E. Debenham reminded the chairman that the paper had been published in the Photographic News some months ago, after which it was arranged that the paper should be dealt with by the Editor of the Society's Journal.

W. England then exhibited an electric dark-room lamp which had already been described at the last technical meeting. In reply to questions, he said that he used three and a-quarter ounces of sodium bichromate, and one and a-half ounces of sulphuric acid to each pint of solution, and he obtained a continuous light for four hours without polarization. He found two thicknesses of "Golden Fabric" gave him plenty of illumination, and was safe at ordinary working distances.

W. Cobb used "Canary Medium," and thought he obtained more light with a given amount of illuminating power.

W. E. Debenham preferred "Golden Fabric," because several thicknesses might be used without lowering the luminosity very much. This could not be done with "Canary Medium."

The Chairman then announced that at the general meeting on January 12th an arc lamp will be arranged in the Gallery by Captain Abney, in order that practical tests of value for photographic purposes may be made by those present. It was also announced that the next technical meeting will take place on Tuesday, December 22nd.

The proceedings then terminated.

South London Photographic Society.

The annual general meeting of this Society was held on Thursday, the 3rd inst., at the House of the Society of Arts, John Street, Adelphi, W. Ackland, President, in the chair.

The minutes of the previous meeting having been read and confirmed,

The Hon. Secretary read the annual report; the following being an abstract:—The committee consider the state of the Society was in a satisfactory condition. The annual lantern and outdoor meetings had been successes. During the year the following papers had been read and demonstrations given:—Morgan and Kidd's "New Rapid Contact Printing." C. Shadbolt's "Experiences of Balloon Photography," G. M. Sitchfield's "Acme Rapid Enamel Paper," C. Hussey's "Sargeant's Instantaneous Shutter," W. M. Ashman's "Hints for Summer Work," E Dunmore's "Pitfalls in Outdoor Photography," W. H. Walker's "Eastman Company's Films and Roll Holder," Marion and Company's "Urie's Automatic Exposing Apparatus," and J Traill Taylor's "Paper Negatives," &c.

The artistic competitions have not been very successful, and in future two subjects—viz., one figure and one landscape—will be given out for the year, and it was hoped that increased energy would be shown by the members.

Turning to the cash account, the treasurer said they had a balance of £5 8s. 9d. to carry forward, after paying all claims that had been made.

The accounts having been duly audited by Francis Cobb and E. W. Foxlee, the report and financial statement was adopted.

The election of officers for the ensuing year then took place, and the Chairman declared the names as follows:—

President—H. Trueman Wood.

Vice-Presidents—T. Bolas, F. York, E. Dunmore.

Hon. Secretary and Treasurer—F. A. Bridge.

Committee—W. Ackland, W. M. Ashman, W. M. Ayres, W. K. Burton, C. G. Collins, W. Cobb, H. Compton, J. Downes, G. A. Garratt, C. Hussey, C. Poirson, and H. Wilmer.

E. W. Foxlee, in proposing a vote of thanks to the Society of Arts for the use of their rooms, desired to couple it with the name of H. Trueman Wood, who had placed a well-fitted dark room at the disposal of the members, and shown many other acts of kindness to the South London Society. This was seconded by W. M. Ashman, and carried unanimously.

A vote of thanks to the outgoing officers having been also carried, the Chairman called upon J. Traill Taylor to give the paper of the evening, entitled, "Paper Negatives" (see p. 789).

During the delivery of the paper, Mr. Taylor passed round several calotype negatives produced in 1840, which, he said, were the oldest in the world, and still in perfect order. A copy of Talbot's "Pencil of Nature" was also shown, the illustrations being photographs printed from paper negatives. He also showed a number of paper negatives recently made on Eastman films, which, so far as quality was concerned, left nothing whatever to be desired. Flexible transparent sheets of prepared gelatine, lent him by the Eastman Company, were passed round, as well as some of those sheets with negative films thereon.

The Chairman said he had listened to the paper with much interest, and he believed it to be a process of the future, for it had many advantages; it would certainly be the process of the tourist. It was evident they might change the glass plates for paper films, and get equal results, without being subjected to the weight and other impedimenta of glass negatives. He then asked for a discussion upon the paper.

W. England had seen a transparent medium made by Warnerke, which was similar to the sheets shown, and he asked for information regarding the preparation.

J. T. Taylor said the practice of stripping films was very common in America. The base was coated with a substratum of soluble gelatine, and the emulsion spread on this, and the negatives were made by ordinary treatment; many of the samples shown were developed in a dish containing twenty-four films at one time, without any difficulty presenting itself. After the usual fixing, washing, and drying operations, warm water was applied to soften the soluble gelatine, which then allowed the films to be stripped quite easily.

The Chairman: Under these circumstances, what time would be allowed for each film to remain in the developer?

J. T. Taylor thought it unwise to have so many as twenty-four films in the developer at the same time; still, it had been done with an old and slow developer. Under any circumstances he preferred a slow developer, one that would take five or six minutes to bring out the image.

Francis Cobb detailed his experience in developing a band of Eastman paper containing twenty-four exposures recently made by T. Bolas in Italy. Having missed the perforated marks, and being at a loss to know just where the band should be cut, they decided to develop the whole roll intact; this was done by passing it several times through a large dish of developer which required an ounce of pyrogallol to compound; the negatives exhibited a few marks, but whether that was due to the strain over the rollers, or the method of development, he was unable to say.

F. A. Bridge was glad they had improved on the plan of rendering the films transparent, for the oil business was a nuisance. In conversation with T. G. Whaite, he learned that the continued use of castor oil, probably from constant heating, caused it to discolour very much, and when in that condition it would not remove opaque spots.

W. England recommended a mixture of equal parts of ether and alcohol for this purpose, and he found castor oil in these solvents answered well for making paper translucent.

E. W. Foxlee imagined the spots were oxidized oil, in which case he knew nothing to remove them.

The Chairman was under the impression that carbon tetrachloride would prove useful, provided the odor could be tolerated.

A discussion then took place on the subject of producing direct positives from gelatine films, in which several of the members took part.

E. Dunmore next drew attention to the question he brought before the previous meeting, regarding the need of protecting gelatine negatives on paper from the influence of sensitized paper. A gentleman then said he had taken a large number of prints from one negative without spots making their appearance, but they were told that ready sensitized paper had been used which contained very little free silver; therefore, it was no criterion as to the safety of changing from glass to paper, for he did not suppose there were many professional printers who would think of using ready-sensitized paper. He then handed to the Chairman a sheet of gelatine and some paper coated with a solution of gelatine, which had been in contact with sensitized paper about a week; there was a large number of the red spots complained of in each instance. He considered that it was necessary for those who wished to introduce such a change in the mode of working to provide a means of protecting the films from such palpable injury, and he knew of nothing better than collodion for the purpose.

W. England had made many thousands of prints from some of his old paper negatives, which were varnished. When these became stained, he was able to remove it by soaking them in alcohol; he preferred seed lac dissolved in alcohol at ordinary temperature, a dram of castor oil being added to each ounce of varnish.

W. M. Ayres spoke in favour of shellac dissolved in cold spirit.

E. Dunmore thought seed lac made the best varnish, and was easily decolourized by filtering through animal charcoal.

The Chairman found a mixture of albumen and water in equal parts very useful in some of his philosophical work, and he thought it would offer a protection to gelatine; it would certainly enable a more perfect continuity to be established between a film of gelatine and varnish.

A vote of thanks to Mr. Taylor was then passed, after which it was announced that the Annual Lantern Meeting will be held on January 7th, and the annual dinner will take place on the 19th inst., at the Holborn Restaurant.

London and Provincial Photographic Association.

The usual weekly meeting was held on Thursday, the 3rd inst.; J. Barker occupied the chair.

T. Waltenberg asked the members' opinion as to the probability of reducing a very dense negative, which he passed round. The circumstances connected with the development of this plate, as related by him, brought out some curious experiences. He was induced late one afternoon to take a portrait of a sitter who was leaving England that day. The light being nearly gone, he used the most rapid plate he had, giving an exposure of upwards of two minutes, with a 3C Dallmeyer lens, open aperture. The plate remained in the developing solution for half-an-hour without any image appearing; a little more pyro was added to the developer, and the tray was then put on one side, and forgotten until some hours afterwards. When the colour of the plate prevented any image whatever from being seen, the plate was put into the hypo bath; but not fixing readily, and the plate being considered useless, it was left in the hypo until the next morning. An image was then discovered, but exceedingly dense, giving rise, however, to some hope that a print might yet be obtained. The various clearing solutions were tried without effect, and the plate ultimately was left for three hours in a solution of hydrochloric acid and alum. This lowered the density somewhat; but as an exposure of three days in the printing-frame had not produced the least trace of a picture on the sensitive paper, the advice of the members was sought.

A. Cowan suggested that ferridcyanide and hypo should be tried. He, however, did not advise a prolonged immersion in this solution, or it might probably have an undesirable effect upon the film.

The Chairman suggested using a different kind of paper, stating that gelatine paper with chloride and an organic salt would, he thought, give a print in a couple of hours. The long immersion in the hydrochloric acid had aggravated the evil Mr. Waltenberg was trying to remedy, it being the treatment he (the Chairman) adopted to intensify a plate. By first converting the image into chloride of silver, then, after washing, exposing the plate to light for some time, he had obtained very good prints from thin negatives in this way. Yellow negatives, however, were not amenable to this treatment.

This led to a discussion upon the best methods of intensification.

A. Cowan preferred Monckhoven's formula.

W. E. Debenham said he had found nothing answer so well as Schlippe's salt; he used it daily, one advantage being that the amount of density was entirely under control.

Two questions from the box were read:—

1. "Are there such things in the market as drawing-pins with thumb-screw heads?"

2. "Is chloride of sodium a restrainer in the developer? If so, is it as good as bromide of potassium for the purpose?"

W. K. Burton said pins of that description would not be drawing-pins, which required that the ruler should pass over them.

With regard to the second question, it was generally admitted that the chloride of sodium was a restrainer,

The Chairman remarked that it would be difficult to test its restraining power in comparison with bromide in a developer, but he thought it would require half as much again.

W. K. Burton thought four or five times.

W. H. Harrison asked why some gelatine plates gave reverse images better than others.

A. Mackie said boiled emulsions gave the best results.

The Chairman was in favour of the iodide plates for the developer.

The proceedings then closed.

Derby Photographic Society.

The annual meeting was held on Wednesday, in the Mechanics' Institute. There was a large attendance of members, and Richard Keene occupied the chair.

The annual report stated that there were eighty-three members in the Society. Mr. Elskes had resigned his membership, and left England for Switzerland, his native country. There were six new members to propose. During the year papers had been read by Messrs. Kaye, on America and Photography; Cox, on the Artistic Application of Photography; Keene, on the Platinotype Process, with practical demonstration; Mayle, on the Process of Enlargement by means of a Lantern, with practical demonstration; Captain Abney (president), on the Theory of Alkaline Development; Messrs. Bolden, on the Hydroquinone Developer; Cox, on Artistic Photography; Keene, on "What to take;" and Bolden on "How to take it," with practical illustrations by C. B. Keene. A camera show had been held, and also a photographic exchange. Out-door meetings had been held during the summer at King's Mills, Cromford, Rowsley, and Tutbury. A conversazione was held on February 20th, which was a great success. Gifts of books had been received from J. Paget, and from the publishers of the News and Journal.

The balance sheet showed the finances of the Society to be in a satisfactory condition.

It was resolved to hold another conversazione on January 20th, in St. James's Hall.

The following rule was adopted concerning the introduction of strangers:—"Members may introduce to any of our meetings any friend, being a photographer, amateur or professional, not resident in Derby."

Votes of thanks were passed to the retiring officers, and to Messrs Cox, Paget, and the publishers of the News and Journal. Captain W. de W. Abney, R.E., was again elected president, and H. Bolden, A. J. Cox, and R. Keene, vice-presidents. A new committee of management was elected, consisting of C. Bourdin, T. Hills, J. C. Merry, J. W. Price, and T. Scotton. James E. Kaye was again elected hon. secretary and treasurer.

J. Mayle then gave a practical demonstration of "How to Make Lantern Slides from Negatives," which was of a most interesting character, and perfectly successful. The new "luminous tablet" was used for printing purposes.

Members gave promises of lantern slides for the "Lantern Evening," which is to be held early in 1886.

Dundee and East of Scotland Photographic Association.

The third regular monthly meeting for the session was held on Thursday, 3rd December, in Lamb's Hotel, Dundee, W. D. Valentine presiding.

After the routine business had been disposed of, Thos. Kyle read an interesting paper on "Pictorial Composition," illustrated with sketches and diagrams, which was listened to with great attention.

A vote of thanks to the lecturer brought the meeting to a close

Hyde Photographic Society.

The usual fortnightly meeting of the above Society was held in the Mechanics' Institute on Wednesday evening, the 2nd inst.

Messrs. Harold, 'Sidebotham, and T. W. Richardson were elected members of the Society.

The President called on George Batty to give a demonstration on "Dry Plate Development."

Mr. Batty then proceeded to develop three plates, which he had exposed in the previous part of the day. The plates were respectively rightly exposed, under-exposed, and over-exposed. In the case of the first he developed with the usual pyro and ammonia. The second plate, which had been under-exposed, he soaked in a solution of ammonia (4 drops to the ounce) for five minutes previous to development. The resulting negative was full of detail, and showed no signs of under-exposure. In the case of the exposed plate, he had used citrate of soda as a restrainer. He said that he found citrate of soda a much more powerful restrainer than the usual ammonium bromide. The plate had been exposed eight seconds, two seconds being considered the right exposure. With the addition of a few drops of the citrate of soda solution to the usual developer, the image came up quite slowly, and the result was a negative of good printing qualities.

Mr. Batty then intensified a thin negative with the mercury intensifier, and closed his paper with a few remarks as to the necessity of well washing gelatine negatives after development.

During the discussion on the paper, the question was asked "Whether or not it was safe to fix the negative, after development, in white light?" The members were divided in opinion on the question; the majority, however, seemed to think it was much safer to fix in the dark room.

The President announced that at the next meeting a general development would take place, each member being requested to bring a negtive and to develop it at the meeting.

North Staffordshire Amateur Photographic Association.

The annual meeting for election of officers was held on Wednesday, December 2nd, C. Alfieri presiding, when the following gentlemen were elected for the ensuing year:—

President—C. Alfieri.
Vice-Presidents—Messrs. Emery and Taylor.
Treasurer—W. Hampton. *Auditor*—R. S. Burgess.
Hon. Secretary—W. B. Allison.
Committee—Messrs. Kelsall, Insull, Hall, F. Emery, Junr., Leek, and West-Jones.

Sheffield Photographic Society.

An ordinary meeting of this Society was held at the Freemsaons' Hall, on Wednesday, December 2nd, W. B. Hatfield in the chair; and after the minutes had been read and approved, the subject of the Society's Exhibition was discussed, and it was arranged to hold the exhibition on January 11th, 1836, at the Albert Hall, Sheffield, six silver and seven bronze medals to be awarded in different classes. The last prize picture for this year, subject a "Street," was voted to Jonathan Taylor.

Dr. Morton read a paper entitled "Notes on Various Methods of Making Lantern Slides" (in our next), illustrated on the screen.

Some beautiful slides were exhibited by the President, and Messrs. Taylor, Hibberd, Wostenholm, Mallham, Gilley, and Pearce.

Glasgow Photographic Association.

The usual monthly meeting was held in the Philosophical Society's Rooms, 207, Bath Street, on Thursday, December 3rd, W. Lang, jun., in the chair.

The preliminary business having been gone through, the following gentlemen were admitted as members:—H. T. Redwood, T. Herbertson, W. McLeuan, and L. M. Miller.

The Treasurer then read his financial statement for last session, which was considered very satisfactory, and was unanimously adopted.

C. Armstrong read a paper on the "Making of Transparencies by the Wet Collodion, and Dixon's Slow Printing Process." He gave a description of these different processes, and a demonstration of his method of working, making an excellent transparency by wet collodion from a negative in the camera. At the close of his paper and demonstration, Mr. Armstrong exhibited a number of transparencies by the aid of a pair of lime-light lanterns, kindly lent by Messrs. G. Mason and Co. The transparencies were all prepared by Mr. Armstrong from negatives taken during this year; and as they passed through the different toning solutions used, were explained by him, as also the circumstances under which the negative had been obtained.

J. Parker said he thought it was a mistake to continue, as we were doing, to use square and circular openings for lantern transparencies, and advocated, instead, the oval and parallelogram form, as complying far better with the necessities of art than the usual shapes.

A number of photographs were passed round showing the results obtained by the "photolux." These portraits were in no way inferior to any produced by daylight, and were very much admired for the softness and brilliancy of the lighting.

Bury Photographic and Arts Club.

The third annual exhibition of the work of the members of this Society was opened at the Bury Athenæum on Tuesday, December 1st. The position of the Club is a most gratifying one, for there has been a steady accession of members since its formation, and considerable interest has been displayed in its progress. About the same number of photographs were exhibited as last year, but the work was on the whole of higher excellence, especially on the part of younger members, who are to be congratulated on the satisfactory result of their labour during the year. One or two former exhibitors failed to contribute towards the exhibition, notably Mr. F. Cooper, whose photographs had been greatly and deservedly admired. Apparently the interest was concentrated in a few pictures by the platinotype process, exhibited by Mr. J. Nelson and Mr. E. Mellor.

J. Nelson submitted one of the prints taken by this process to as severe a test as possible. A picture of the Guild Church of Stratford-on-Avon was printed on satteen; it was then boiled for half-an-hour in a solution of soap and soda, and afterwards ironed out with an ordinary flat iron, which process it withstood without the tone of the print being in the slightest degree affected.

There were several specimens of photographic apparatus exhibited, and S. Hopworth contributed a camera in which he had embodied several important improvements. The photographs filled the stands arranged along the whole length of the hall, but these were not sufficient, and three others were erected in the centre of the room.

Talk in the Studio.

Hyde Photographic Society.—The exhibition of photographs and photographic apparatus will open on January 7th and 8th, 1886. Half the carriage will be paid on all exhibits of apparatus, and the whole carriage on exhibits of photographs. Exhibits to be sent, not later than January 2nd, 1886, to John Pennington, Hon. Sec. Great Norbury Street, Hyde, Manchester. Intending exhibitors are requested to communicate with the Secretary at their earliest convenience.

The Special Christmas Number of the Cyclist.—Among the great fund of amusing varieties served by the editor of this annual may be mentioned a capital account—partly burlesque, we must admit—of the adventures of some amateur photographer. The conception and execution of the illustration of "A Startling Development" are capital.

Colonial and Indian Exhibition, 1886.—As the object of this exhibition is to represent the progress and the development of each colony, it has been considered impracticable to call upon the Colonial Governments to comply with any form of classification, as has been customary at previous exhibitions. Each colony has, therefore, been at liberty to make a classification most suitable to its own requirements. As much interest is taken in this country in the woods of the various colonies, it is hoped that where cases are requisite for the display of goods, these cases will be made from native woods of the colony, in order that a complete representation of the forest resources of each colony may be practically shown; and it has also been suggested that the building stones and marbles of various colonies should be sent over in the form of pedestals. Special arrangements will be provided for the practical illustration, by one special kitchen, of all the frozen meat industries, and of the colonial preserved meats, fish, and vegetables. This department will be carried out by the National Training School of Cookery, under the direction of the Royal Commission itself, in order that the due participation of the various interests concerned may be maintained. It has been decided that only *bona fide* colonists can, through their respective governments, participate in the exhibition; it will not, therefore, be possible for the Royal Commission to entertain any applications, upon any pretence whatever, from colonial importers or agents in this country. The time for the opening of the exhibition is not yet definitely fixed, but it will be during the first fortnight in May, 1886.

Transfer Paper for Silver Printing.—There appears to be a very good prospect of the carbon printers' transfer paper, or a similar preparation, becoming an exceedingly useful article in the production of silver prints. Judging by examples which have reached us from correspondents, the double transfer paper, sensitized in the manner recommended by Ashman and Offord, forms such an excellent substitute for albumenized paper that it really becomes a difficult matter to distinguish prints of this class from those on albumen. Even the most critical eye might easily be deceived were Rive or Saxe papers employed. "A Printer" writes us:—"I have made an experiment on double transfer paper, the result of which I forward you. The washing was conducted with ordinary batches of silver prints. Toning the same, and as quick as the others. There was no difficulty in curling, or any other failing. The prints remained in water all night."

More Lightning Images.—Report of a curious freak of lightning comes to us from Albemarle Co., Va. A pane of glass in a window of a house in that section has on it, or rather in it, an exact reproduction of the features of a woman who, while standing at the window, was killed by the "thunderbolt" which so marvellously photographed her likeness on the glass. This is vouched for by the very best authority. This incident calls to mind another of a somewhat similar nature, the scene of action in this case being in New Jersey. A lad, standing on the threshold of his father's house, was struck down by lightning, and when his body was examined it was discovered that the limbs and leaves of the tree, through which the lightning had passed before reaching him, were photographed in livid colours on his flesh, and this through his clothing. These marks, however, gradually faded away, and at the time of his burial had entirely disappeared. *—Anthony's Bulletin.*

Abstract of Chapman Jones's Lectures at the Birkbeck Institute, Dec. 2nd and 9th.—Photographically considered, light generally decomposes, and in most cases darkens; but sulphite of lead, which is black, is converted by the action of light and air into the white sulphate. The pure oxide of lead is decomposed by light, and becomes lighter. Nitrate of silver is permanent when pure, but in the presence of organic matter, as when spread on paper, ivory, &c, it readily blackens by light, hence its use as a marking ink for linen. The chloride, bromide, and iodide of silver are darkened by light, unless perfectly pure and dry, a portion of the chlorine, bromine, or iodine being liberated from the silver. The salts, when not decomposed, are readily soluble in cyanide of potassium; they are also soluble in hyposulphite of soda, but a large excess of this latter salt must always be used to avoid the production of a sparingly soluble compound, and to retard the spontaneous decomposition of the compound formed. Sodium sulphite, sodium chloride, and ammonium chloride are somewhat similar to the cyanide and the hyposulphite, but they act so slowly that they are not practically useful as fixing agents. Dec. 9th.—If the mineral matter of bones is dissolved away, the form of the bone remains as a yellowish, transparent substance. This, or the original bone, boiled with water, gives gelatine. Skin and hide also give gelatine by boiling, but cartilage gives a jelly having different properties, and called chondrin. Chondrin is used for size, and is present in variable quantity in commercial gelatine. Isinglass, when boiled, gives a very pure gelatine. Glue is an impure, dried gelatine made from animal offal. Gelatine varies even when prepared from the same tissues of animals, if the animals were of different ages; it also varies according to the method of preparation. By heating with water, gelatine gradually loses its gelatinizing qualities. Dilute acids do not prevent gelatinization, nor do dilute alkalies, nor strong ammonia. Gelatine keeps indefinitely when dry, but moist gelatine may begin to decompose in twenty-four hours, but many antiseptics prevent decomposition. Gelatine swelled in a chrome alum solution requires a higher temperature to melt it than if it were swelled in plain water.

The Sun's Corona.—Signor F. Tacchini, the successor of Signor F. Secchi, at the Observatory of the Collegio Romano, has published a confirmation of the astronomer Forel's statement that the sun's corona is, in a clear sky, discernible on high mountains in a surprisingly distinct manner. He himself observed the phenomenon from the summit of Ætna at the beginning of July. At Rome, Naples, Messina, Catania, the sun appeared surrounded by a broad, white crown; but, from the top of Ætna, 3,300 metres above the level of the sea, in a very clear sky, it presented the appearance of a white ring surrounded by a splendid copper-red corona. Near the horizon, the sun's appearance changed into an ill-defined arch of great span. He was able to observe all these phenomena at leisure on two different days. At sunrise and sunset he saw clearly the beautiful red light of the arch. But he is of opinion that those appearances are not as strong and brilliant this year as in 1883 and 1834.—*Times.*

Photographic Club.—The subject for discussion on December 16th will be "Methods of Rendering Paper Transparent."

To Correspondents.

⁂ We cannot undertake to return rejected communications.

R. S.—We will try and arrange for a series shortly; as far as we know, nothing of the kind has been published.

W. H. H.—As the block has to be cut, your communication must stand over till next week.

J. W. P.—Obtain Liesegang's "Carbon Printing," published by Sampson, Low, and Co.

W. H. Tuck.—As we know nothing of the merits of the case, we can hardly do as you suggest; and this more especially as you intimate that it is likely to be the subject of further litigation. We imagine it to be tolerably well established that the mere possession of the negative confers no more copyright in a photograph than the possession of the stereotype plate does in the case of a literary work.

Beggar.—The best thing is moderately strong glue, to which as much methylated spirit has been added as the glue will bear without precipitation taking place.

Thos. H. M.—It is to hand, and we shall make good use of it. Thanks.

Forrester.—Make it up like the gold bath, but using three or four times as much chloride of platinum as you would of gold. 2. We have had no difficulty in getting it in London at the ordinary oil shops; but if there is any doubt about the quality of the article sold in bulk at the oil shops in your neighbourhood, you had better obtain the mineral oil sold by gun-smiths under the name of "Rangoon" oil. Buying it in this way, one pays a trifle more than the market value, but one is sure of getting the right thing. Ebonite sheets are sold by the Silvertown Rubber Co., 100, Cannon Street, London.

Brittany.—A weak solution of ozone bleach, or of chloride of lime, will probably answer. Wash well afterwards.

Nitrate.—It is quite possible to take a very useful photographic equipment on a bicycle—in fact, we have done it ourselves—but a tricycle is to be preferred on the whole. The Coventry Rotary is a very suitable machine, but there are very few tricycles which will not admit of being used as luggage carriers provided that a little judgement is exercised in fitting the case to the machine.

Nox.—1. There is no handbook better than Abney's "Instruction," as far as we know. You surely must have got hold of the first edition; obtain the latest, and you will find everything you require. 2. Dissolve it in weak hydrochloric acid.

The Photographic News.

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For Advertisement Scale, see page v.

THE PHOTOGRAPHIC NEWS.

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INFLUENCE OF SUNLIGHT ON THE DURATION OF LIFE OF MICROBES.

E. Duclaux has been engaged in experiments upon the vitality of microbes in sunlight. In a paper in the *Comptes Rendus* he has treated particularly on micrococci. These he cultivated in veal broth. When kept in darkness or in diffused daylight, they lived for more than a year; in the sunlight of spring, they died after forty days; whilst in July fourteen days sufficed to kill them.

The vitality of microbes is still lower when kept in a dry state. Microbes were kept in a glass globe for six months, and then exhibited full vitality. In sunlight in July they were killed in two or three days. Not one withstood the action of the sun for three days in August, although the direct sunlight only shone upon them for four hours each day.

This fact is very important, that, since micrococci belong to the most dangerous and wide-spread kind of microbes, and excite many diseases, a short action of sunlight suffices to kill them.

This probably explains why the germs of micrococci found in the air are dead, and that many epidemic diseases, in spite of the dispersion of germs by air currents, remain confined to their place of origin. Germs carried by winds, after having been exposed for some time to the sun's rays, become so much enfeebled as to lose their dangerous properties. On the other hand, articles of clothing done up in parcels, and carried in the dark holds of ships, may convey microbes, and become the cause of the spread of epidemic disease.

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THE NEW YORK AMATEUR EXHIBITION.

Anthony's Bulletin says:—

The most notable event in photographic circles in New York recently, was the first annual exhibition of the Society of Amateur Photographers. Taking into consideration the age of the Society, the whole affair was a grand success, and this new feature of their development must be uncommonly encouraging to the officers who have managed it. The room in which the exhibition was held was sufficiently large for the purpose, and the arrangements for lighting the pictures at night were very good, while the large and numerous windows afforded ample light by day. With those who have done so well it is hard to find fault; nevertheless, we must say a word or two of criticism. In the first place all the pictures, except those in some of the frames, are too close together. We are told that this was due to the unexpectedly large number of prints (seven hundred) sent in for exhibition. Still something could have been done to prevent this great overcrowding, even at the last minute, and we hope that the house committee will bear this well in mind in the future. Another point that appeared to us to be overlooked, was the character of the mounts of many of the prints exhibited. This is very much a matter of opinion, but it is very rare that a clear white mount is suited to any photographic print. The predominance of white mounts at this exhibition detracted considerably from the enjoyment of those details of artistic work found in many of the prints. We do not say these things in any fault-finding spirit, and would give the gentlemen who managed the exhibition all the praise that they can enjoy.

In another place we have given as detailed a report of the whole exhibition as our space and time will admit. The evident interest of the individual exhibitors was demonstrated by the number and character of the pictures sent in. From the beautiful photo-micrographs of Mr. Atkinson, the exquisite Eastern pictures of Mr. and Mrs. DeForest, and the superb work of Mr. Dumont, to the grand, majestic and magnificent church interior (24 by 36) from a paper negative by Mr. Rockwood, every variety of picture lent its aid to the success of this highly interesting exhibition.

Perhaps a word or two may be said in regard to the means used to produce the pictures. In the matter of lenses, almost every make was represented, Ross, Euryscope, Steeinheil, Darlot, and others; but it was noticeable that many exhibitors having these lenses also showed pictures made with instruments of Dallmeyer. Indeed, this latter lens was in the majority. In regard to plates, Cramer, Seed, and Carbutt, were well represented, while Stanley appeared to be the favourite. Many exhibitors showed pictures from several brands of plates, and often with equal success in each case; while for instantaneous work, the Stanley gave results that were unsurpassed by any.

Very few records appeared to show the kind of paper used for printing on, but occasionally the ready-sensitized variety was noted, and showed to good effect. Perhaps the most beautiful examples of printing were those of Mr. Maghee, who exhibited platinotypes. These excelled in every respect anything of the kind we have yet seen. They were simply superb.

Those of our readers who could and did not visit this exhibition, missed a great treat. But we are satisfied that with the experience gained in this effort, the officers of the society will give us something in the future that will make New York proud of its amateur photographers. There is talk of having a spring exhibition, and with the increasing membership, now over one hundred and sixteen, the success of such a project is assured. We advise all our readers who are members to bear this in mind, and if each one sends *something*, it will be still more encouraging to the gentlemen who manage it than the one just closed, of which they may well be proud.

Awards of Diplomas.

Class 1. Landscape—Without figures (or animals), F. A. Jackson. Class 2. Landscape—With figures (or animals), H. G. Runkle. Class 3. Marine—Surf, J. H. Maghee. Class 4. Marine—Sail (including steamers or other vessels), J. E. Dumont. Class 5. Architectural, Ralph McNeill. Class 6. Interiors, H G. Runkle. Class 7. Portrait—Not taken under sky-light, J. E. Dumont. Class 8. Group—Not taken under sky-light, Edward M. Franklin. Class 9. Cloud effect, Randall Spaulding. Class 10. Flowers, C. W. Canfield. Class 11. Animals, Francis Blake. Class 12. Still life, Gilbert A. Robertson. Class 13. Street views, Ralph McNeill. Class 14. Expectation—(Composition), W. H. Bartholomew. Class 15. Halt !—(Composition), F. A. Jackson. Class 16. Rustic Bridge—(Composition), Dr. P. H. Mason. Class 17. Enlargement, L. P. Atkinson. Class 18. Stereoscopic, L. P. Atkinson. Class 19. Transparencies (other than lantern slides), L. P. Atkinson. Class 20. Lantern Slides, J. E. Brush. Class 21. Photo-Micrographs, L. P. Atkinson. Class 22. Platinotype, J. H. Maghee. Class 23. Entire collection. J. E. Dumout.

RESEARCHES AND EXPERIMENTS WITH BROMIDE AND CHLORIDE OF SILVER IN GELATINE.

BY PROFESSOR DR. J. M. EDER.

I.—The Priority of Publication of the Developing Power of Phenylhydrazin Compounds.

In the spring of 1885, it was stated in the photographic journals of Berlin that Dr. E. Jacobson had discovered a new developer. It was further said that Dr. Stolze had developed good pictures with a new substance, but no intimation was given as to the nature and properties of this substance. I did not concern myself about these statements, since there was no indication to be met with in the journals as to what this secret substance was; but continued my experiments with alkaline solution of oxide of tin, and with other inorganic and organic reducing agents, as I have now for some years been doing.

When phenylhydrazin came to be experimented with, I discovered, *quite independently, and without any knowledge of the labours of others*, the developing properties of this substance in alkaline solution, for silver compounds. I communicated the same at the general meeting of the Photographic Association of Vienna on May 8th, and published the particulars in the *Photographische Correspondenz* (1885, pp. 181 and 198). At that time neither Dr. Jacobson nor any one else had spoken of the photographic properties of hydrazin, so that I not only discovered them independently, but was the first to publish them.

It was afterwards made known in the Berlin journals that Dr. Jacobson had already lodged a patent for this application of hydrazin, of which, of course, I could have no knowledge.

In the meantime, I had found that phenylhydrazin sulphate was better suited for the purpose than its other compounds, and *was the first to publish this fact*, before it was heard of from any other source. It is now stated that the sulphate has been tried by Dr. Jacobson, and found better than other compounds.

I maintain, therefore, that I, independently, found the developing property of hydrazin, and the preference to be given to the sulphate of hydrazin, and *first published them.* Dr. Jacobson certainly gets his patent; I claim the independent discovery and first publication of this property of hydrazin.

II.—Hydrokinone may be employed with advantage for the development of chloride of silver in gelatine, as stated in a communication upon this substance, made by me in conjunction with Captain Pizzighelli in the year 1880. We gave good formulæ for its use at the time,* and these have since been added to by Warnerke. In many hands, however, hydrokinone, for inexplicable reasons, has not succeeded.

I have recently made the observation that after some years, chemically pure hydrokinone loses its powers. The colour changes but little; it gives, however, a dark brown solution in alcohol, and no longer possesses its full developing power. With such a preparation, no good pictures can be obtained, unless the hydrokinone be recrystallized from a very weak aqueous solution of sulphurous acid. In the presence of a little sulphurous acid, hydrokinone keeps better.

As a test of the quality of hydrokinone, a ten per cent. solution may be made to serve. This should be transparent, and at the utmost not more than of a light brown colour.

III.—Accelerators as Baths before Development, and as Additions to the Developing Solution.

Hydrosulphite of Soda.—Hydrosulphite of soda was first employed by Samman in the year 1877, as an addition to the pyro developer. The less easily decomposed sulphite of soda was subsequently employed, and has found general acceptation. Both these salts have little or no action when used with the ferrous oxalate developer. With respect to sulphite of soda, I stated this to be the case in the first edition of my work on "Bromsilber-gelatine," page 49. I am still of the same opinion, although in some journals this addition is given as a novelty, and recommended.

Hydrosulphite of soda retains the ferrous oxalate developer somewhat longer in an active condition when exposed to the air. In alkaline pyro developer it acts in somewhat the same manner as sulphite of soda—that is to say, it keeps the picture clear during prolonged development, and allows the faint half-tones time to gain greater intensity. For the same reason, Capt. Himly's accelerator, "Excelsior," is satisfactory in its action with pyro, which I cannot say is the case with ferrous oxalate. The "Excelsior," for pyro developer, owes its efficiency to the hydrosulphite of soda, which my analysis has shown it to contain, in addition to a certain amount of ammonia. The ammonia increases the keeping property of the hydrosulphite of soda, and is a good accelerator for the soda developer. It is known that a trace of ammonia in the soda developer accelerates development, and more quickly gives intensity to the picture.*

Hydrosulphite operates somewhat against the appearance of ammonia yellow fog, which many commercial plates show when developed with soda and ammonia, without the addition of bromide, and gives more brilliancy. "Excelsior" works well with soda developer; on the other hand, it has almost no action with the ammonia sulphite developer. Unfortunately, hydrosulphite of soda, which is prepared by digesting sulphite of soda with zinc in powder, is not permanent with access of air, and this may explain the contradictory statements that have been made with respect to this substance.

Of any orthochromatic action obtained by the use of "Excelsior," I found no trace.

IV.—Messerschmidt's Work with Photographic Sensitisers.

I have repeated Messerschmidt's experiments, and found neither any increase of sensitiveness to green from the addition of crysaniline to the developer; nor, after the addition of quinine, any increase of sensitiveness to white or ultra-violet light. Immersion of the plate in the solution after exposure was unsuccessful so far as obtaining any change in sensitiveness, except such as may result from bathing the plate with water. Further communication with respect to my experiments in the direction of spectrum analysis, I will leave till later on.

V.—Not long since the *Amateur American* stated that it is advantageous for instantaneous pictures to highly dilute the pyro developer, and in order to compensate for the weakness of the developer, to leave the picture for a long time in the developing solution. This was also recommended by Dr. Stolze. I have made a set of parallel experiments, using normal potash developer and ordinary soda developer of varying grades of concentration.*

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* Eder's "Photographie mit Bromsilber and Chlorsilber, in Gelatine." 3 Auflage, 1886. Knappe in Halle.

* See Eder's "Photographie mit Bromsilber und Chlorsilber Gelatine" (3rd part of the Ausfuhrliches Handbuch der Photographie), wherein receipts for developers are given.

The result was, shortly, as follows:—The developer diluted with three or four volumes of water brought out, after thirty or forty minutes, as much detail in the shadows as the ordinary undiluted developer; but the latter had given so much intensity in the highly-lighted parts, that the negatives printed with difficulty. The plates from the dilute developer were more tender and harmoniously defined. For instantaneous pictures with strong contrasts of light and shade, therefore, the dilute developer is to be preferred to the concentrated. We must, however, allow from half to three-quarters of an hour's stay in the solution.

When, however, the whole scene from which the instantaneous exposure has been taken is monotonously lighted, and poor in effects of light, the ordinary strong developer as hitherto employed is to be preferred.

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ARTISTIC FEELING IN PHOTOGRAPHY.

BY A. H. WALL.

Part VI.—On the Treatment of Skies and Clouds.†

Every good landscape painter and art photographer will, I believe, admit that over no part of his work has he more control, or finds better opportunities for getting artistic technical effect, and expressing feeling and thought, than he has when putting in skies and clouds. There, nature presents him with such infinite and ever-changeful varieties of forms, lights, shadows, and effects. But the scope offered him is a source of both power and danger. If he ventures into this vast storehouse to select for himself, he must do so with some scientific knowledge of atmospheric phenomena, which is only to be acquired by careful study and observation, otherwise he may perpetrate many serious mistakes.

Obviously, for instance, it would never do to join in discordant mixture a sunless sky and a sunny landscape; yet even this has been done. And as palpable would be the blunder of putting clouds lighted from the zenith over a landscape lit up by a westerly or easterly sun; and this, too, has been done. Nor would it be less ridiculous to give the feebly-marked details, the wan, mistily-lighted objects, and the vague, vaporous distances of morning or evening landscapes under clear, bright, noontide skies; although even these combinations are to be found. Here, then, we see the advantages and dangers of a photographic practice now common, and, I think, artistically commendable—that of printing-in skies from separate negatives.

I have already pointed out (see page 645) that linear and ærial perspective govern the forms and tones of clouds just as they do those of terrestrial objects, and therefore, again, we must have due harmony or agreement between sky and landscape. The photographer who lacks the requisite knowledge, and therefore does not understand these necessities, should be content to watch and wait until sky and landscape present such pictorial combinations as he has seen in the works of our best landscape paintings, notably some more rarely seen in nature which exist in the paintings of the Turner collection, and then secure two negatives, one of the sky and one of the landscape—of course without altering the position of the camera.

One great element of usefulness in cloud and sky effects in proper combination, is the aid they render in the composition of lights and darks, meaning by this, please remember, not only light and shade, but objects which are light or dark by virtue of their local colours. Let me illustrate this.

Even in full sunlight touches and masses of dark colour may spread through a composition, giving it breadth, richness, and variety. But sometimes, through their positions, they have the reverse effect, resulting in isolated, staringly prominent, scattered spots and patches, spoiling utterly from a pictorial point of view what would otherwise have been an extremely interesting and beautiful landscape. The painter would, in one way or another, boldly alter these offending spots of local light or dark, rightfully ignoring unimportant facts, generally due to some mere chances, when unaltered they would spoil an excellent subject. But the photographer's power in this direction is either not sufficient, or he has really none. Only nature can come to his assistance, and she will often do so by such an alteration in the general effect, as a shadow-casting cloud will give. Then see how rapidly a magical change is wrought, and be swift to seize it! The staring patches of light and dark cutting up and destroying the composition are all but lost in a broad sweeping mass of delicate shadow, toning down the lights subduing details before prominent, and lessening the contrast between the local lights and darks, thereby increasing the appearance of space,* giving greatly increased brilliancy to light and shade in the luminous portion of the picture, subduing too uniformly "made out" details, and giving some parts of the landscape dominance over others, while in various differing ways securing those vital elements of pictorial effect, harmony, breadth, and vigorous contrast. A wonderful variety of effects altogether new are thus wrought by the shadow of a passing cloud over hill and dale, forest, fields, villages, and white scattered cottages, the mere enumeration of which would demand as much space as I can give my present paper. Yet in times past I have actually seen a photographer standing before just such a landscape as I have imagined, waiting with his hand upon the cap of his lens, until "that beastly cloud-shadder" had sped away!

These flying cloud shadows, being sometimes within the plane of the picture, come into it; but they are more frequently out. In the former case they must, as a matter of course, be seen in the photograph; but in the latter there is no such necessity, and thus the door is opened for a little skilful artistic dodging, in the printing of which, however, only a truly artistic photographer should avail himself. The attempt, if made inartistically, would probably err on the side of comicality.

"It is a strange thing," wrote Ruskin in one of the most beautiful of his many prose poems, "how little people know about the sky. It is the part of creation in which nature has done more for the sake of pleasing man, more for the sole and evident purpose of talking to him and teaching him, than in any other of her works, and it is just the part in which we least attend to her . . . There is not a moment in any day of our lives when nature is not producing scene after scene, picture after picture, glory after glory, and working still upon such exquisite and constant principles, of perfect beauty in that glorious dome, for the good and delight of all the dwellers upon earth. It is the realm of beauty, beauty raised to the loftiest in order that all may see it. Sometimes gentle, sometimes capricious, sometimes awful, never the same two minutes together; almost human in its passions, almost spiritual in its tenderness, almost divine in its infinity. Surely it is meant for the chief teacher of what is immortal in us, as it is the chief minister of chastisement or of blessing to what is mortal. And yet we never attend to it, never make it a subject of thought, but as it has to do with our animal sensations. We look upon all by which it speaks to us more clearly than to the brutes, upon all which bears witness to the intentions of the Supreme in giving us more from the covering vault than the light and the dew, which we share with the weed and the worm, but as a succession of meaningless or monotonous accidents, too common and too vain to be worth of a moment of watchfulness, or a glance of admiration . . . . Who, among the whole chattering crowd, can tell me of the forms and the precipices of the chain of tall white mountains that girdled the horizon at noon yesterday? Who saw the narrow sunbeam that came out of the South and smote upon their summits until they melted away in a dust of blue rain?"

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* The formulæ of ordinary concentration are well known. I employed those given in my work, "Die Photographie mit Bromsilber Gelatine," 1886, Knappe in Halle. See also my article in one of the last numbers of the Photo News on the "Soda Developer."

† Continued from page 647.

* We destroy both space and size, either by the vacancy which affords us no measure of space, or by *the distinctness which gives us a false one.*—Ruskin.

"The landscape painter," said Turner, in a letter to one of his friends, "who does not make his sky a very material part of his composition, neglects to avail himself of one of his greatest aids."

"Rocks, trees, mountains, plains and waters," wrote C. R. Leslie R.A., "are the features of landscape, but its expression is from above; and it is scarcely metaphorical to say nature smiles, or weeps, is tranquil, sad, or disturbed with rage, as the atmosphere affects her. Hence the paramount importance of sky in landscape—an importance not diminished, even when it forms but a small portion of the composition."

There is, perhaps, no finer illustration of solemn pensiveness and tranquility expressed chiefly by sea and cloud than will be found, by way of illustration, in a picture Turner exhibited in 1842, which is now in the National Collection. It is called "Peace," and represents the burial at sea of Wilkie, the painter, just off Gibraltar. Here is a slight sketch made from it in black and white (fig. 1) just sufficient to indicate roughly its composition and general effect. The ghastly blue rocket, the ghostly smoke of the funeral gun, the lurid and deep golden blaze of the torchlight reflected by the sea where the corpse is being lowered into its ocean grave; the pale crescent moon, the vapour-veiled sunset, and the mingling of gloomy smoke and pallid steam, all blend in producing a strangely weird effect of mournful grandeur. Stanfield objected to this picture's representing sails as black. Turner replied that there was nothing darker than black, or he would have used it; meaning, I suppose, that the intense feeling and powerful sentiment with which the black harmonized were more to him than the simple and comparatively unimportant fact that sails never are black.* Personally, I agree with Stanfield, and object to these glaring violations of even minor truths, believing that it is the business of the artist to minister to the necessities of art with strict regard to actual realities, however great may be the difficulties in his way. This imperious process of cutting the knot seems to me very like indolence, impatience, or shirking a duty.

It is, I suppose, my fault or my misfortune, but, honestly, I do not agree with Mr. Ruskin in thinking that although "there is considerable power" in "parts" of this majestic picture, it "has no high merit nor material interest." But I quite agree with him in believing that it is, as he says, "spoilt by Turner's endeavour to give funereal and unnatural blackness to the sails." I introduce a sketch from t here to serve my purpose in showing the power sky and ouds possess in emphasizing and giving new force to the sentiment and feeling of a picture. Ruskin speaks of it as a work which, I presume, from this point of view should "be precious to students."

Turning from it to another example of powerful sky effect in which we have moonlight and sunlight weirdly blending, and vaporous exhalations and vague cloud-forms rising into the dying glories of a mighty day, I add to the above another grand illustration of pictorial composition from the same great artist's picture of "The Fighting Téméraire tugged to her last berth to be broken up, 1838."

The obvious defect in this picture is, in the opinion of your humble servant, the impossible lighting of the glorious old battle ship and ugly little steam-tug. "Evidently Turner's object in this arbitrary lighting," says Mr. Hamerton, "was to give the 'Téméraire' a sort of ghostly, unearthly look, as if already more a melancholy vision of the past than any present reality," but this might surely be accomplished by the art-power of a Turner without a staring violation of fact and probability. The sentiment is otherwise most eloquently and poetically enforced without any such ready and royal road to artificial stagey effect, why should it not be so enforced throughout? The sun going down dimly in a lake of blood-red misty light was but an actual fact, and so was the old three-decker's looming up so pale and ghostly in the gathering gloom.* It is in studying such paintings as this that our more loftily-aspiring photographic artists—amateur or professional—will realize most forcibly the superior power of expression and feeling over all mere dull, plain, uneventful matter-of-fact representations. Let us be as true to nature as excellent lenses, first-class chemical conditions, and accurate observation will enable us to be, but do not suppose that lenses and chemicals will ever do the work of imagination or inspire feelings and sentiments without the help of art, although this art is not—or should not be—be it also remembered, used as means of falsifying facts, but rather to increase their power over human minds and hearts.

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* Leslie, who overheard the conversation, supposed Turner's remark only indicated the intensity of his grief for Wilkie's death, and that it expressed "his determination to put the picture, as much as possible, in mourning." If so, the feeling of the friend was stronger than the judgment of the artist.

* Mr. Thornbury described how Stanfield, Turner, and a group of fellow-artists witnessed the facts (represented by this picture in his biography of Turner) from the deck of a river steamer.

Before quitting the subject of this picture, I cannot refrain from quoting another of Mr. Ruskin's poetical word pictures with which it will ever remain associated, and having done so, I must once more put my pen aside. The extract is so fine that I am sure you will excuse my doing this.

"The painting of the 'Téméraire' was received with a general feeling of sympathy. No abusive voice, so far as I remember, was ever raised against it. And the feeling was just, for of all the pictures of subjects not visibly involving human pain, this is, I believe, the most pathetic that was ever painted. The utmost pensiveness which can ordinarily be given to a landscape depends on adjuncts of ruin; but no ruin was ever so affecting as this gliding of the vessel to her grave. A ruin cannot be; for whatever memories may be connected with it, and whatever witness it may have borne to the courage or the glory of men, it never seems to have afforded itself to their danger, and associated itself with their acts, as a ship of battle can. The mere facts of motion, and obedience to human guidance, double the interest of the vessel, nor less her organized perfectness, giving her the look, and partly the character, of a living creature, that may indeed be maimed in limb, or decrepit in frame, but must either live or die, and cannot be added to nor diminished from, heaped up, or dragged down, as a building can. And this particular ship, crowned in the Trafalgar hour of trial with chief victory—prevailing over the fatal vessel that had given Nelson death—surely if ever anything without a soul deserved honour and affection, we owed them here. Those sails that strained so full bent into the battle, that broad bow that struck the surf aside, enlarging silently in steadfast haste, full front to the shot, resistless, and without reply, those triple ports whose choirs of flame rang forth in their courses into the fierce revenging monotone, which, when it died away, left no answering voice to rise any more upon the seas against the strength of England. Those sides that were wet with the long runlets of English lifeblood, like press planks at vintage, gleaming goodly crimson down to the cast and clash of the washing foam. Those pale masts that stayed themselves up against the war ruin, shaking out their ensigns through the thunder, till sail and ensign drooped—steep in the death-stilled pause of Andalusian air, burning with its witness cloud of human souls at rest. Surely for these some sacred care might have been left in our thoughts, some quiet space amidst the lapse of English waters.

"Nay, not so. We have stern keepers to trust her glory to—the fire and worm. Never more shall sunset lay golden robe on her, nor starlight tremble on the waves that part at her gliding. Perhaps where the low gate opens to some cottage garden, the tired traveller may ask, idly, why the moss grows so green on its rugged wood; and even the sailor's child may not answer, nor know, that the night dew lies deep in the war-rents of the wood of the old Téméraire."

It is something glorious for art to have inspired such thoughts and feelings which, *via* Ruskin, plead so nobly for so holy a cause, and in such trumpet-tongued, heart-stirring echoes. And it will be something grand if both, through any instrumentality, however humble, succeed in wakening a deep and earnest desire to elevate photography higher and higher in the domain of art.

(*To be continued.*)

MOUNTING PHOTOGRAPHS ON PAPER.

BY J. H. BIGGS.

Ordinary silver prints on albumenized paper cannot be mounted satisfactorily unless they are in a damp state when put down on their supports, and, if these latter are not sufficiently rigid to resist the contraction of the prints in drying, they will be much drawn out of shape.

Having to mount a great number of photographs for book illustration, I tried a variety of means to prevent the wrinkling of the paper supports, without success, but eventually found that all difficulties were overcome by straining the paper on a board, as for water-colour or plan drawing; the mode of proceeding being as follows.

On each side of a drawing board of corresponding size, mount a sheet of suitable paper, say of double elephant or imperial size, by wetting it thoroughly, placing it down flat and even, and applying glue all round under the edges.

When the sheets are dry, draw pencil lines marking off a margin of about an inch from the edge of each sheet, to allow for waste where the paper is fastened down, and other lines, dividing the space inside this margin into as many pages of the required size as the sheet will allow; also make such marks on each page as may be necessary for guides in placing the prints truly on the pages. To draw these lines and marks with accuracy and facility on the successive sheets, marks are made, indicating their positions, on the edges of the board.

A sufficient number of prints to fill the pages on both sides of the board having been damped, they are placed in a pile, face downwards, and each print in succession is brushed over on its back with a strong starch paste, and, by the aid of the guide marks, is accurately placed in its proper position on one of the pages. When both sides of the board have been thus filled up, the whole are allowed to become thoroughly dry, and then the pencil guide marks are rubbed out, and with a sharp knife and a straightedge, the paper is cut through along the lines representing the limits of the mounts, thus producing so many illustrated pages ready for binding.

To economize time and material in printing long numbers from the same negatives, the following plan will be found useful.

In thin paper, cut an opening of the size and shape the trimmed print is required to be. Fasten this mask on the face of the negative, taking care to adjust it accurately with respect to the vertical lines of the picture. Mark each sheet of albumenized paper into sizes just fitting into the opening in the mask, and cut them out accurately and neatly. It is obvious that all prints thus secured will be identical as regards the amount of subject included, that they will require no trimming, and that the minimum quantity of paper and chemicals necessary for their production will have been used.

THE CHEMISTRY OF SULPHITE OF SODA.

BY A. BOAKE AND CO.

In your issue of November 27th, Mr. Robinson dealt with the chemistry of sulphite of soda, and it occurred to us that as the study of the compounds of sulphurous acid has been pursued with close application in our laboratories at Stratford, the following observations might prove interesting.

Estimation of Sulphite of Soda.—The method followed in our laboratories is the volumetric one based upon the reaction between iodine and sulphurous acid, and in this respect is similar to that given from Mr. Robinson, from which it differs very materially in detail, however.

Standard Solution of Iodine.—In preparing the standard solution of iodine, we employ the pure resubblimed iodine of commerce; numerous experiments having shown us that it is so nearly chemically pure as to answer all technical requirements, thus the troublesome process of purifying the iodine is dispensed with.

Of the above mentioned iodine, 12·7 grammes (195·99 grains) are weighed out, transferred to a litre flask, covered with about 100 c.c. of cold distilled water, and to this about 25 grammes (385·8 grains) of iodide of potassium are added. Complete solution of the iodine in the iodide of potassium is the object aimed at, and to assist in this, the flask should be rotated so as to agitate the contents; as the solution proceeds, more water is to be added, in portions of about 100 c.c. at a time; finally, when the iodine is completely dissolved, the volume is made up to the mark. If the whole of the water were added at first, complete solution of the iodine could hardly be effected.

Standard Solution of Hyposulphite of Soda.—In addition to the standard solution of iodine, a solution of hyposulphite of soda of such a strength that 1 c.c. of it shall exactly discharge the colour of 1 c.c. of the standard iodine is requisite. Recrystallized hyposulphite of soda (easily obtained in commerce) is powdered and spread out in a thin layer upon filter paper. In a moderately dry room at the ordinary temperature, a few hours' exposure upon filter paper is sufficient to eliminate the surplus moisture always present in the hyposulphite. (*Note.*—The hyposulphite must not be dried by heating.) Of the salt so prepared, 24·8 grammes (379·63 grains) are weighed out, transferred to a litre flask, dissolved in a little distilled water, 10 grms. of pure bicarbonate of potash added, and when the last salt is dissolved, the volume made to 1 litre. The object of adding the bicarbonate of potash is to prevent the hyposulphite decomposing. So prepared, the solution will keep for months in a *dark* cupboard without change. The standard iodine prepared as we have recommended will also keep for many months unaltered.

Starch Paste Solution.—1 gramme (15·4 grains) of starch is mixed into a paste with a little cold distilled water; 100 c.c. of water, quite boiling, is then poured upon the paste, with stirring. After cooling, the solution is ready for use.

The Actual Assay.—Weigh out 0·5 grammes (7·71 grains) of the sulphite to be tested on a watch glass (the sample should be reduced to fine powder in a mortar previous to weighing). Into a wide beaker or dish 41 c.c. of the standard iodine is run from a burette. The watch glass containing the weighed sulphite is now placed in the beaker containing the iodine solution, and the whole stirred with a glass rod until the sulphite is completely dissolved, which takes place almost immediately. The amount of iodine solution employed, viz., 41 c.c., being a little more than the quantity actually required by 0·5 grammes of pure sulphite of soda, there will necessarily be an excess of iodine remaining in the beaker after the above operation is concluded; this excess is measured by running in the standard hyposulphite of soda already mentioned, drop by drop, from a burette. As the excess of the iodine is consumed by the standard hyposulphite, the colour of the solution becomes lighter. When the colour is only faintly yellow, a little starch paste is added, when the deep blue colouration of iodide of starch appears, and renders the end of the reaction more delicate. After adding the starch paste, continue to drop the hyposulphite in, stirring between each addition. When the end is reached (*i.e.*, when the excess of iodine is completely consumed by the hypo) the blue colour of the iodide of starch is lost, the fluid becoming colourless. Now read off the number of c.c. of hyposulphite employed, deduct this quantity from the 41 c.c. of iodine run into the beaker, and the remainder will be the iodine consumed by the 0·5 grammes of sulphite of soda weighed out. To obtain from this the percentage of crystallized sulphite of soda ($Na_2SO_37H_2O$) in the sample, multiply the number of c.c. of iodine consumed by 2·52 (we suppose 0·5 grammes of sulphite of soda to be used for the estimation).

Example:—0·5 grammes sulphite weighed out, transferred into 41 c.c. of iodine, required 2·1 c.c. of hyposulphite to discharge excess of iodine; therefore 41 c.c. — 2·1 = 38·9, and 38·9 × 2·52 = 97·03 (percentage of crystallized sulphite of soda present in sample).

The above modification of the iodimetric estimation of the sulphites was fully described by Messrs. Giles and Shearer in a paper read before the Society of Chemical Industry (*Soc. Chem. Ind. Jour.*, May, 1884), where the authors pointed out that the plan of dissolving the sulphites in water previous to titration led to low results. In addition to the error due to the above, the procedure of running in the iodine into the sulphite tends to an error in the same direction, so that an analysis conducted as described in Mr. Robinson's article would necessarily give the percentage of sulphite much too low.

In respect to the keeping qualities of sulphite of soda, we can endorse the remarks of your contributor upon the inferior quality and rapid deterioration of much of the sulphite at present in the market. The rapid deterioration alluded to only applies, however, to the low quality sulphite of foreign (German) manufacture. We have frequently analysed samples from the source named containing no more than 50 per cent. of $Na_2So_37H_2O$. As the largest makers of pure sulphite of soda in the world, we can state that a commercially pure salt containing 98 per cent. of sulphite, as sent out by us, will keep for any length of time in a well-corked or stoppered bottle without undergoing any practical change.

It should be mentioned that low quality sulphites, in addition to other impurities, are always contaminated—frequently very grossly so—with hyposulphites, thus rendering them most objectionable for use in the developer.

The presence of hyposulphites in sulphites is easily detected by dissolving a quantity of the sample (two or three grammes) in distilled water, adding a considerable excess of hydrochloric acid, say 40 c.c., and boiling for ten minutes; the presence of hyposulphites is indicated by the fluid becoming turbid from the separation of finely divided sulphur. The testing for sulphates requires more care than is generally supposed. If no sulphate were originally present in the sulphite, it would certainly be formed by the action of the oxygen of the air, unless precautions were taken to exclude the latter, when the sulphite is brought into solution in presence of hydrochloric acid. The examination for sulphates should be conducted as follows. A small flask of about 200 c.c. capacity is fitted with an india-rubber stopper, the latter being pierced so as to carry a short length of glass-tubing, drawn out to a fine point at one end, into this flask about 100 c.c. of distilled water and 20 c.c. of hydrochloric acid (free from sulphuric acid) are placed; the stopper, with drawn-out exit tube inserted, is placed over a lamp, and the contents briskly boiled for ten minutes, when the stopper is momentarily removed, about a gram of the sulphite dropped in and the stopper replaced. The boiling is continued until the whole of the sulphurous acid is expelled; fifteen minutes' boiling will usually be sufficient to attain this. The solution, free from sulphurous acid, may now be tested for sulphuric acid by means of chloride of barium solution; only a slight cloud should make its appearance upon dropping in the $BaCl_2$ if the sample is a good one.

We regret to have taken up so much of the valuable space of this journal; our excuse must be that from the character of the sulphites, the method of analysis employed while not necessarily demanding a great expenditure of time, require to be based upon thoroughly sound principles in order that results of technical value may be obtained.

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MY CAMERA'S FIRST SWISS TOUR.

BY "JEAN VILLE."

A tour in Switzerland under most circumstances is very pleasant, but when a camera is comprised in our luggage, then Switzerland becomes most enjoyable.

A few years ago I started from Lucerne with my 7½ by 5 camera, intending to cross the Furka from Andermatt to Viesch, spend a day or two at the Eggischhorn and the Belalp, and then go to Zermatt for several weeks. I was quite a novice in the art of photography. I had exposed a few plates previously, giving them more or less the wrong exposure; my good old friend, Monsieur Tairraz, the photographer at Chamonix, had developed them for me, and when no efforts on his part could make anything of them, I was still quite unconscious of the direction in which the fault lay. I started on this tour with Monsieur Tairraz's one piece of advice as to development (the only bit of advice I received) in my mind, and it was "Develop till the plate looks as black as a mortal sin!"

Here, then, in a few words, was comprised my whole knowledge of photography, save that I could stifle myself in the focusing cloth, and give the objects in front a most unstable appearance on the focusing screen. Knowing all this, my readers will not be surprised to hear that I took with me a store of the most rapid plates I could procure, and exposed them with the full aperture and for a considerable length of time, imagining that thus the snow would appear more brilliantly white. At Brunnen I exposed all of my six plates. On arriving at Andermatt, I was seized with an earnest desire to secure some of the fine rock scenery passed during the drive from Geschenen. Crouched in a corner of my room, under a mackintosh and rugs, I endeavoured to change my plates, and at length managed to place six unexposed ones in my slides, after breaking two by trying to put them in paper, clips and all. Soon I was on my way to the Teufelsbrücke, and busy giving exposures of about thirty seconds to the brilliantly lit waterfall and rocks. I felt great satisfaction at my afternoon's work as I trudged back to the hotel, a frame of mind which, however, was not destined to last. The next morning, on stopping the carriage to take a view of the Rhone Glacier, my camera screw was not forthcoming. I then recollected having placed it on the ground when packing up my things after photographing the afternoon before. Well, it might have been worse; the lens might have been left behind. With what I was pleased to consider a great display of ingenuity, I tied the camera with string to the triped, and proceeded to focus and expose. On the following four days the weather was perfect. The string as a substitute for the screw was called into constant use, and—the cap fitted so tightly to the lens that it required a good pull to get it off. My readers will probably at once forecast the future of my plates thus exposed; but I was in blissful ignorance, and mused in a very happy frame of mind on the beautiful souvenirs which I was securing of that magnificent scenery. I had even the audacity to consider the advisability of offering my latest and most imposing work of art—a picture of some icebergs floating on the Märjelen See—to the Photographic News. As there were four pictures on this plate, two through the plate having been twice exposed, and each doubled by the violent shake the camera had received whenever I uncapped the lens, the Editor of that interesting journal would, perhaps, have hardly felt a becoming amount of gratitude. Arrived at Zermatt, good Madame Seiler placed a room, more or less dark, at my disposal, and next morning I began to develop my two dozen plates. I won't enter into the details of all that happened while I accomplished my work. It was a very unhappy, not to say humiliating time, and caused me to give evasive answers to questions asked me as to the success of my tour with regard to photography. I had still several dozen rapid plates, but I also possessed an instantaneous shutter, and I used it during every exposure I made after that time on snow, till the end of the summer. I also learned many little dodges which helped me much when exposing at great altitudes. The two worst enemies of the photographer on these occasions are cold and mist; also the porter who invariably puts the slides in the sun while the unconscious climber has his head under the focusing cloth. Therefore, as the guide or porter is placing the camera and slides on his back, make him a speech on not interfering with your things while you are at work. Tell him you won't be able to put him into any of your pictures if he does; that threat invariably brings about the desired result.

How many plates I have exposed twice over or otherwise spoilt by the false kindness of those excellent people who insist on helping and talking and wanting to know where the picture is. As to cold, it is advisable for the photographer to accustom himself to do as much as possible, if not all his work on the mountain summit, in gloves, otherwise he may find that the cold has numbed his hands after one exposure, or even before one exposure, and further effort is impossible. The intensity of the cold on a mountain, even on a cloudless day, is difficult for anyone to realize who has not experienced it. Last year I found myself on the Dom, the highest mountain in Switzerland (17,800 feet) under these conditions. The sun was shining, the most distant peaks stood out distinctly, but an icy wind blew with great force, and our boots were frozen hard as iron. My two strong guides entreated me to remain on the summit only a minute or two; they said that they could not bear the cold, even if I could endure it. Nevertheless, I was determined to make one attempt; I put up the camera, but by the time it was ready for focusing, none of us could turn the screw, and when at last we got it round, each giving help in the operation, the furious wind made it most difficult to focus. Clinging to each side of the focusing-cloth, my guides held it down as well as they could, but on development I found that both pictures were out of focus.

Lower down the mountain I secured some views which almost repaid me for my disappointment on the summit. Last summer I used Wratten and Wainwright's ordinary plates, and found them excellent for landscape work on snow. Within the last few weeks I have taken all my pictures on Eastman's negative paper with his roller-slide, and I cannot speak too strongly in its favour. It appears to me to allow of a wonderful latitude of exposure; so far I have had no failures with it, and I have tried it on a variety of subjects such as portraits, panoramas from the summit of a mountain, landscapes covered with snow, interiors, and views of trees and rocks in the shade, with the result that the pictures are more satisfactory than I could have got on glass.

Notes.

One of the few instantaneous views which really convey the idea of motion, is issued as our supplement of this week. It is a little difficult to understand why this picture appears more natural than most instantaneous photographs, but perhaps the absence of the individual who is so often seen in the act of rushing across the field, or with one leg poised high in the air, has something to do with it.

Lieut.-Colonel Hooper tells us but little about his picture, except that it was taken with a drop shutter accelerated by the use of an elastic band, and that it was developed with Beach's developer.

Among the books which may shortly be expected from the prolific pen of Léon Vidal are a treatise on "Photo-Ceramics," and "A Handbook of Photo-Engraving." This latter will include both line and tint work.

Those who intend sending pictures to the Sheffield Photographic Exhibition should communicate at once to the Secretary, J. Taylor, 205, Sheffield Moor, Sheffield. The Exhibition opens on January 11th, 1886.

We have great doubts whether the public will rush in their thousands to take part in the excursion which is being organised for the purpose of combining pleasure and instruction. It is announced that a vessel has been chartered which will carry some fifty first-class passengers, accompanied by an artist, a photographer, a geologist, a mineralogist, a botanist, and a zoologist. Explorations will be made wherever opportunity offers, and there will be no hurrying over ground where anything valuable to science or art can be obtained. All this sounds very nice on paper, but it is to be feared that the unfortunate first-class passengers will soon be bored to death. It is so difficult to properly apportion the pleasure and the instruction, and we should not be at all surprised if the geologist, the mineralogist, the botanist, and the zoologist, were shelved in about a week, and the "fifty" give themselves up to music, private theatricals, dancing, flirtation—and photography. But to make the thing a success, fifty cameras and an ample supply of material ought to be taken, and produced, one by one, as a sort of surprise. We are quite certain that if this were gone about judiciously, the whole "fifty" would return, each with his and her camera, and each with a stock of photographs, the taking of which would have proved an everlasting pleasure.

A favourite pastime at juvenile parties in America is the photographic album. A large frame with a cover on hinges represents the album. The outside is covered with red cloth, while inside is an oval mat, with an opening sufficiently large to admit a life-sized head. The young folks then dress up in various characters, and are exhibited one by one through the opening, the album lid being closed between the exhibition of each picture. Of course means have to be adopted to conceal the lower portion of the figure, but this can be easily contrived. The use of the magnesium light gives, it is said, quite a photographic look to these human pictures.

A Philadelphian enthusiast—both in photography and Shakespeariana—has just issued a lovely little book (only fifty copies printed) entitled, "Composite Photography applied to the Portraits of Shakespeare." The author, W. R. Furness, is the son of the well-known critic, Dr. H. H. Furness, and he has applied Galton's well-known method of combining various portraits to produce a single face, by the combination of all the important pictures, &c., of the poet, taking the Droeshout, Chandos, Jansen, Stratford, and Felton portraits, and the Stratford bust, reducing them all to one size, and then exposing a negative of each for one-sixth of the proper time over a sensitive plate. The result is a very remarkable picture, the six very distinct portraits combining much better than might have been expected. Still, we think the author will admit that the material accessible is too scanty—probably only the Droeshout portrait and the Stratford bust have good claims to authenticity—and too diverse, to admit of satisfactory results. Notwithstanding all this, the experiment is a very interesting one.

H. Sadler is well known as one of our keenest-eyed astronomers, so that his testimony as to the value of stellar photography is doubly valuable. He writes to the *English Mechanic*:—"I have just seen a most marvellous photograph of the region round Epsilon Lyrae, made by the Bros. Henry with a 13-inch telescope. The 'debilissima duplex' of Struve (a famous quadruple star) is most beautifully shown, the component stars being as clearly defined and round as the dot over a printed i. Not only this, but far smaller stars are most distinctly shown, without the slightest optical aid, as minute little needle points. The time of exposure was 120 minutes, and the star-discs are as round as possible."

Among those uses of glass which are a pretty direct outcome of its cheapness, may be mentioned its employment as a flooring material in business houses where light is scarce.

In our Year-Book for 1885, this idea of using glass flooring was referred to by A. Borland, he telling how he had made a portrait studio in which all the top light came through the glass floor of the room above. Slabs of glass about an inch thick are strong enough in ordinary cases.

An inn situated among the Surrey Hills, and famed as a house for bean-feasts, has a framed inscription hanging up in the bar, of which inscription the landlord is very proud. It sets forth how the employés of a certain establishment have for fourteen years in succession dined at the inn in question, and have always been satisfied with the accommodation. So that there should be no mistake about the matter, two photographs of the excursionists in a large break are stuck on the card, and testify unquestionably the genuineness of the testimonial. The photographs, though differing slightly, have evidently been taken at the same time. This we are inclined to think is a pity. What a chance for showing the quality of the viands and the goodness of the liquors there would have been had the party been photographed before and after dining!

At the Autotype Works there is to be a change with the close of the year, E. W. Foxlee then terminating his long engagement with the Company. From the first, Foxlee has been associated with the development of carbon printing in this country, and the prints which he exhibited about the time that Swan's first paper on carbon printing was read, will be remembered by many. The Autotype Company, as represented by Messrs. Sawyer and Bird, have always been ready to render graceful tribute to the importance of E. W. Foxlee's thoroughly practical labours in connection with the technical department, and it was only at the November meeting of the Photographic Society that J. R. Sawyer spoke of Foxlee's share in the working out of a photo-engraving process at Ealing Dene.

The arrangements which have been made with the view of amalgamating the businesses of Wratten and Fallowfield with that of Morgan and Kidd have fallen through, so that the large joint stock company which was to have been, will not be formed.

Unusually successful was the show of Alpine pictures got together by the Alpine Club this year. Much credit is due to W. F. Donkin for his share in making the arrangements.

There were present on Wednesday an unusual number of visitors, and loud were the expressions of satisfaction. Amongst the water colours, may be specially noted the work of E. T. Compton, this artist excelling most notably in realising the beautiful cloud effects of Alpine scenery.

V. Sellas' new series of photographs, on plates about fifteen inches long, were much admired, one of the most striking being the view taken from the Pas de Chevres. It is needless to say that Mr. Donkin's magnificent pictures were thoroughly appreciated. Among other good shows may be mentioned the fine series by "Jean Ville," and also contributions by G. P. Baker, De Dèchy, and Howard Barratt. "Jean Ville's" view taken from the window of an hotel at Wiesen is exceptionally fine, owing to the wide play of gradation in the sky.

The Burmese take a great interest in photography. It would be interesting to know whether a photograph just received by the *Globe*, from Mandalay, was executed by order of King Theebaw, or whether the photographer took it on his own account. In either case, the picture seems to be a most ghastly one, as it represents the crucifixion of a distant relative of the king's, who, for a trifling offence, was tied to a rough bamboo gate, and left in the sun for twelve hours, with drops of water falling on his head from a bowl fastened above. After this, the unfortunate wretch was mutilated, till death ended his sufferings. One would not like to have an album of such photographic horrors.

The American workman has found a new use for photography. According to the *American Stationer*, "travelling sign painters photograph their work, and send in their picture as a voucher on which to draw their pay." Novel, but scarcely satisfactory, one would think.

The New York satirical journal, *Puck*, came down very heavily on the *New York World* in a recent issue. The *New York World* published, on November 11th, what purported to be a portrait of Stead. It was not a bit like Stead, but no doubt it was near enough for the readers of the *World*. Unfortunately, however, two days after—that is, on the 13th—out came the *World* with another portrait, of Beckwith, a San Franciscan politician; and by an extraordinary coincidence, his portrait was identical with that of Stead—in fact, the same block seems to have been used. The opportunity was too good for *Puck* to lose, so tearing out the two portraits with the adjacent text, the Editor of *Puck* had the fragments photographed, and reproduced them under the heading of "Illustrated Journalism." Whether the using of the same block twice over for different men was an act of carelessness on the part of the *World*, or whether it thinks any portrait will do so long as the original is a stranger, we are unable to say.

What strange ideas some people have of photography! We heard the other day of an amateur who, desiring to scrape an acquaintance with the art, bought an old camera and lens at a pawnbroker's. He showed his purchase to a photographer, who at once pointed out that the camera let in light, and that the lens, a common French one, would never focus satisfactorily. "That may be," replied the tyro, innocently, "but I suppose *they will do to practice with!*" Imagine how a pupil would progress with a cracked camera and a defective lens! Plates which have been exposed to light are all that are wanted to make his happiness complete.

Apropos, the argument maintained by some that artists who wish to be true to nature should draw the horse in motion by the light thrown on his movements by instantaneous photography, is not altogether tenable. The artist seeks to convey a general impression of movement, not merely the attitude assumed for an instant, and imperceptible to the eye. It is possible with a very rapid plate to photograph a wheel revolving slowly, so that every spoke shall be distinctly shown; but were an artist to draw a wheel in this manner, no sense of motion would be imparted. To the eye these photographs of horses walking, trotting, and galloping, appear very unreal and even ridiculous; in a picture they would appear no less so. While, therefore, they are intensely interesting, they will not much affect the pictures of artists. We except, of course, photographs of horses standing or poised on their hind legs in the act of rearing, when they not unfrequently remain stationary for an appreciable period. These should be of great practical value.

Patent Intelligence.

Applications for Letters Patent.

15,162. George Mold, 17, Parson Street, Banbury, Oxfordshire, for "Improved form of flap-shutter and shutter-band combined for instantaneous photography, 'Mold's trio shutter.'"—Dated 10th December, 1885.

15,163. George Mold, 17, Parson Street, Banbury, Oxfordshire, for "A shutter for instantaneous photography, and a diaphragm band to be used instead of diaphragms or stops in lenses, 'Mold's symmetra shutter.'"—Dated 10th December, 1885.

15,196. James Willmott, 1, Key Hill Drive, Hockley Hill, Birmingham, for "Mounting photographs and pictures."—Dated 11th December, 1885.

15,270. Walter Henry Bacon, 70, Chancery Lane, London, for "An improved method of increasing the effect of Christmas and other cards, reliefs, pictures, photographs, and other designs."—12th December, 1885. (*Complete Specification*).

15,312. Anthony Gache, 141, Evering Road, Stoke Newington, London, for "An automatic registering apparatus for photographic printing presses, whereby the number of copies printed is indicated and registered on a dial."—Dated 14th December, 1885.

16,979. Julius Schenkenhofer, Hamburg, Barmbeck, for "An improved method of drawing positives (originals) for photolithography, and of negatives for photography without camera."—Dated 29th December, 1884.

Patents Sealed.

16,087. Charles Sands and John James Hunter, 53, Chancery Lane, London, W.C., for "Improvements in photographic cameras."—Dated 6th December, 1884.

16,691. Emanuel Falk, 323, High Holborn, London, W.C., for "Improvements in the production of half-tones or 'grain' in plates or surfaces for photo-mechanical printing.'"—Dated 19th December, 1884.

17,602. Alexander Melville Clark, 53, Chancery Lane, London, W.C., for "Improvements in photographic apparatus." Communicated by Henry Correja, United States.—Dated 29th December, 1884.

Specifications Published during the Week.

1027.—Robert Galland-Mason, of Hambleton House, Douglas, Isle of Man, Schoolmaster, for "Improvements in microphotoscopes."—Dated 23rd October, 1885.

This invention relates to improvements in the optical instrument called the "Microphotoscope," for which letters patent were granted to me dated January 8th, 1884, No. 912.

The improved microphotoscope consists in arranging microphotographs in spectacles, eye glasses, or hand glasses in concentric circular groups, so that each microphotograph may be brought separately under or before a single minute microscope, instead of each microphotograph being provided with a separate lens.

The microscope may be placed in a radial slide. This radial slide is to enable the microscope to be moved opposite to any circle of microphotographs; or it may be let into the rim of the spectacle glass and provided wrth a minute screw for focussing for varying sights.

The microphotographs would be taken upon a piece of circular glass, gelatine, or any suitable transparent substance; in photographing them it would not be necessary to take each microphotograph separately.

If the models from which the microphotographs are taken were arranged in a circle, the whole circular group of microphotographs could be taken on one negative.

1406.—John Urie, jun., of 83, Jamaica Street, Glasgow, Lanarkshire, Photographic Artist, for "Improvements in photographic printing, and in apparatus therefor."—Dated 31st January, 1885.

This very voluminous specification makes rather broad and general claims regarding automatic printing arrangements of the Fontayne type. As several developments of the Fontayne machine have been recently described in the News, and as we find it rather difficult to gather the exact nature of the improvements claimed, we prefer to leave any readers who may be interested to refer to the specification itself.

WANTED—A BREEZE.

BY WM. T. BASHFORD.*

At first sight some of our junior members may think that Breeze's pictures being stereos they are much out of date, and wonder why they are considered worthy of prominence. To such I would say—it is their date, their historic position, that renders them so interesting. It will be noticed that they are from negatives that must have received very short exposures, similar to what are now called instantaneous views. Thanks to Mr. Bennett, it is in the power of almost anybody to take such rapid photographs nowadays, and if endowed with a cultivated eye, may select as charming views; but these negatives were made long before the advent of gelatine, in the very earliest days of wet collodion, before iron development had been adopted; these were developed by acid pyro—therein is their wonder. Look at them:—Compared with the work that was done at that time, these were like works of magic; remember all the disadvantages—gelatino-bromide unknown—wet plates from the old bath and iodized collodion—exposure extremely brief—no iron development! What does this imply? It means that Breeze exposed his plate, and then went into his dark room, poured on his developer, and sat down to watch and wait—waited by the hour, all that day, perhaps, and perhaps all the next night; coaxing, warming, washing, developing, washing and again developing, and so patiently waiting hour by hour; and it means that he did sometimes succeed, for under these conditions he produced these pictures.

It was possible under those great disadvantages to get work that may be looked on with pleasure and profit at the present day—but the possible and the probable were very far apart.

I have often expressed the notion that the good old wet collodion process did not get the credit it deserved except from a very few. I like the modern gelatine plate, it is so simple, so cleanly, the plate is ready at any moment, prepared for exposure, and an intelligent worker can be sure of getting something satisfactory from extremely difficult subjects with a small expenditure of time and trouble, hence beautiful instantaneous views, representing delightful phases of nature, are quite common; but I must soberly acknowledge that under favourable conditions the old wet plate would produce work equal to the best I have ever done with the gelatine dry plate. I have taken good commercial portraits, equal to the best I have ever done in my life, by the old bath process, when the light was so weak I could not see the face on the camera screen, and had to focus by a piece of white paper or a candle held at the shoulder. The most rapid gelatine plate could do no more, but the latter will do this with a less expenditure of time and patience. What at one time were difficult subjects are now obtainable with comparative ease. Try, do your best, and the probability points to success. In the old time a high degree of success was possible, it is now probable.

Who will show us the possible in gelatino-bromide?—the exceptional, high-class, difficult work that a genius alone can produce?—work that shall be as exceptional now as that of Breeze was in his time?

Very beautiful as the generality of work now is, I hope for still higher things, and that by reason of the generally high standard. Surely the multitude has not attained the highest possible! If so, there is no further advance on these lines, and a new departure will have to be devised, for the approach of the probable and possible indicates the limit of progress.

Not so very long ago the chief end of almost every negative was the stereogram, and everybody had a stereoscope; the thing became wearisome; there was too much of a good thing. But a good stereogram was a good thing, still is a good thing, and ever will remain so.

I would plead that as good work can be done so easily now, some of it ought to be specially devoted to the production of this neglected branch of picture making.

Our Society might most appropriately reawaken an interest in this class of picture, for he who claimed to be the father of the stereoscope was at one time our President.

I feel persuaded that if members would occasionally contribute some of their studies specially arranged for the stereoscope, they would be among the choicest treasures in our possession, eagerly examined, borrowed, exchanged; they would develop a healthy enthusiasm, and would certainly be of high educational value.

THE ADVANTAGES OF TECHNICAL EDUCATION IN PHOTOGRAPHY.

BY HENRY G. TEMPLETON.*

When we look back upon the progress science has made during the last decade, we cannot help being struck by the fact that this is in no small measure due to the great increase of the means of gaining technical knowledge which have been afforded the masses. If we look at chemistry, natural philosophy, engineering, or any of the many other sections into which scientific pursuits are divided, we find in almost all of them a thirst for more insight into the inner recesses of the subjects, which has, to a large extent, been supplied by the technical schools and classes scattered over the country, and the large attendances at which are a proof that they are supplying a long-felt want.

But when we turn to our own science, "photography," do we find the same longing for more knowledge on the part of its devotees, or the same facilities for gaining knowledge which we find in the other branches? I am afraid our answer must be in the negative. True, photography as a science is yet in its childhood; indeed, it may be said to be hardly out of the nursery. Yet this is, I think, all the more reason why it should be lovingly nurtured, and its future thoughtfully anticipated. Not many years since it was possible for a man to purchase a camera and the other requisites for the black art, and start almost at once as a photographic artist, and turn out satisfactory results. But now things are changed. It is now no longer looked upon as a "black art," but as a true science, and as such requires to be thoroughly and carefully studied, not only in its practical work, but also in its deeper and more important and subtle branches.

What, then, is being done to advance this technical study? Can we rest satisfied with the means at our disposal, or with the results they are bringing forth? True, we have now many societies throughout the country, but in too many cases their papers and discussions are of a purely practical nature, and do not lead to a steady, systematic study of the subject.

Photography may be said to be made up of mysteries, from the preparation of the plate to the finished picture, and it is to the unravelling of these mysteries that we must apply technical education. Yet how often do we find our younger brethren, who, may be, have just commenced their course, content if they can take a good negative, and from it print a satisfactory picture—and this especially among amateurs, never for a moment considering the why and wherefore of the steps they are taking, or how it is that certain processes bring about certain results, or stopping to consider how that wonderful and mysterious latent image has been formed on the sensitive plate. How different is the case with the man, be he amateur or professional, who, having carefully studied his subject, can confidently look forward to obtaining a certain result to his labours, not because somebody else told him it would be the case, but because he knows the *rationale* of what he is doing, and is not groping in the dark! This brings me to the question: "What is the best way to obtain the necessary technical and theoretical knowledge which we now know to be so valuable?"

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* Read before the Edinburgh Photographic Society.

* Read before the Newcastle-on-Tyne and Northern Counties Photographic Association.

No doubt one great help will be careful reading and study of good works on the subject, but where the student is left to himself, he is very apt to fall into a habit of desultory reading, swallowing much, but digesting little. A safeguard against this is found in the classes for instruction in photography which have been established in some towns, where the student will have the advantage of an abler mind to guide his, and keep him from straying into bye-paths. Where such classes are not accessible, I would suggest that as many as are interested in the study should meet together to read up and discuss the subject, and test their work by trying to solve difficult problems which may, from time, to time be brought before them.

What, then, is our duty as a photographic association? Is it not to do our utmost to spread the technical knowledge of our science, not only among our own members, but also to others outside our circle who may be taking up photography? Now we come to the important point. How can this best be done? Failing the formation of a special class, I would suggest it might be accomplished by a series of special papers on theoretical subjects, by some of our more experienced members, these papers being given either at our ordinary meetings, or on some other night set apart for that object. But as the mere listening to a paper will not necessarily command the attention necessary for the proper study of the subject, I would further suggest that even failing the special papers I have referred to, one or more questions of a technical character might be put from the chair at each of our meetings, and members invited to send in written answers, which could be examined by some of our more advanced members elected for the purpose, and the answers explained at the next meeting. This, I am convinced, would often induce members to read up and study points they would otherwise overlook.

In concluding this paper, I would earnestly invite all members to sit at the Examination in Photography, held by the City and Guilds of London Institute, for the advancement of technical examination, in May next, particulars of which the Secretary will be happy to supply. The preparation for this I am sure would greatly aid in the acquirement of technical knowledge.

LANTERN TRANSPARENCIES, AND THE METHOD OF MAKING THEM.

BY THOMAS H. MORTON, M D.*

It seems rather singular that, in the early history of photography, the magic lantern had a separate existence—was deemed a scientific toy—a means to amuse and create astonishment. Now it is inseparably united with photography, and has become a mighty educational agent. I am not going to hazard conjecture as to priority of either invention; but supposing the lantern was an outcome of the fertile brain of Roger Bacon in the thirteenth century, the principle of a lantern image—a modern cast on a lighter surface, like many photographic phenomena—is of the same date as our solar system. The old lantern slides were hand-painted, and often well done. It was an art. The greatest painters, perhaps, did not engage in such work. They might have been unable, as painting on glass for a projected image is different in many ways from painting canvas or other solid opaque medium, equally so in effect as that existing between a photographic print which is judged by reflected light, and a lantern picture by transmitted light. There are several photographic methods by which excellent slides are made, and the number appears to be increasing. It is almost impossible to decide which gives the best result; certainly some are more troublesome and difficult than others. I can only give a description of a few processes.

In the first place, we start with the desire to make a permanent photographic image—a positive, by transmitted light, on glass (no better medium yet known). The high lights should be very transparent—nearly clear glass, unless clouds are depicted—the shadows with nice gradations, flat field, everything sharp, and correct perspective. The image itself should be of such fine granular structure as not to show particles on magnification; there should be perfect freedom from blemishes, as fog or streaks—in short, an exact counterpart of the view or object pourtrayed; and, finally, the picture should possess an agreeable tone. The nearest approach to a painted slide in principle, minus colour, is the Woodbury slide, which is an image consisting of bichromatized carbonaceous colouring matter, adhering to the glass by a gelatinous base. The carbon tissue is sensitized by floating with dichromate of potash solution, dried in darkness, then applied to negative. The action of light renders parts of the tissue surface hard and insoluble—especially the shadows—and, when this is pressed on a gelatinized glass slide, it adheres; then warm water causes the paper back or temporary support to curl up, depositing pigment, and as the parts not hardened by light are soluble or mixable with warm water, they float away, leaving insoluble image on the glass; an alum solution consolidates the transferred image. Splendid lantern slides are made by this process (examples on the table), but it is only applicable to quarter-plate size negatives by contact in daylight.

Slides made with collodion include wet process, same as ordinary glass positive, collodion emulsion, which is collodion and zinc bromide and silver nitrate, and collodion bromo-iodized, sensitized in a silver bath, coated with a preservative. They all have collodion as a base, and a granular silver image. I cannot show the details of wet process, for obvious reasons; suffice it to say that the negative you wish to copy on a slide is placed in front of an extending or copying camera, with its gelatine surface towards the lens—any ordinary portrait combination or rectilinear. I use a cabinet size stopped down a little, which is fixed in a sliding camera. The junction of this part of the apparatus, with extending front, is protected by a focussing cloth, the hand being introduced under to uncap and cap the lens. It is well to place a sheet of ground glass between negative and window; a north light is also preferable. Having ascertained the proper relations of negative to focussing glass, I find the distance in reducing a whole plate to lantern size, $3\frac{1}{4}$ square, is 28 inches from negative to lens front combination, and 14 inches to focussing glass or dark slide. It is a good plan to mark your base board or fix the apparatus; it is then always ready. A dozen or two $3\frac{1}{4}$ by $3\frac{1}{4}$ well-cleaned glass plates edged with albumen solution the day before, a quarter-inch margin all round surface, will do. I used to coat the whole plate with albumen as a substratum, to prevent the film slipping, but a margin is sufficient. Use bromo-iodized collodion, a trifle ripe, but tough, a 36 to 40-grain silver bath, slightly acid, an exposure of half to one or three minutes, according to density of negative or kind of light. A full exposure required. Use a rather weak or restrained developer. The usual sulphate of iron, acetic acid, spirits, and water is poured over the plate, and, as soon as the details are out, stop, wash plate, fix with hypo-soda solution or weak cyanide of potassium, wash well, and tone with platinum chloride, one grain to ounce. The solution will last some time, and can be used until exhausted. An objection to the wet process is it being rather tedious and messy, danger of bath going wrong, streaks and fogs being incidental; but a good black and white picture, full of detail, is generally got. Collodion emulsion: in this method, the silver salt, bromide of zinc, and collodion, are all mixed together; hence, the bath is not required. The plate should be edged as before, washed, and coated with preservative, and can be developed by ferrous oxalate, or pyro, citric acid, and silver nitrate. The third process, collodion sensitized and in a dry state, is an old plan revived; the silver bath is used. Particular reference is made to this method in the *Photographic Times*, New York, dated October 2nd, 1885, as being an excellent plan, and held out as a substitute for gelatine plates, which often turn out feeble results.

I made about half-a-dozen slides, according to instruction, but, as I expected, a partial failure arose from markings, owing to using a flat dish to sensitize, instead of a proper bath. Briefly, the details are: edge or coat with albumen the lantern slide, collodionize—and here is the danger—"immerse, face uppermost, in the flat silver bath"—I should say dip into usual upright bath—and observe very carefully the minutiæ of the wet process.

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* Abstract of a paper read before the Sheffield Photographic Society.

After being properly sensitized, wash in acetic acid and water, then in clear water, then apply a 15-grain to ounce solution of tannic acid, rack to dry, work in yellow light, and then pack; avoid scratching films. I show a transparency by contact exposure 1½ minutes to a gas jet 2 feet off; it is developed by a pyrogallol acid, 3 grains to ounce of water, acid citric 2 grains, and a few drops of argent. nit. solution, 40 grains to ounce. This may be rocked in a dish until details are well shown; wash, and fix by cyanode solution. The sample slide has the defect mentioned (bath markings), also most of the others I made. The next class of slides are gelatino-chloride, Cowan's, and other formula; they are much slower than bromide. By contact with gas-light, ten or fifteen minutes was found about right in some examples on the table; they are developed by ferrous-citro oxalate, the formula of the maker. There is a newer plate introduced, A. L. Henderson, London, gelatino-aceto-chloride. He kindly furnished me with the formula, and I made a small quantity of emulsion, and coated about a dozen plates. An example here shown is exposed by contact; took several hours, daylight, dull November weather. No doubt, in sunlight, or good printing weather, it might work in the same time as ordinary sensitized paper. You can watch the stain or image going on by lifting up the pressure-board; its great advantage is the simplicity of manipulation, only to tone, fix, and wash, the colour is a most brilliant orange or purple tint, according to toning. I might say the toning bath is as follows:—

Terchloride of gold	2 grains
Acetate of soda	10 ,,
Chalk	q.s.
Water	10 ounces

Another kind of lantern slide is produced by gelatino-bromide, the ordinary negative plate. The modifications recently introduced have tended to improve the quality for transparencies; possibly, by different proportions of bromide, iodide, or chloride of silver admitted. The manufacturers do not furnish their working formula, consequently we are rather in the dark; but experience teaches that the difficulties to be met with in making a good lantern picture, with ordinary gelatine plates, are usually thinness of image, want of contrast and vigour, degradation of tone, and lack of clearness in high-lights. The latter defect is more noticeable, I think, when copying in the camera than by contact printing with gaslight. This, however, is not always the case; some gelatine slides turn out extremely good. What is the cause of these imperfections? There must be errors either in emulsion exposure or development. As regards the first, the composition being unknown, we must let that pass, except to remark that plates are not always sufficiently or evenly coated with emulsion; second exposure (either in camera or contact) when too short, and particularly when too long, gives a thin image and want of contrast; thirdly, development has to answer generally for mistiness in high-lights, lack of detail, sharpness, and disagreeable colour or tone. What is the best developer? I can only mention a few: ordinary pyro, ammonia, and bromide; or, with addition of sulphite of soda, ferrous-oxalate, simple or modified. As regards plain pyro, ammonia-bromide alkaline process is not always satisfactory.

I show a slide treated in this way after an exposure of half an hour in camera, reduced from half-plate negative: using the light from paraffine lamp and reflector, it came up a warm brown. Another slide was made by contact with collodion negative, and used pyro, bromide of ammonium, citric acid, carbonate of soda, and water, according to a formula of W. T. Wilkinson, which he recommends for negatives as giving clear shadows (*vide* Photographic News, October 23rd, 1885). I thought it would be good for photographic slides, and the result proved so. I have here another slide, made in the way mentioned by Mr. Wilkinson in the same communication; it consists of ferrous oxalate, bromide of potassium, and citrate of potash. This also turned out very fair. The slides are not toned; they would be better, perhaps, if they were; probably the gold toning recommended by Mr. Henderson would answer well.

I have no examples of gelatino-bromide slides developed with pyro, sodic sulphite, sulphurous acid, and carbonate of potash, *i.e.*, Beach's formula; nor with pyro, ammonic sulphite, or the fixed alkalies, potash or soda. Good results in careful hands can be obtained from each; but whatever salt is employed, the reducing agent must act effectually and evenly upon the latent image without staining the film, or attacking strongly those parts feebly altered by light; the bases of the image should, of course, be transparent. Most of the gelatine slides I have made lately have been developed with ferrous sulphite solution (1 ounce to 4 ounces of water), citric acid, 20 grains. Two drachms of this solution are poured into a measure containing 8 drachms of saturated solution of oxalate of potash, with 2 grains dissolved of potassium bromide added just before mixing. The plate in a tray is then flooded with the combined solutions, and as soon as the details are strongly out, the plate is removed, washed, and fixed in hypo; then well-washed under tap for an hour, and placed in a dish containing citric acid, alum, and water, which has a clearing effect; well washed again, and allowed to dry.

Time will not permit description of other methods, except to mention albumen chloride, and iodide methods. A process by Lieut-Col. Noverre in the Year-Book for 1835, p. 113, can be read with advantage.

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Correspondence.

LEVELLING TABLE FOR GELATINE PLATES, EXHIBITED BY A. COWAN.

Dear Sir,—I trust you will allow me a little space in the News, to reply to a letter from B. J. Edwards in your last issue, relative to a model of levelling table which I lately exhibited at the Photographic Society of Great Britain; and first let me assure Mr. Edwards that I never had the slightest idea that it could be by any means considered an infringement of his patent coating and levelling machine. Of course all machines may have *certain parts similar*, without in any way infringing on one another.

Prior to the exhibition of the model, I had not seen Mr. Edwards's specification; but having carefully read it since, I am convinced that the simple arrangement I showed cannot by any means be considered an infringement. There are but two principles involved in the apparatus, which are the travelling arrangement, and the ice-tunnel (not shown at the meeting), both of which I have used, and publicly advocated the use of, for years. It may perhaps be forgotten, but in 1881 I showed a model working a train of plates through an ice tunnel, which was devised by Mr. Cobb (of Woolwich) and myself, and published in the News during 1881, and also again in the Year-Book of 1882, page 135. The exact words, after describing the travelling arrangement, are:—"M, a metal box, which may serve as a cover in cool weather, or as an ice-box in hot weather, so that the emulsion shall become set before the plates reach the rack." A. Cowan.

Dear Sir,—I enclose copy of that part of my specification which relates to the cooling and setting of gelatine plates, from which it will be seen that any travelling band carrying plates through an ice-tunnel as described, is included in my claim. Thanking you for your kind offer to insert this extract.

Extract from Edwards's Specification, 8643, of 1885.

In order to facilitate the cooling or setting of the emulsion after it has been spread upon the surface of the plates, I cause the travelling band carrying the plates to pass over a table or slab artificially cooled by being kept partially immersed in ice water or other cooling substance, contained in a metal tray within which the slab rests, and I cover the table or slab with a metal tank containing ice or other cooling substance. The tank is supported so that the under side is only a short distance above the slab, thus forming, of the space between the slab and the under side of the tank or cover, a cooling chamber or tunnel, through which the plates pass. The cover or tank also serves to protect the plates from light and dust after they have been coated with emulsion. By the above-described means the emulsion is rapidly set, and the plates are very quickly ready to be removed from the travelling band, and placed in racks to dry.

The claim is as follows :—

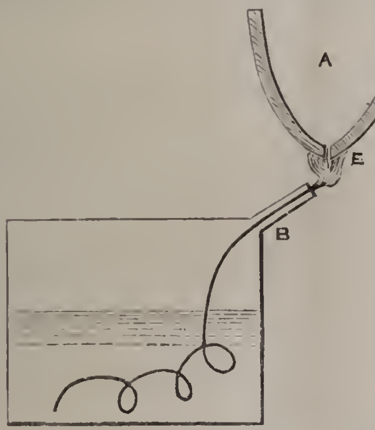
Secondly. The cooling chamber or artificially cooled table or slab in combination with the endless band carrying the plates, in order to facilitate the setting or cooling of the gelatine emulsion after it has been applied to the surface of the plates or paper by means of the roller and scraper, or by any other method.

Hackney, December 14th, 1885. B. J. Edwards.

[Our correspondent has not sent that which his letter of last week led us to expect.—Ed. P. N.]

PHOTOGRAPHING BY THE MAGNESIUM LIGHT.

Sir,—The woodcut you published on December 4th, illustrating my remarks on the magnesium light produced by apparatus constructed on the principle of the Larkin's lamp, chanced to be copied from the worst of the two rough sketches I scratched on paper at the meeting. The accompanying cut may more clearly explain the matter.



The brass vessel, A, is of the size of an egg-cup. The neck B, of the spirit lamp is so placed that the falling sand and magnesium just clear the end of the wick, but leave the hole of the cup in, or very near, the flame, E, for unless the hole be kept hot, water from the flame will condense in it, and the powder adhere thereto. The hole in the cup should be as big as a pea, or larger. A funnel will not do in place of the cup, as the neck would get choked with powder and water The powder is poured in all at once, from a sheet of paper, and the larger the proportion of magnesium, the longer is the flame ; there is no difficulty in getting a flame a yard and a-half long, if desired. Mr. Larkin's lamp was, and perhaps is, patented, and my experiments of years ago were carried on by his permission.

W. H. Harrison.

Proceedings of Societies.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 10th inst., Alexander Cowan in the chair.

W. E. Debenham, speaking in reference to a discussion which occurred at the previous meeting, said he had brought three negatives—one developed to full printing density, another intensified at home, and the third he proposed to intensify before the members. Having passed these negatives round, he placed the thin one in mercuric chloride, which had previously been partially saturated with potassium iodide ; after bleaching and well washing, it was placed in a solution of Schlippe salt, the strength of which was said to be unimportant. The plate was then passed round for examination, the image being of a yellow colour, which was said to help the intensity.

The Chairman inquired if there was much danger in over-intensification, also was much washing needed between the two processes ?

W. E. Debenham replied that great density could be obtained if desired ; half an hour's washing was all that was required after the mercury. Several negatives intensified in this way were then shown, and it was pointed out that unless Schlippe salt was used after mercury, an unstable compound was likely to be formed. An example of copying on an unwashed emulsion plate was also shown.

The Chairman remarked that Mr. Debenham's negatives appeared rather over-exposed, and too yellow for his fancy ; he also thought that there was a danger of the shadows thickening when intensification was resorted to.

W. E. Debenham then exhibited an old publication print and reproduction of the same ; the origianl had faded, more especially in the neighbourhood of an opening at the back of mount, between two pieces of back-board, which permitted air, soot, and noxious gases finding their way into the frame.

A. Haddon asked if it were possible to reduce negatives which had been over-intensified.

W. E. Debenham replied that ozone-bleach, followed by hypo, would do it.

The Chairman then announced that the remainder of the evening would be devoted to the exhibition of members' slides, and they would be free to criticise each others work.

C. Darker manipulated the lantern, and a considarable number of collodio-bromide, gelatine-chloride, and bromide slides were shown.

At the conclusion, the Chairman proposed a vote of thanks to Charles Darker, which was carried unanimously.

After a short conversation on the best plan of marking lantern slides, the proceedings terminated.

Newcastle-on-Tyne and Northern Counties Photographic Association.

The ordinary meeting was held in the College of Physical Science, Newcastle, on the 8th inst., Mr. Downey in the chair.

W. Parry was nominated for membership, and Messrs. Williamson, Lee, and Hikeley were duly elected.

Nominations were made for next year's President, Vice-Presidents, Officers, and Council.

This business concluded, the Chairman called upon Mr. Templeton to read his paper on "The Advantages of Technical Education in Photography" (see page 810). At its conclusion the Chairman invited discussion.

Professor Herschel spoke encouragingly of the scheme or idea broached by Mr. Templeton. The Chairman and others followed in the same strain.

Mr. Payne thought it would be very interesting to have a series of papers and demonstrations illustrating the various photographic processes, commencing with the Daguerreotype. As a result of this suggestion a demonstration of enamelling (photo-ceramic) process was promised by P. M. Laws, and it is probable that others will be forthcoming.

The Chairman called attention to the circular which had been distributed to members referring to the Conversazione to be held on the 22nd inst., and stated that the Secretary would be glad to receive lantern slides to be shown on that occasion ; the same to be in the Secretary's hands by the 16th or 17th, to allow of proper time for arrangement. Pictures intended to be shown in the photographic section of the Associated Conversazione should be delivered at the Literary and Philosophical Society's Institute, Westgate Road, Newcastle, on the 21st inst. (Monday). Hon. Secretary's address, 43, Northcote Street, Newcastle.

Cheltenham Photographic Society.

The December meeting was held December 10, at 4, Clarence Street, Baynham Jones in the chair.

W. Beetham read a short paper on the "Ferrous-Oxalate Developer," illustrated by a series of transparencies on Wratten's ordinary plates. These had received exposures proportional to the numbers 1, 2, 4, &c., and were developed with an amount of bromide increasing in the same proportion. The results showed the great power possessed by potassium bromide of compensating for over-exposure. As an example of what can be done with an under-exposed plate, two transparencies were shown which had had the same exposure. The first, developed with the ordinary developer, was much under-done, whereas the second, which had been developed with the same developer, with the addition of 15 drops of a ½ per cent. solution of hypo to the 2 ounces of developer, was quite satisfactory.

Mr. Jones showed his improved focusing cloth, covering the front of the camera; and a simple view-meter for the waistcoat pocket.

Leicester and Leicestershire Photographic Society.

The monthly meeting was held in the Mayor's Parlour, Old Town Hall, on Wednesday evening, the 9th inst., W. S. **Hobson** in the chair.

The members attended in good number, and for the first half-hour were busily engaged in inspecting and criticising a number of prints brought by several of the members.

Mr. **Roche** then proceeded to give a practical demonstration of enlarging from the negative, explaining the process *en passant*. The greatest interest was evinced by the members, to most of whom the process was quite novel. The illustrations were exceedingly successful, the enlargements being full of vigour and detail.

Ten members were balloted for, and unanimously elected. Five members were proposed for the ballot in January, and a few remarks from the President brought the proceedings to a close.

It was announced that at the next meeting an exhibition of lantern slides would take place, and all members were invited to bring slides.

Birmingham Photographic Society.

The usual fortnightly meeting was held on Thursday, the 10th inst., at the Technical School, Bridge Street, J. H. **Pickard** in the chair.

The preliminary business having been disposed of, the recommendation of the Council that the Society affiliate itself with the Camera Club was unanimously adopted.

The following inquiries appeared in the question box :—

1. What is the cause of the coloured metallic appearance sometimes observed on a gelatine dry plate?

E. J. **Cox** had observed coloured streaks across the plate, which might arise to some extent from the plates being kept in impure atmosphere: had not found it interfere with the printing.

J. **Nock** had noticed similar markings, and believed they arose from the ammonia fumes in developing dish: had washed the plate well, using slight friction, and they disappeared.

S. **Delicate** found the appearance by pyro-ammonia development, but not with soda.

G. **Smith** remarked that it was caused by excess of ammonia in the developer. It would be very useful if makers stated the maximum quantity of ammonia with which their respective plates could be treated.

E. J. **Cox**: If from excess of ammonia, it should show equally all over plates, and not in parts.

W. J. **Harrison**: Probably this arose from unequal flow of developer over plate.

G. M. **Jones** thought it would be a deposition of metallic silver.

2. What is a flare spot? How is it caused, and how may it be remedied?

E. J. **Cox**: A defect in the lens or arrangement of stop.

J. **Nock**: All single lenses, pointed in a certain direction to the light, would produce it.

E. H. **Jacques**: In using cheap lenses, which were liable to this defect; had entirely overcome it by making a small hood for front of lens.

H. **Lucas** said it could be remedied by altering the diameter and position of stop in front of single lenses.

3. How can over-printed silver proofs be reduced?

B. **Karleese** had used a solution of cyanide of potassium, but the results were not so satisfactory as destroying the over-printed proof and making another correctly.

4. Does any member recommend Morgan and Kidd's paper for enlargements?

S. **Delicate** recommends it, but it requires touching up in the shadows.

E. H. **Jacques** had found varnishing the negative was an advantage.

J. **Nock**: It works very nicely, and in my hands gives a satisfactory picture, but all enlargements need touching up.

S. **Delicate** recommends Indian ink as very suitable for finishing enlargements.

5. How can purple-black tones be obtained on collodion transparencies?

J. **Nock** suggested adding acetate of soda to the developer.

E. J. **Cox**: Try toning with platinum chloride.

J. **Place** thought toning with gold would give the desired result.

It was reported that one of the members (Mr. Foster) had promised a water colour drawing for the best photograph, by a member, from a subject to be selected, and the meeting thereupon tendered its best thanks to the donor.

W. J. **Harrison**, F.G.S., then gave a descriptive discourse upon "The Optical Lantern as applied to Education," during which over 100 slides were exhibited on the screen by the aid of the magnificent lantern at Mr. Harrison's disposal. The oxy-hydrogen light was used, and the subjects treated were—Astronomy, Physics, Geology, Physical Geography, Natural History, and some views of Welsh scenery. In treating of Astronomy, the contrast between the appliances in use a century ago and at the present time was very effectively shown. Perhaps the best slide of the dozen on this subject was that of Saturn with its rings. Physics.—The decomposition and recomposition of light was explained, also Faraday's curves in magnetism, and an interesting slide of the breaking at sea of the first Atlantic cable. Geology.—This subject was treated by Mr. Harrison in such a manner that can only be expected from the holder of the Darwin gold medal for Geology.

Commencing with the earliest known fossils—the Trilobites—of which excellent illustrations were shown, we were carried in imagination to the primeval Coal Forest, and enchanted with photographic copies of most delicate fossil ferns, vieing with which we had the beautiful Foraminifera, found in the chalk. The Victoria Cavern, in Yorkshire, explored under the direction of the British Association, was fully explained and illustrated. Next was introduced to view some of our ancient animals—the Mastodon and Mammoth elephants and Irish elk, a fine specimen of the latter being in our Mason College. Illustrations of the Glacier period were then shown. The slides of Llanberis Pass, as it would appear in that period compared with its appearance to-day, were particularly interesting. In Physical Geography, we had the lake upon the banks of which Professor Tyndal has built his residence; Vesuvius in eruption, a photograph from nature; Fingal's Cave, and two specimens of crystallization of water vapour, which were remarkable for the beautiful outlines produced in so simple a manner at this season. The Natural History slides consisted principally of transparencies by Mr. York, from instantaneous photographs of the animals at the Zoo. The slides of Welsh scenery were prepared by the carbon process, and showed how well it is adapted where fine warm tones suit the subject. Mr. Harrison also exhibited specimens of the method adopted by Mr. Dallinger in preparing slides at short notice by drawing with pencil upon ground glass, and coating with Canada balsam. During the summer of this year Mr. Harrison was successful in securing an instantaneous photograph of the "Wild Irishman" express train, travelling at about sixty miles per hour. The 5 by 4 negative had already interested us, but the enlargement considerably increased that interest.

A few slides brought by Mr. **Benson** were passed through, and this concluded what we hope is not to be the only successful lantern evening of the session.

Bolton Photographic Society.

The December meeting was held at the Baths, Bridgman Street, on the 3rd inst., Thomas **Parkinson** in the chair.

E. M. Garstang was elected a member of the Society.

R. **Harwood** exhibited a half-plate Eastman roller-slide, which was much admired for its ingenuity and beauty of workmanship.

The Rev. J. W. **Cundey** gave a lantern exhibition, and threw a number of Swiss views from his own negatives on the screen. A large quantity of slides were also shown by Messrs. Knowles, Johnston, Boothroyd, Laithwaite, Mercer, and others.

Photographic Society of Ireland.

The ordinary monthly meeting was held on Friday evening, the 11th inst., in the Royal College of Science, Dublin, Howard **Grubb**, F.R.S., in the chair.

The minutes of the last meeting having been read and confirmed,

Dr. **Scott** exhibited and explained the Eastman roller-slide for paper negatives.

Mr. J. V. **Robinson** also showed "Sharpe's" roller-slide for the same purpose; and there was a great deal of discussion among the members present as to the relative merits of the two slides, and on the subject of paper negatives generally. The mechanism of the Eastman slide elicited great admiration for its workmanship and finish; but the size of the slide, as compared with the size of negative taken, was objected to by some.

Mr. **Greenwood Pim** also exhibited a paper negative of large size, on Warnerke's tissue, and a print from it, which were kindly lent by the Warnerke Tissue Company, and which were greatly admired.

The following gentlemen were elected members of the Society:—G. C. Ashlin, G. B. Deane, Dr. J. Dallas Pratt, A. P. Sharpe.

Manchester Amateur Photographic Society.

Over 300 members and friends attended the open meeting, which was held on December 8th, in the Lodge Room of the Masonic Hall, Cooper Street. The President, the Rev. H. J. **Palmer**, took the chair, and the following gentlemen were elected members of the Society:—G. Pickering, A. G. Jackson, A. W. Walker, W. E. Buckley, Quentiu Bluhm, Joseph Hardy, E. H. Collier, and J. B. Whitworth.

William Stanley, the Secretary, said: Of the many hobbies that gentlemen are prone to take up, photography offers the fewest objections from a lady's point of view, inasmuch as it is interesting to gentleman and lady alike, and there is no part of the dry-plate process that cannot be pursued by the ladies, equally as well as by the gentlemen; indeed, in some portions I might say even better. It is our intention to-night to show, by means of the lantern, some of the pleasing results which everyone can now obtain for him or herself by means of photography, and also to show the royal road opened out to the acquirement of the necessary knowledge through the medium of the Manchester Amateur Photographic Society. Its low subscription, 5s., enables everyone to become a member, while its monthly meetings, its fortnightly rambles during the summer in and around Manchester, and the various practical demonstrations by adepts in the art, not only smooth the way, but also in a great measure prevent unnecessary inroads on that very sensitive organ, the pocket. Nearly 400 slides had been sent in for exhibition. Mr. Stanley described in detail the means by which the pictures had been produced. After the difference between a negative and a positive picture had been illustrated, a number of fine pictures, on both wet and dry plates, were shown.

A vote of thanks was passed to Mr. Bathe for his kindness in bringing his lantern to the meeting, and especially for his neat and efficient manipulation of the pictures.

Edinburgh Photographic Society.

The second ordinary meeting of the session was held in 20, George Street, on the evening of Monday, 7th December, W. **Forgan**, President, in the chair. The minutes of last meeting having been read and approved, J. Lamb, Silvester Rollo, A. Fairley, and W. R. Kinnear were duly elected members.

There was a numerous attendance, and the President congratulated the members upon the improved circumstances in which they, as a society, found themselves.

This being the occasion on which the annual exhibition of members' work was intimated to take place, the walls of the hall were well covered with a very creditable collection of pictures. About three hundred exhibits were displayed, and as the hall is admirably adapted for an effective exhibition, the hanging committee were enabled to place the works generally to advantage and within comfortable examination. Professionals and amateurs alike contributed largely, and several members lent works of merit in their possession, which added much to the interest of the collection. The tables were also well furnished with a varied collection of apparatus, which claimed, with the pictures, a large amount of attention.

Dr. **Alex. Hunter** read a paper entitled, "Where to go with the Camera in and about Edinburgh." Before doing so he showed a folding portable cork seat, covered with cloth, which he highly recommended to all present who photographed or sketched out of doors, as extremely useful. The paper was profusely illustrated by large sketches of many of the views the speaker alluded to.

Mr. **Fraser**, in moving a vote of thanks, remarked that a paper like this was of special interest to an Edinburgh audience, and pointed them to beauties which they were apt to overlook through constant familiarity with them.

The **President** intimated that the first popular meeting for the winter was to be held in January, when Andiew Pringle would lecture upon the "Life, Land, and Lyrics of Robert Burns," on an evening as near as possible to the poet's birthday. In addition to a series of transparencies illustrative of the lecture, it is anticipated that several of Buins' songs will be sung during the evening.

Mr. W. T. **Bashford** brought before the notice of the members several fine transparencies by Breeze, and read a paper concerning them (p 810). Amongst them was the somewhat famous one entitled "What are the wild waves saying?" Several years ago this slide occasioned considerable discussion in the journals because of a sea-gull which appears flying in it, the feat of taking such an object then being considered marvellous. The slides were examined with much interest.

Mr. **Turnbull** pointed out the various works exhibited, giving the artists' names and the processes employed.

The **President** presented the Society's silver medal to Marshall Wane, it being the first prize awarded for the best picture in a recent competition. T. G. Whaite, for the second best, received a bronze medal.

A paper from the proceedings of the American Academy, on "Coloured Media for the Dark Room," was laid upon the table from Prof. Piazzi Smyth, which concluded a very pleasant evening.

Birkenhead Photographic Association.

A *Conversazione* was held on the 8th inst., at the Music Hall, Claughton Road, Birkenhead.

Clarke Aspinall, J.P., who presided upon the occasion, explained that the Association was a kind of offshoot of the older Society in Liverpool, and established principally for the convenience of those interested in the art who were resident on the Cheshire side of the Mersey. They were now entering upon the second year of their existence, and he thought they certainly did so under very bright and instructive auspices. He advocated lady members in connection with the Association, and he thought it would be a great help and charm to the institution; he hoped that in this matter, at any rate, the Society would get ahead of the Liverpool Society, and continue to progress in the coming year as it had done in the past.

Having announced the names of the winners of prizes and certificates in the competition for the year now closing, which were as follows:—"Best Picture," Paul Lange; "Best Photograph," John H. Day; "Old Mill," Adolf W. Beer; "Trees," G. A. Carruthers; "Instantaneous," A. W. Cornish; "Lantern Slides," F. Evaus; "Clouds," Paul Lange; "Bridge," H. S. Ellerbeck; "Old House," A. W. Coruish—the President made a few observations respecting the aims, objects, and prospects of the Association, after which the audience dispersed through the room, for the purpose of examining the varied objects of interest provided for their entertainment.

G. E. **Thompson**, in the course of the evening, read a short paper upon "Photographic Reminiscences of the Mediterranean," which was most thoroughly enjoyed, together with the fine lantern transparencies with which he illustrated his remarks.

The musical portion of the programme was also greatly appreciated, and the success of the meeting is in no small measure attributable to the assistance so kindly rendered in this department by Miss Hunt, M. E. P. Zeper, H. Knottenbolt, and Mr. Barlow, also to Messrs. Symond and Co. for their exhibit of instantaneous yacht pictures, Messrs. West and Son for their splendid enlargements, to J. T. Ellerbeck, for his large collection of Norwegian views, to Silvester Parry, Messrs. Robinson and Thompson, Dr. Watling, Dr. F. T. Panl, the Autotype Company, Messrs. Annan and Swan, A. W. Beer, and many others for their loans of pictures, which were greatly appreciated, notwithstanding the rather difficult process of perambulation in consequence of the crowded state of the hall.

Of the miscellaneous exhibits, Messrs. Atkinson and Co., Newton and Co., and Wood and Co. sent a large assortment of cameras, lenses, and other apparatus immediately connected with the practice of the art science. Messrs. Archer and Sons' Wimshurst electrical machine, and Mr. J. Marples' brilliant electrical experiments monopolised a large share of attention, as did also the beautiful objects displayed upon the stages of the microscopes by Messrs. Newall, Forrest, Beer, Williams, and others, and altogether the gathering was of a most agreeable and entertaining description, and the **Chairman**, in replying to a hearty vote of thanks, expressed a hope that the Society would see its way to taking the larger hall next year, as he considered them fully warranted in doing, judging from the very large audience he had the pleasure of presiding over on that occasion.

The Halifax Photographic Society.

The monthly meeting was held in Mr. Mauley's rooms, on the 4th inst., Mr. Edward Gledhill in the chair.

The minutes of the previous meeting were read and confirmed, after which the rules of the Society were revised, and the programme for the coming season discussed.

Several of the members brought specimens of their work for comparison and criticism.

J. I. Learoyd exhibited a Pantascopic Camera for panoramic views, and explained its working. It embraces a very wide angle, the camera revolving on the top of the stand, motion being given to it by clockwork mechanism which can be adjusted for short or long exposure.

Experiments were also made with the "Eclipse" oxy-magnesium light, and a fairly successful negative was taken of the vice-president.

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Talk in the Studio.

Photographic Society of Great Britain.—The next monthly technical meeting of this Society will be held on Tuesday next, December 22nd, at 8 p.m., at the Gallery, 5a, Pall Mall East; open at 7 p.m. for journals, &c.

Annual Dinner of the Photographic Club.—This took place on Wednesday, the 9th inst., at Anderton's Hotel, Fleet Street, between forty and fifty persons being present. The chair was occupied by W. Ackland, and after dinner several of those present gave recitations and songs.

India-Rubber Stereotypes from Phototype Blocks.—We have recently seen some excellent rubber stereos from Dallastint blocks, and, by using one of these, it becomes practicable to sign a letter with one's portrait.

Optical Lantern with Electric Light.—We have received the following:—"I have at last succeeded in getting a battery to work my magic lanterns; I have been trying for some time, and at last a friend of mine has got me one to do all I could wish. I showed on the 8th of this month at the Camera Club, and every one thought it a very good. I am the first person who has lit a magic lantern with a single liquid battery only weighing a few pounds (about twenty) when empty, and it takes one gallon of liquid to fill, the liquid costing about 3s. a gallon, and then it will burn all at once, or a time, say one hour, and then you can work it again for an hour and so on till the liquid is used up. It will last for about five hours, four for certain with a good light. You can lift your zincs, and when out it rests. The pair of lanterns are lit with an incandescent electric lamp, the current of which is supplied by a small primary battery. The battery consists of twenty-four sets of ordinary carbon zinc elements in twenty-four cells, the whole of which only measure twenty inches long, seven inches wide, and five inches high, and which are contained in a handsome box, easily carried in one hand, which serves as a rest for the lamps. The cells are three parts filled with exciting liquid (which is the secret and is patented) quite white and entirely without smell. The current generated in this battery is sufficient to supply two Swan-Edison lamps of twenty volts each, burning from four to five hours, and is switched from one lamp to the other as the slides are changed. The light is very powerful, white, and perfectly steady. The great advantage is that one always has his lamp ready for use (as when at home he shows for an hour and puts on one side, lifting zincs out, and then it is ready till he wants to use again. No smell or danger, no heat, and only a few pounds to carry about. I think it a great step ahead in lighting for the magic lantern, and after the 28th I shall be glad to show it to anyone who comes down to me, letting me know a day or so before. All information, &c., I can give to anyone who wishes.—A Dresser."

Abstract of Chapman Jones's Lecture at the Birkbeck Institute, December 16th.—Albumen is merely changed in form when it is coagulated; when dry, it may be heated to 100° C. without coagulation taking place. It is coagulated by strong alcohol, and by most acids, without heating. Asphalte treated successively with alcohol, ether, and chloroform, yield three extracts, of which the first is practically not sensitive to light; the second is sensitive, and the third is much more so. Elder pith, manufactured cotton, linen, hemp, unsized white paper, are each of them almost pure cellulose. Cellulose is unalterable when pure, but readily decays when in contact with decomposing matter. Strong sulphuric acid dissolves it; strong hydrochloric acid does not change it, and strong nitric acid makes nitrates of it; these nitrates are pyroxyline or guncotton, the latter by very prolonged and more complete action of the acid. The sulphuric acid used merely helps the nitric acid. Gallic acid is prepared from gall nuts, and gallic acid, when suitably heated, gives pyrogallic acid. Pyrogallic acid is a more vigorous reducing agent or developer than gallic acid. Neither chemistry, nor optics, nor both, are photography, but a certain knowledge of these subjects is indispensable to the student of photography.

The Dundee and East of Scotland Photographic Exhibition.—Applications for space should be made at once to the Secretary, D. Irelaud, junr., Commercial Street, Dundee. A large number of medals will be awarded, and we are told that a large number of exhibits are to hand from abroad.

Photographic Club.—The subject for discussion on December 23rd will be "The Effects of Varying the Amount of Pyro in the Developer."

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To Correspondents.

⁂ We cannot undertake to return rejected communications.

☞ As Christmas Day falls on the Friday, our next number will be published on Thursday, December 24.

J. L.—If you give six or ten times the exposure, and weaken the developer sufficiently, it is probable that the prints will tone satisfactorily. The development should be decidedly slow.

Ignoramus.—It is not customary for camera makers to do as you suggest, and if you are working with a lens in which the foci differ, you must either let the camera maker know the extent of the difference, or you may make correction yourself by shifting the ground glass in its setting.

A. Austin.—1. Leave it in a saturated solution of mercuric chloride until the image is thoroughly whitened, after which, thoroughly wash, and immerse in the potassic iodide solution—1 part of the iodide and 30 parts of water.

George Dyson.—They are almost exclusively used now, and they make negatives which, in general estimation, are quite as good.

Allen Selwyn.—See p. 66 of our volume for 1884.

J. M.—There is very little doubt that the spots arise from a chemically active dust which settles on the paper during some stage of the process. Be more careful as regards sweeping the rooms or other proceedings which may cause dust.

Ebbw Vale.—1. About 300 or 600 *double* vibrations a second, according to which octave is taken. 2. The remark applies only in the case of a developer containing so much saline matter as to render the gelatine somewhat non-absorbent of water, and in no sense does it apply to the ordinary pyro and ammonia developer. 3. Considering that in the case of each lens the focus varies half an inch from that given in the list, and that in each of the instruments this difference is in a contrary direction, bringing the foci of the two so near as to make it scarcely worth while to take both lenses into the field, you are quite right in demanding others to replace them, or a return of your money. Of course one cannot expect the focal length of a lens to be exactly as catalogued, but a variation of half an inch on an instrument which is supposed to have a focus of 5¼ inches, is altogether unreasonable.

E. S. D.—1. Possibly the lens may be dirty; a screen is useful in many cases, but not essential. 2. Proceed until it is well out at the back. 3. Try another thickness of yellow paper. 4. Very few are using it; they do not look as well as prints on albumenized paper. 5. If the glasses are misplaced, the instrument is useless.

Ed. J. Hughes.—Judging from your description, you have a lantern condenser. This, or any such arrangement as you describe, is quite useless for photographic purposes.

Col. Biggs.—Thank you for the communication.

R. J. Gorman.—Get Abney's "Instruction."

M. J. M. (Hants).—It may be that the film has become very hard, and prone to repel aqueous fluids, and we should suggest that there is no alternative but to use the mercurial solution as strong as possible, and leave the plates in for a still longer time.

F. M. S.—It seems to us that the film has become loosened by the action of extreme cold on the wet paper.

The Photographic News.

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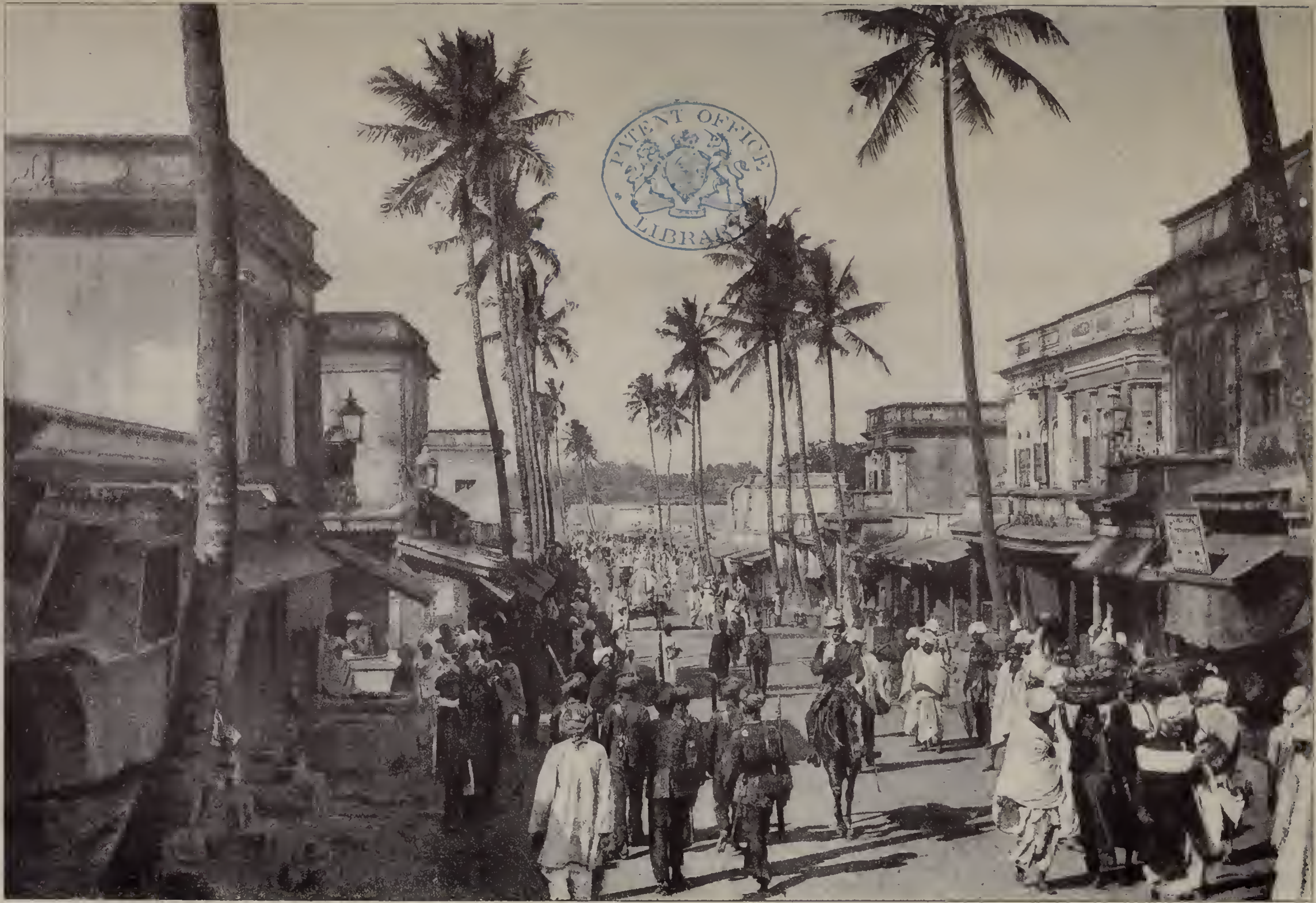

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THE PHOTOGRAPHIC NEWS.

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SOME OPTICAL MATTERS IN CONNECTION WITH STEREOSCOPIC PHOTOGRAPHY.

It has always been a matter of some surprise to us that the stereoscope has fallen so much into disrepute during the last few years. That it has so fallen is, however, indisputable. Every effort to raise it into popular favour again seems, moreover, to meet with total failure more or less nearly complete.

In the *Photographisches Wochenblatt*, Von F. Stolze has a long disquisition on the instrument, in the course of which he certainly points out very many defects possessed by it in its present form, which have, so far as we are aware, always been more or less overlooked. We cannot go so thoroughly into the matter as he has, but will give an outline of what he says on the subject. We think it will be useful to our readers, especially as in the end Herr Stolze describes an arrangement whereby the defects are overcome.

The main defect of the stereoscope is that it shows the objects not as they are seen—barring colour, of course—but as minute models of these objects; models standing out in bold reliefs, it is true, still, only models.

The principle whereby the stereoscope is enabled to produce the appearance of solidity is, that it presents to each eye a slightly different picture. As each eye, in looking at an actual object, being a little distant from the other, sees the object from a somewhat different point of view, the mind, either in the case of the actual object, or of the stereoscopic reproduction of it, fills in, by what may be termed a reflex trigonometrical effort, the relative distances of the various parts.

To produce the stereoscopic effect, it is of course necessary that similar points of the true photographs should fall on corresponding parts on the retinas of the two eyes. "Hereby the size of each picture is at once limited to a maximum breadth of 2½ inches, or even a little less," that being the average distance between a pair of human eyes.

This limitation at once produces liability to a certain error. A stereoscopic picture must always be so arranged that on looking at it through the stereoscope, the impression is conveyed that the object is seen through a framing, and the framing should naturally be made to appear between the object and the observer. For this it is necessary, however, that, in the case of the right hand picture, a little more should be visible on the *left* hand edge, than on the same edge of the left hand picture. It is a common practice, however, to so trim prints that the reverse is the case, that there is a little more on the outside edges than on the inside. The effect of this is to cause the object to appear between the framing and the observer, which, of course, does not tend to magnify its apparent size.

The next point enlarged upon is one of very considerable importance. It is pointed out that it is quite necessary, if the stereoscopic delusion is to approach completeness, that the simulatious of the objects in the instrument subtend the same angle as did the objects themselves to the camera when they were being photographed.

According to Herr Von Stolze, it very seldom occurs that, with the ordinary stereoscope, the arrangement is such that the picture is seen under the correct angle. Further, he states that in the case of pictures taken with the wide angle stereoscopic objectives, the magnifying power of the lenses of the spectroscope could require to be so great, if the pictures therein are to subtend to the eye, the correct angle that the grain, even of albumenized paper, would become very visible, and materially deteriorate the effect. It is an indistinct knowledge of this fact that has caused stereoscope makers rather to increase the widths of their prints than the power of their lenses; but this has availed nothing, as lenses of longer focus have not been used in making the pictures, so that the scale is not increased, but only the amount in subject. The maximum angle of view properly admissible with the ordinary stereoscope is one of 30°.

Another fault in the usual stereoscopic apparatus is caused by the fact that the objectives with which the photographs are produced are always placed too far apart. Our idea of the distance of an object is gained from the amount of difference in the images received by our two eyes. The greater the difference, the nearer the object appears. By placing the objectives with which the photographs are taken farther apart than the eyes, the difference is increased, so that on this account alone the objects, as seen in steroscope, appear nearer than they should, and consequently smaller.

So far various reasons have been given for the appearance of diminutiveness in the image as seen in the stereoscope, but followed by the final one they seem somewhat unnecessary—as unnecessary, perhaps, as the preliminary excuses of the soldier who was asked why he did not fire on the enemy. He gave sundry trifling reasons first, but finally explained that he had neither powder nor shot to fire with. We quote Herr Stolze's first reason.

"As is well-known, the position of any object is of necessity assigned to that point where the lines drawn from the two eyes to it cross each other. The same thing follows in observing with the Brewster stereoscope. It is well known, however, that in looking through the prismatic glasses of this instrument, parallel rays emanating from corresponding points are so deflected that they appear to cross at a point about 28 c.m. from both eyes. This uncommonly weighty circumstance induces us, then, to place these points at this distance, not of course quite precisely, because the adjustment of the axis of our eye is not performed with such precision; but approximately. But when we see an object which subtends at a distance of 100 m., an angle of 10°, subtending still the same angle, but apparently only 1/300 part so far off, it is set down as only 1/300 part the size, and appears in place of 17·6 m. in size only 2·5″m."*

This is Herr Stolze's chief explanation of the diminutive appearance of the pictures seen in the stereoscope, and having given it he need, we think, scarcely have troubled himself to give others.

Another reason is given, however, which we confess we scarcely follow. We once more quote: "Such small objects observed from so short a distance must give images varying from each other much more than they do when far distant. But as we are compelled, from the convergence of the rays, to place the objects so near, they appear not really solid, but rather to be in relief, and as we in turn have an idea of the correct relative distances of the objects, and seek to construct them after this knowledge, there arises a singular impression of disguise which prevents us from coming to any correct estimation of size, and strains the eyes painfully. If, besides this, we see the grain of the paper on account of the extent to which the image is magnified, it is not to be wondered at if the stereoscope, as it now exists, falls more and more into discredit, or at least becomes an instrument not commonly used."

(*To be continued.*)

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CAPTAIN ABNEY'S LECTURE

On Thursday evening last, December 17th, Captain Abney delivered a lecture on "Light and the Atmosphere," at the London Institution, Finsbury. He commenced by saying that we are accustomed to speak of the sky as blue, and of sunlight that it is yellow, and it was upon those two points he intended to touch. In order to know anything about light, they had first of all to decompose it and examine the spectrum produced. By means of a 50 Grove-cell battery, an electric light was produced, and a decomposed beam shown on the screen. Captain Abney then demonstrated that although ordinary white light can be decompesed into seven colours, it was possible to have approximate white light which could not be decomposed into the same number of colours. By the interposition of blue glass certain colours were absorbed, while others passed through the medium, and by still further modification only blue remained upon the screen.

Photometry was next dealt with, Bunsen's and Rowland's methods being explained; the Lecturer giving preference to the latter as being more accurate *per se*, and very cheap in construction. The method was, however, inconvenient for measuring the illumination of the rooms. He then introduced an instrument designed by Preece; it was a rectangular box with a semi-opaque screen at one end, the centre of which was rendered translucent, the inside being illuminated by a small incandescent lamp. To ascertain the intensity of illumination in any given room, the light inside the box was increased until the grease spot vanished, which indicated that the illumination outside was equal to that within. The internal illumination being increased as one-sixth power of current, calculation became easy.

The method of measurement by oscillation was next shown, and the extinguishing of colour by a preponderance of white light alluded to. Continuing, the Lecturer said, it had been stated that the sun was not always the same colour, but they had good reasons to think it did not vary from day to day, and if they could get outside the atmosphere they would not be able to distinguish any great difference, since changes of colour were brought about by the condition of the atmosphere. At four o'clock on a September afternoon the sun would appear yellow, at six it would be red; so if the sun was not variable, the atmosphere must be, and the light had to pass through a relative thickness of atmosphere which was not clear, but turbid.

The theory of small water bubbles, floating in the air, next received attention, the two principal objections urged by the Lecturer being the probability of bursting, and the difference of maximum polarization, a subject which he shortly described.

Professor Tyndall's well-known experiment of passing a beam of light through a turbid liquid was then illustrated by pouring a few drops of spirit varnish into a trough of water through which a beam of light was passing, which rendered a white disc upon the screen somewhat yellow. By increasing the turbidity of the liquid the colour became deeper, the Lecturer remarking that he could in time get a sunset-red, owing to the blue becoming extinguished.

Lord Rayleigh's researches then received attention, and various colour effects were shown upon the screen to illustrate the yellow and red sunsets. Turning to the question of dust influencing the blue colour of the sky, the Lecturer thought it highly improbable that it would rise 300 feet, for above that altitude the sky was still blue; again, dust would have to go up as it pleased, which was impossible.

Captain Abney then called attention to diagrams upon the walls, and pointed out that the curves there shown gave a remarkably close reading, which pointed to its being water, and in a liquid condition. There was no reason against the theory of water floating in the atmosphere; it does exist in clouds, and if we have water between us and the sun, in the form of clouds, it is quite reasonable to suppose that there are water particles in the atmosphere. Captain Abney having alluded to the glorious sunsets which were visible a short time ago, spoke of light measurement by photography, and which had given him readings at 12,000 and 13,000 feet high. The instrument was a narrow band of platinotype paper, long enough for 50 exposures, and somewhat similar to the carbon printer's actinometer. To test the power of light at given altitudes, it was merely necessary to expose a portion of the strip for a couple of minutes, development being deferred until a more convenient opportunity presented itself.

The process of developing exposed strips of platinotype paper was demonstrated, and it was stated that the readings taken in high altitudes showed that the actinic properties were much less than where the atmosphere diffused the light to a greater extent. Some transparencies were then shown upon the screen, and the effect of different conditions of the atmosphere on distant views pointed out, the subjects chosen being mostly Alpine scenery, which elicited much interest.

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PRACTICAL CHEMISTRY FOR PHOTOGRAPHERS

BY RALPH W. ROBINSON.

IV.—Sulphite of Soda—Preparation.

It being so difficult to procure sulphite of soda in a state approaching purity, some photographers may prefer to prepare their own, and as it is easily and cheaply done, I give for their benefit a description of the method.

The outline of the process is this. Sulphur dioxide is passed into a cold solution of carbonate of soda, until all the carbonic is replaced by sulphurous acid, thus—

$$Na_2CO_3 + SO_2 = Na_2SO_3 + CO_2$$

Weigh out roughly a certain quantity of common carbonate of soda, or better, the "crystal carbonate" mentioned in No. II. of these papers; but if the latter is used, bear in mind that 124 parts are equivalent to 296 parts of the common soda, on account of the different amount of water of crystallization. Dissolve this in cold water in a tall beaker, or other suitable vessel.

Now, into a flask fitted with thistle funnel and delivery tube, as in the diagram, put some clean copper turnings, about one ounce of these being used for every four ounces of common carbonate of soda, or for crystal carbonate about two ounces copper for four ounces soda. The cork should then be carefully fitted into the flask, and the latter fixed in the retort stand. The delivery tube is connected by a short piece of india-rubber tubing to another glass tube running through the cork to the bottom of a six-ounce bottle about half full of water. The gas, after bubbling through the water, passes out of the washing bottle by a glass tube, which reaches only just inside the cork, and by this it is led nearly to the bottom of the beaker containing the solution of soda.

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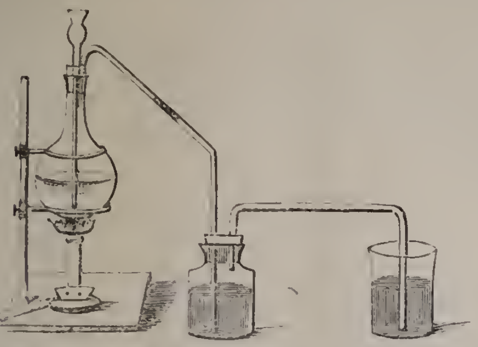
* It appears to us that a slip in the figures has been made here. We make the apparent size only 58·6 m.m.



Having ascertained that the corks and joints are tight, run into the flask through the thistle funnel sufficient strong sulphuric acid to cover the copper turnings. Now apply a gentle heat with a Bunsen burner, using the rose top, as shown in the diagram. The copper decomposes the sulphuric acid, sulphate of copper and sulphur dioxide being the final products of the reaction, thus—

$$2H_2SO_4+Cu=CuSO_4+SO_2+2H_2O$$

If the heat is properly adjusted, the gas is given off in an even stream, and is washed, principally to catch any sulphuric acid that may be volatilized, by passing through the water in the intermediate bottle; and finally, it is absorbed by the carbonate of soda in the beaker.

When the action has properly commenced, the soda solution will be seen to effervesce, minute bubbles being continuously given off. Sulphur dioxide is passed through the solution for some time, when the effervescence will considerably diminish, and the liquid will have an acid reaction, shown by its reddening blue litmus paper. When this happens, it is time to stop the flow of sulphur dioxide. This is done, *not by removing the heat*, which, by leaving the flask free to cool, would diminish the volume of gas contained in the flask, and owing to the partial vacuum formed, the water would flow back from the wash bottle, and probably break the flask, or at the best cause great inconvenience. First, disconnect the flask from the wash bottle, and then remove the Bunsen burner, and carry the retort stand with the flask into the open air to cool, before washing out.

The solution in the beaker now consists of normal sulphite of sodium, Na_2SO_3, with some bisulphite or acid sulphite of sodium, $NaHSO_3$, which is formed, as shown by the equation, by the excess of SO_2 passed into the solution—

$$Na_2SO_3+SO_2+H_2O=2NaHSO_3$$

The solution will also contain some carbonic acid (carbon dioxide), and perhaps some free sulphur dioxide. The liquid is transferred to an evaporating basin, and boiled to expel all dissolved but uncombined gas. If, after this, a drop of the solution, taken out on the end of a glass rod, reddens litmus paper, some solution of soda must be added a little at a time, with boiling between each addition, and then testing with litmus till the reaction is neutral. We have now simply to boil down till a scum of crystals is formed on the surface when it is blown upon, and leave to cool. The greater part of the impurities, which consist chiefly of chloride and sulphate, being more soluble than the sulphite, are left in the mother liquor, and the sulphite crystallizes out. The liquor should be poured off, and the crystals thrown on a filter to drain, after which they may be dried between blotting-paper.

By this method I have made from common soda a sulphite containing over 90 per cent. of $Na_2SO_3,7H_2O$; but should greater purity be desired, the salt obtained as above described may be redissolved in water, and again crystallized. As this salt is so very liable to oxidise, care should be taken to expose it to the air as little as possible, and all the water used in its preparation should have been boiled recently, as ordinary water contains a considerable quantity of dissolved oxygen. Before using, test the sulphite as directed in the last paper of this series.

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COMMUNICATIONS FROM THE PHOTO-CHEMICAL LABORATORY OF THE IMPERIAL HIGH SCHOOL OF BERLIN.

BY DR W. H. VOGEL.

Chrysaniline as Optical Sensitizer and Accelerator of Development.

Dr. Lohse was the first to recognize the sensitizing action of chrysaniline and of diamidoazobenzol. He found that the first mentioned substance raised the sensitiveness for green and yellow. Eder experimented with the same body, and discovered that it altered the spectrum of bromide of silver, inasmuch as it shifted the maximum of sensitiveness towards the green. Eder does not allude to a second maximum of sensitiveness beside that of pure bromide of silver, nor does Messerschmidt. The latter says: "According to Lohse . . . it is all the same whether the plate is immersed in chrysaniline solution before or after exposure." Messerschmidt refers in these words to my theory of optical sensitizing by a dye-stuff. In fact, it would be remarkable in the highest degree, if chrysaniline possessed the property of raising the sensitiveness for green after, as well as before, exposure.

As the subject is one of great interest to me, I made experiments with two of Sach's and two Monckhoven plates, exposed side by side in the spectrum. One plate of each make was developed in the usual way, and the other after an immersion in a bath of chrysaniline before development. The result was that chrysaniline greatly accelerated development (on this practically important point I shall have more to say further on), but the colour-sensitiveness was not altered in the slightest degree. The spectra (of which each plate bore five impressions, with exposures of ½, 1, 2, 5, 10, and 15 seconds) showed the same increase and diminution of intensity, and extended just as far with the bathed, as with the unbathed plates.

Colour-sensitiveness consequently is only given by chrysaniline—and it cannot be otherwise—when the plate is treated with the substance before exposure. Nevertheless, I have obtained, when experimenting with chrysaniline, certain results which differ in some points from those reported by Lohse, Eder, and Messerschmidt.

Herr Messerschmidt states that chrysaniline removes the ordinary maximum of photographic action towards the red, and adds, that since this dye-stuff has only an absorbing action in one portion, the characteristic referred to cannot be said to be in connection with an absorption band. I must, on the other hand, recall the fact that chrysaniline has an absorption band between F and *b*. I have referred to this in my hand-book of "Spectrum Analysis, 1878." This absorption band must, however, correspond with a photographic action. Such, nevertheless, does not appear to be present, according to Eder, Messerschmidt, and Lohse. In order to clear up this point I have made further experiments. In the result it proved that when Sachs'* gelatine plates were immersed in a solution 1:2000 of chrysaniline, the only effect produced was that the action was moved farther towards the yellow than with undyed plates; this about corresponded with Eder's description.

It is different, however, when using the pure bromide of silver plates of Monckhoven. These gave a second maximum of sensitiveness at *b* E, which gradually fell off on both sides, quite analogous to the fading absorption band, which can be observed by the eye. And as with most dyestuffs, a shifting of the absorption band takes place. Chrysaniline, therefore, forms no exception to the principle of optical sensitizing, but, on the other hand, affords confirmation of it.

As a sensitizer, chrysaniline acts in its own peculiar way. If two plates are exposed, and one of them is immersed before development in nitrate of chrysaniline 1:2000, and the two developed in ferrous oxalate, the development is found to be much accelerated by the chrysaniline. If the two plates are taken at the same time out of the ferrous oxalate, it appears as though the plate treated with chrysaniline had received at least double the exposure of the other. This is, however, a mistake, for if the second plate is left longer in the developer, it catches up the first, and shows just as much detail. The first plate, however, with chrysaniline, shows less powerful contrasts, and the details in the lights are better preserved; and consequently chrysaniline, as a preliminary bath, acts like one of hypo 1:5000 in giving softer picture. I must add that this substance (chrysaniline) has many advantages over hypo used as a preliminary bath. It works not only more rapidly, but has less tendency to the formation of fog.

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THE NEW WINTER HEALTH RESORT.

BY "JEAN VILLE."

WIESEN.

I wonder how many readers of the News have ever heard of Wiesen. An article in the News of October 2nd, on "Clouds," gave me the idea of offering a few specimens of my work here. Though we have not the low horizon line recommended by Mr. Wyles, and which no doubt would be a necessity in England for first-class work of cloud subjects, yet a variety of cloud effects unattainable, I think, in a district without mountains, can often be observed in this neighbourhood, and others resembling it. This lovely little place has not, as yet, been done justice to by the photographer. Of the stream of tourists, flowing continually during the summer months to and from the Engadine, very few turn off at Alvenen-Bad, after crossing the Albula Pass, and visit Wiesen. And yet, the reward of doing so would be ample, for they would find lofty mountains, deep and savage gorges, picturesque old bridges, and, in fact, material enough to supply the photographer with work for many days. A small colony of English people is established this year at Wiesen for the winter, owing to the marvellous effect of the air on those suffering from lung diseases, nervous complaints, and many other disorders. At a height of 4,700 feet above the sea, and perched high up on the hill side, the situation is magnificent, and the long belts of clouds which sometimes fill the valley below, leaving the mountains clear and the which was to convey me to Alexandria, on my way home, *via* Brindisi. I had written to Mrs. Selby, begging her to bring Clara to meet me in Paris. Her doing so would but shorten our period of separation by some ten or twelve hours, but I knew that those hours were golden to her as well as to me, and I was selfish for both of us. After a stormy voyage, I reached Brindisi in due course; I hurried to the Post Restante, for I had asked her to reply to me there, but there was nothing for me. It was evident that my letter had not reached her; perhaps she had delayed a few days in Paris on her way home. She had a *trousseau* to prepare, and it is a strange article of faith among women that this can be done more effectually in Paris than elsewhere; consequently, nothing was more probable than that she was there at that moment, my letter would probably be forwarded to her, and if so, she would surely be at the station on the arrival of the train from Italy.

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* Sachs' gelatine plates contain about two per cent. of iodide of silver.

As I rushed across Europe I had but one thought in my mind—would Clara be at the Paris terminus to meet me? The towns flew by me when I thought of her, and yet at times the intervals between them seemed interminable. Every stoppage irritated me, yet the two days were not tedious. I could always lose all count of time by allowing my mind to dwell upon the incidents of our voyage together, and especially on the crowning incident that was yet to come. But when the doubting question arose whether or not we should meet in Paris, the train seemed to dawdle as train never dawdled before. At length we reached the terminus. I eagerly scanned the few people on the platform as we entered the station, and my heart sank when I saw that she was not there. Then I remembered that on French railways friends of passengers are not as a rule, allowed on the platforms, and my hopes rose again. They were soon dashed, for there was no Clara for me in the waiting-rooms or at the entrance.

A dim sense of calamity – unknown, and the more terrible for being unknown—took possession of me. I hurried across Paris to the "Nord," reached Calais in due course, crossed to Dover, and made my way to London, which I reached late at night. The next day, at nine in the morning, I hurried to Mrs. Selby's house in Oxford Square. I rang the bell, and it was answered by a maid servant in deep black. I asked for Mrs. Selby, but so inarticulately that the girl did not understand me. I pulled myself together and repeated the question. The girl stammered awkwardly. Had I not heard? No! I had heard nothing; was anything wrong? The French ship in which Mrs. Selby and Clara had sailed from Bombay had been lost—as it was supposed—in a hurricane between Bombay and Aden, and all souls drowned.

I staggered as from a strong man's blow, I remember nothing until I found myself lying on the sofa in the dining-room, tended by an elderly gentleman, Mrs. Selby's brother and administrator. He, of course, did not know me; still less did he know of my relation towards his dead niece. I told him all, and he treated me with the greatest kindness. He could give me no hope; the ship was then six weeks overdue, and the insurances on her had been duly paid.

Desolate and broken-hearted, I left him, and went to my mother's house in Devonshire. After three weeks of fever I began to recover strength, but the light of my life was extinct, and an indefinable sense of night was all that remained to me. As soon as I was strong enough to stand I thought of the photographs I had taken at Singapore. They were all that was left to me of my dead love, and with a feeling of unspeakable awe I proceeded to raise her presentment as it were from the grave. In the closely darkened room, illuminated only by the dim red light of my developing lamp, I prepared the necessary chemicals with a trembling and uncertain hand. I took the plate from the slide in which it had been enclosed for so many months, and as I looked upon its plain, creamy surface, so soon to be sanctified by her image, I almost felt that I was engaged in some unhallowed deed of necromancy. Breathless with excitement, I poured the developer upon it, and as I awaited the result, I could hear my heart thumping against my chest. I had not long to wait. Slowly, but surely and distinctly, the features of my darling came to me from the grave. Notwithstanding the inversion of its tones, it stood plainly before me—herself in every detail. As I watched the gradual perfection of the portrait I cried like a little child. *At length the development was complete*, and, shaking like a leaf, I took it from its bath to examine it more closely. As I did so, the door of the room was suddenly opened, a flood of light was admitted, and *the photograph was ruined beyond reparation.*

With an inarticulate cry I seized the intruder in my weakened grasp—it was my valet, who had accompanied me on my voyage out and home. I know not what I said to him in my furious despair—the words, whatever they were, passed into forgetfulness as they were spoken.

"Sir—sir," said he, "I bring you great news. Miss Selby—Mrs. Selby. Their boat was picked up by a sailing ship. She encountered adverse winds, and only reached Plymouth yesterday—and—and—Miss Clara is here—and I have come to tell you so!"—*Illustrated Sporting and Dramatic News.*

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WHERE ART BEGINS.

BY H. NISBET.*

I mean to take up photography only where it joins hands with my own work – painting—in the broad sense of the word, which, I may safely assert, is taking it nearly all round.

When I look back twenty years, to the time that I first began to mix with the professors of the suncraft—"Brothers of the Light," to use an occult term—and compare the work of those days with the results of this day, and think upon all it may yet be, it is with a feeling of profound astonishment, not unmixed with admiring envy, that I regard the young scientist beginning a career so filled with possibilities and future discoveries. It seems as if I, the painter, walked upon a highway tramped down by countless travellers, leading to an end definite and unavoidable, while he has before him only a little distance marked out, with a vast country to explore as his mind and genius may best determine.

About twenty years ago my father took it into his head to begin a photographic business. He did not know much about it himself, although he had a good knowledge of chemistry; but he was an enthusiast in experiments, and a credulous believer in the honesty of mankind. So, through the advice of a friend, he built a glass-house, bought some cameras and chemicals (it was the wet plate days), laid in a stock of handsomely designed mounts, &c., and advertised for an operator. He bought cameras and hired operators. I think he got through about a dozen of the one and about half a hundred of the other, before he woke up to the knowledge that something else was required before the business could be built upon a firm basis, or the public satisfied with the efforts made to please them.

In those days backgrounds and accessories were not greatly considered as the means towards an artistic end. One plain background and one a little complicated were all that the operator considered needful, with a carved chair or fluted pilaster, and so the multitude were turned out with a set, fixed stare, full front, bolt upright. If male, a lenient photographer might permit one leg to cross the other by way of ease. The female portion generally sat with hands meekly crossed over the lap and a curtain falling gracefully on one side, like those heroic portraits of the times of Sir Benjamin West.

When I had painted the fancy background—a room with a bay window looking out, window partly open, revealing an Italian lake with a "palace lifting to eternal summer" its (half concealed) marble walls"—and got a house painter to do the plain subject, we were ready to begin work, turn out your Dick and Harry by the rose-tinted dozen, all as visitors to that wire-work painted Italian lake. I had not then learned the value of suggestive mystery, nor did I do justice to the imagination of our public. I considered then that a fact could not be too plainly told—a mistake often committed by ardent youth.

We changed our operators rapidly. Some had been old positive men, who had no sympathy with the negative system, therefore, out of principle, spoilt all the negatives they took; some had a weakness for ardent spirits and strong tobacco while at work, and, in consequence, made mistakes with their solutions; others, again, developed such an extraordinary appetite for gold and silver, that the most profitable business in the world could never have supplied the baths they required to go on with. We tried a number of wandering workers, who having pawned their own stock-in-trade, came with arms out at elbow, and stayed with us just long enough to do away with the most of our stock as well as feebly growing trade; yet the old man held out, tried another and another, and sunk a lot of money in that glass-house, before he eventually came to the conclusion that it would be much more satisfactory and less expensive to devote it entirely to plants and the growing of grape-vines.

While those experiments were going on, I was picking up some stray crumbs of knowledge. My artistic instincts and a fair education made me revolt against that instrument of torture, the head-rest, and try to pose the sitters a little more naturally than the regimental rule so rigidly adhered to. Of course, the time required for the sitter to remain steady in those wet-plate days necessitated a rest of some sort; so, considering all things, I suppose they took portraits then pretty respectably; one point to be specially regarded with regret being, that the young photographer had more chances of learning the details of his trade thoroughly, than be has now with all the facilities for ease and comfort in the prepared dry-plate processes, for I contend that in all trades and professions a man to be thorough ought to learn the way to prepare his materials from the very foundation, as well as to be able to work with them after they are ready for his hand, as the old masters did with their canvases and colours, and the old positive men with their collodion and other chemicals.

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* Abstract of paper read before the London and Provincial Photographic Association.

In those early days photographers did not trouble themselves much about light and shadow, *i.e.*, the subtilties and refinements of light and shadow. To me, an artist, the sight of a good Daguerreotype with its silver lustre, soft light, and indefinite masses of shadow, is infinitely superior to the crude attempts at carte printing in its early stages. The finest studio work of to-day harks back to those chance effects of imperfect knowledge or time-workings, as the great painter strives to cultivate the freshness of early attempts, or the mellowing upon the canvases of the old painters. I have seen effects hit by chance from young pupils, who regarded them as failures, through want of experience, which I would have given a lot to be able to imitate; and so, the longer a man lives, thinks, and works, the more eagerly he watches the immature attempts, and the more he can learn from seeming failures; for when a man is struggling with all his might to get an object, he is wrestling with an angel, as Jacob did, and though he may be lamed, as Jacob was lamed, yet the failure is so illuminated with a divine light, that success may be read between the lines. He thinks he has failed, and that the ground is strewn only with the shattered pieces of his frail armour, whereas it is covered with the jewels which he has torn from his mighty antagonist; as he lies back panting and oblivious from exhaustion, he can see nothing of all this, but to the onlooker it seems a triumph, to the after-gleaners it means success.

You all know from experience how photography has grown, what grand strides it has made year after year, and how it is marching on; first a shadow on a metal plate; an impression upon glass, when all art attempted was a little coloured powder to give it a life-like look; a staring print upon paper, where art sometimes stepped in and painted over. Then the modelling upon the negative, where art must reign supreme, where anatomy must be studied, and mind dominate; and which, as far as I can see, has no ending in the way of possibilities. There is no need for a man to use paints and canvasses to write artist, in the fullest sense of the term, after his name, if he is master of the art of manipulating a negative; here art begins after the posing, and has a delicate and very great mission to fulfil.

(To be continued.)

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BLEACHING DRAWINGS MADE UPON A PHOTOGRAPH AND THE MAKING OF A SUITABLE PHOTOGRAPH.

BY W. W. BODE.

Reading in one of your late issues of a method of bleaching away a photograph made on good Bristol board, after the same had been worked over by the artist, so as to admit of its being reproduced by photo-engraving processes, recalls to my mind many of the unpleasantnesses encountered in attempting to bleach drawings made upon a photographic print. The principal objection which presented itself was the dinginess or yellowness of the paper after bleaching, notwithstanding the precautions of having it thoroughly washed, and even after repeated applications of flowing with the bleaching solution, made after the well-known formula of about one quart absolute alcohol to one ounce bichloride mercury.

The dingy yellow-brown on the paper not permitting a strong black and white negative to be made, would be fatal to a good reproduction; if the drawing happened to be one with a large proportion of shadows, the dinginess increased proportionately, and more so where the drawing would take a couple of days or more to complete.

To remedy these difficulties I resort to the following method, which has always given me clean white results, and one which can be relied upon.

Procure good plain paper, salted, and float the same on a silver bath, made as follows:—

Distilled water	9 ounces
Nitrate of silver..	1 ounce

Dissolve the silver in the water, and separate 3 ounces of the solution from the rest, to which add liquor ammonia until the oxide of silver formed is re-dissolved and the solution is again clear. Then add it to the remaining 6 ounces of solution. Oxide of silver will again be formed, which can be allowed to settle to the bottom, or decant and filter same.

Give sufficient time in printing to get out all the detail, but do not print very strongly; thoroughly wash until the print becomes red (do not use warm water); when the excess of silver has been thoroughly removed by several changes of water, place the same in freshly-made hypo; let it be rather weak and about equal proportions of hyposulphite of soda and good bicarbonate of soda; it should remain in this solution about ten or twelve minutes only, and not longer than that time; you desire to fix the image temporarily, and not permanently; thoroughly wash the same in several changes of clean water, and then mount on cardboard.

The drawing should be made as soon as possible after the paper is thoroughly dry, for, if kept several days, the image will begin to show signs of dissolution. After the artist has outlined enough for his guidance, flow on the bleaching solution (alcohol 40 ounces, and bichloride of mercury 1 ounce) as you would collodion, and in fifteen minutes you will have a pure white paper without the slightest trace of a photographic substratum.—*The Lithographer.*

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Proceedings of Societies.

The Photographic Society of Great Britain.

A technical meeting was held at the Gallery, 5a, Pall Mall East, on Tuesday last, the 22nd inst., H. Sebastian Davis in the chair.

A faded or soiled Daguerreotype was handed round, and suggestions as to the best treatment were asked for.

W. E. Debenham said that although treatment with a solution of cyanide of potassium is generally the best, in this particular case he recommended the use of dilute hydrochloric acid.

C. Goldborn handed round a series of negatives having upon them spots of various kinds, and a long conversation ensued.

The mounting of prints was then discussed, and each one of the fourteen persons present related his experience.

A question was then asked as to the best way of securing very distant mountain effects; and

A. Spiller said he thought it best to either use isochromatic plates, to endeavour to accentuate the difference between blue and white by the use of a yellow glass over the plate, or by some equivalent device.

The **Chairman** exhibited a system of levelling screws for gelatine plates.

London and Provincial Photographic Association.

A meeting of this Society was held on Thursday, the 17th inst., J. Traill Taylor in the chair.

W. England showed a portable electric dark room lamp, which he found perfectly satisfactory after careful trial.

A. Cowan suggested the employment of a translucent screen in order to diffuse the light more efficiently, and

J. J. Smith recommended an alteration in the position of the carbons, so as to reduce internal resistance.

The **Chairman** then called upon Hume Nisbet to read a paper entitled "Where Art Begins" (see page 829), and in doing so paid a graceful compliment to Scotch artists, who had always been in the front rank among photographers; they, as a Society, held out the right hand of fellowship to their brethren. The paper was listened to with very great interest. At the termination the Chairman invited a discussion. Referring to natural attitudes and objects in nature, he said that, according to Luther, objects should be painted as they ought to be, and not as they are.

W. Cobb proposed the paper should be printed and circulated, as he did not feel that he could make any remarks at present on so comprehensive a paper.

W. England, speaking in reference to the subduing of whites sky blue over head, form a constant series of pictures which are never twice exactly alike. The glistening snow in winter, the frozen waterfalls, the rocky gorges from which huge icicles are suspended, the pine trees with their snowy cushions, and the remains of the huge avalanches which usually fall in the wild defile of the Züge, form material for many strikingly beautiful pictures, while an occasional tobaggon or sledge lends interest and animation to the view. Wiesen can be reached by carriage in six hours from Coire, and the well-known health resort Davos-Platz is two hours' drive from Wiesen.

IN WINTER.

How enjoyable a hard-worked Londoner would find it to come to this district for a holiday of even a week or two! December, January, and February are our best months, and from sunrise to sunset both hale and invalid alike can be out of doors, either basking in the sunshine, or skating, tobogganning, sledging, or walking. How envious would the stay-at home friends of the traveller feel when he returned to England, invigorated by the bracing but windless climate, and his portmanteau crammed with negatives of white and sunny valleys, and ice scenery of varied and wondrous beauty!

THE APPEARANCE OF THE IMAGE DURING DEVELOPMENT.

BY F. C. BEACH.*

Those who commence the practice of photography are frequently puzzled over the problem of the proper development of the plate, and such questions as "How am I to tell when the development is complete?" "What is the proper time to stop?" "How am I to judge when the details are fully out, and to know when the plate has sufficient density?" are heard on every side.

A VIEW FROM WIESEN.

With a view to enlighten those who are in need of information on these questions, I will relate the manner of working which I have adopted, knowing that it is not perfect, but at the same time I have reason to believe it may be of some benefit. By consulting the various guide books relating to photography much useful information can be obtained regarding development; but how is a person who never saw a plate developed going to know when to stop? He is told, as soon as the details appaer well out, then to stop; but he cannot judge correctly on this point until he has developed and lost several plates. To his mind the details might be out with the shadows all white, or the entire plate might be dark brown, and the film one mass of fog. Either case could consistently occur, and he not be the wiser whether they were right or not. Therefore, it seems to me the study of the appearance of the image during development is of special importance to beginners, and more specific details regarding it should be put in our guide books. Experience is conceded to be the best book. At the same time it is possible to give certain prominent hints, which are sure to be useful to anyone.

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* Read before the Society of Amateur Photographers of New York.

Having been accustomed to develop, some years ago, under a liberal quantity of yellow daylight, when using the wet process, and then experiencing no trouble whatever in quickly flashing out the image under the old iron developer, I was naturally cautious when I was told that the new gelatine plate would fog under that brilliant light, and that the development must be carefully watched, and certain strict injunctions about admitting white light through crevices of doors, &c., be heeded. So I obtained some of Carbutt's ruby paper and covered it very carefully over my yellow window. I was then working under a great abundance of diffused red light, which, according to some of the latest experiments, must have been quite non-actinic, coming, as it did, through yellow-red combined.

To take the exposed plate out from the holder, lay it in the tray (for I had always developed the wet plate by holding it at one corner with my hand), and pour on the prepared developer of iron and oxalate, seemed novel to me at that time. I soon found patience was a prime necessity, and after waiting for five minutes the image commenced to appear. I imagined the exposure had been too short—that I had overrated the supposed extraordinary speed of the plate—hence I added more iron.

But when I had the plate well developed, the question arose, "How am I to tell as to its density?" The ordinary advice is to hold it up to a lamp and look through it, but I was using ruby daylight, and had no need of it, and I found it impossible to look through the plate; hence I was all at sea as to density, and only judged from the surface opaqueness of the blacks, or what is commonly termed high-lights, that it would be right after fixing. And here comes another uncertain element in gelatine plates: if the development has been too short, the plate will fix out too thin, and the supposed intensity will disappear. How must we develop to know when the plate will fix out right? One person will tell you, continue the development until you can see a greater portion of the image on the back of the film, when you look at it by reflected light on the glass side.

I have found this a very good guide in many cases, even superior to looking through by transmitted artificial light, for you are certain then that every portion of the film that has been affected by the actinic light has been acted upon by the developer, and will remain after the plate comes out of the fixing bath.

You ask: "When this condition is reached, what is the surface appearance of the film?" In a majority of cases, if pyro is used as a developer—which is what I advise—the film will have a slaty-brown colour all over, not quite as dark in the deep shadows as in the other portion, but it will be perceptible to the eye. Furthermore, the unexposed edges of the plates behind the rabbet of the holder will perhaps be a very light brown. Much depends upon the length of development as to this, and the quality of the plate. Ordinarily the edges should remain white throughout development, but when they do slightly turn, you need not fear but what you will turn out a handsome, clear negative.

Another will say: "You cannot judge this plate by looking at the back." When the whole surface of the film is well brought out, development should cease, though it appears all white on the back. I have had plates of which this statement was true, and have found them more difficult to judge by reflected light, regarding their density, than any other. Viewing by transmitted artificial light is here a necessity, and is the only way to tell when the development has been carried far enough.

By holding the negative up to a certain standard oil or gas lamp, distant about three inches, for a moment, the eye can quickly judge whether there is any solid detail in the shadows, or sufficient opaqueness in the high-lights. And for anyone using a brand of thickly-coated plates, where profuse ruby daylight is preferred during development, I would advise the employment of a lamp which could be kept burning low, and turned up only as you wished to examine the state of the negative.

By this means you can familiarize yourself with the appearance of the plate in the different stages of development, and soon learn when to stop.

One manufacturer has told me to continue the development, in using his plates, until the white rabbet edges of the plate commenced to turn slightly, reasoning that all the detail that it was possible to bring out was out at that stage, regardless of the appearance of the back of the film. I found this a good guide, but by continuing the development further, though the surface appeared quite dark, I obtained a negative more dense, and just as clear.

It takes some experience to tell by the ruby light, as it is reflected upon the negative in the developing tray, whether the details fully appear on the surface, for the reason that the light itself is so poor in illuminating power. Consequently, beginners are often deceived.

The moment the prominent objects appear to be fully out, the plate is at once removed, and, after fixing, the operator is disappointed at finding so much that is missing. My experience is that it is better to have the image appear at least one-third darker by the ruby light than you think it ought to, in order to secure a good negative afterwards. Sometimes we are deceived by the apparent turning of the rabbet lines on the edges, which is really due to the reflection of the red light from the sensitive film, and to the red colour of the developer. In the development of paper negatives, it seems to be much easier to tell by the surface appearance when it is time to stop, for we have a white background, as it were, similar to the effect of a ground or opal glass behind a transparency, which tends to bring out more the delicate details in the shadows, causing them to be more easily seen than with the ordinary plate. Furthermore, the coating of the sensitive film on the paper is thinner than that usually put on the glass, and as the developer acts upon both sides of the film at once, through the paper on one side and direct on the other, a considerable portion of the prominent details of the picture can be seen by looking upon the back of the paper by reflected light when the development is completed. The developer also acts very evenly upon the paper. There is no danger of air-bells or frilling, and it is remarkable with what ease and safety from four to half a dozen or more negatives can be developed in one tray, with one developer at a time.

Supposing from ten to fifteen instantaneous exposures have been made in one day, and it is desired to develop them rapidly. Cut off half a-dozen sheets at a time, and immerse them one by one over each other in a pan of water; then turn the film side up, drain off the water, and pour on the developer, weak in the alkali, increasing it by degrees until the development starts. You have the whole matter then under your control, and can examine each negative as leisurely as if you were toning, and you have plenty of time to manipulate the developer to obtain any effects you desire. It was not until I actually tried it, that I realized the pleasure and satisfaction to be obtained in developing these paper negatives.

I made three successive exposures on the same object, using the smallest stop, giving exposures of five, ten, and twenty seconds, developing all in one developer in one tray. I commenced by using a small amount of alkali, and when the twenty second negative was finished, I added more alkali, and brought up the other two to good density. I was therefore surprised and delighted to notice the latitude allowable. Paper negatives can be dried very easily, so as to leave as smooth a surface as glass, after the hypo has been eliminated, by first putting a drop of any kind of oil on the glass, and apparently rubbing it off clean with a piece of cloth or paper, then laying upon this prepared surface, face down, the negative, pressing out the air-bells with the finger, or squeezeeing the back with a velvet rubber squcezee, leaving the negative to dry. In place of glass, hard rubber can be used without oil.

Both sides of the glass or rubber can be utilized. When dry, the negative is seized at one corner with the fingers, and pulled or peeled off the glass. It presents a beautiful polished surface, which will remain until the paper is either oiled or mounted. I have one or two specimens to show you.

I have recently experimented further with developing by two solutions. I put two plates in a solution of pyro, four grains to the ounce, for three minutes, then poured it back into the graduate, putting on the alkali. When the development was complete, the plate was too thin in the high-lights, so I poured off the alkali, washed the plates with water, and put on the original pyro solution, strengthened up to about eight grains to the ounce. I simply let the pletes soak in this pyro solution for half an hour, and, to my surprise, their density had greatly increased, and I obtained two soft, clear negatives.

This experiment leads me to the conclusion that, in developing with two solutions, it is better to soak the negatives for two or three minutes in a very strong pyro solution—as much as twelve grains to the ounce—than a weaker one.

But in case sufficient density is not obtained after the alkali has acted in bringing out the image, we have the satisfaction of knowing that it can be produced, without in the least fogging the plate, by simply soaking the latter for a long time afterwards in the pyro solution.

We thus have a means, perfectly under control, of improving the negative and rectifying any errors which might have been made during the first part of the development.

In conclusion, let me say that the development of the negative is to me, as I know it must be to every sincere amateur, the most fascinating part of our work. Under, or too short, development is usually the difficulty beginners have to contend with. My advice to them is, commence with a weak alkali solution, increase it as is necessary, and take plenty of time to bring out the picture; you will then, allowing that the exposures have been within bounds, undoubtedly succeed.

PHOTOGRAPHIC APPARATUS AT THE ENGLISH PATENT OFFICE.

BY CHAPMAN JONES.*

Baths in General and Washing Troughs.

There are a few matters worthy of notice, in addition to the details given in the preceding section.

Baths have been constructed of a variety of materials. Daguerre and Niepce (see M. Berry, August 14th, 1839) used tinned copper trays in the preparation of Daguerreotypes. Wooden baths, but with glass bottoms, are described by J. P. Bourquin (January 18th, 1884), and P. A. le Compte de Fontainemoreau (April 7th, 1854) talks of an apparatus "of pans with edges perfectly flush, resting on a plate of glass," for treating paper with liquids "by absence of any intervening atmosphere, light, dust, &c." Gutta-percha was used at an early date, and J. Knight (April 6th, 1861) uses thin gutta-percha covered with paper, fabric, or other material, and so gains in economy and durability.

The use of yellow or orange glass, in connection with baths, is referred to by many inventors, the coloured glass being as eye-pieces, a sliding-cover, bottom as well as top, &c., to enable development to be performed in daylight. J. Purnell (April 9th, 1857) appears to be the first who registered this idea, though a box, looked into through yellow glass windows, had been used before then.

L. J. M. Daguerre and J. I. Niepce (M. Berry, August 14th, 1839) uses a hook of tinned copper to raise the plate out of the bath. J. P. Bourquin (January 18th, 1854,) stands his baths on levelling-screws; and P. I. A. Gaudin (July 13th, 1855) has an outer case or jacket to contain warm or cold water, to keep the bath at the most favourable temperature.

A bath rocked by machinery, in one or other of the usual methods, is described by H. L. D. Marsden (December 4th, 1868), and gradually leads us to consider washing-troughs; that is, apparatuses for washing negatives or prints, that are not mere vessels or baths.

J. Garnett (April 11th, 1862) has a box with a perforated top and bottom, and divisions for different sized prints. This is submerged in a vessel of water, and worked up and down therein by a handle or otherwise. Various forms of centrifugal apparatuses are described by J. E. Grisdale (August 23rd, 1861). The prints are secured round the surface of a drum in piles, the individuals being separated by layers of wire gauze or pieces of fabric, and the whole is alternately wetted, and dried centrifugally. The drum revolves in a trough. A disc may be used instead of a drum. T. Reissig, for W. Reissig (March 10th, 1865), also drives out the washing water centrifugally, but uses a folding frame or cage, "covered with lattice work," within which the prints are confined. J. Beckett (September 16th, 1872) tones, fixes, and washes prints by securing them with elastic bands on to a cylinder that revolves in a trough containing the required liquid or solution. Thus the prints alternately dip into and out of the liquid.

Enlarging Cameras.

Just as a reduction of a picture is obtained in the ordinary way, as understood by the expression "photographing it," so an enlargement may be obtained if the thing photographed is brought near to the camera, and the sensitive surface moved sufficiently far from the lens. This, the simplest method, is still in use, and was referred to more than four years before the "solar camera" of Woodwad was described. J. Brett (July 8th, 1853) very curtly describes such an apparatus for producing positive pictures on sensitive surfaces. P. C. Stortz (October 23rd, 1858) mounts the negative or positive transparency in the open back of a camera in daylight, and points the lens into the dark room. The magnified image is received on a suitable surface, supported on an easel, but this surface is not sensitive; the image is gone over with indian-ink, chalk, or pigment. E. Edwards (March 23rd, 1867) uses two cameras, front to front, and supports the negative in the open back of one of them. The back of the other camera is for the sensitive surface. J. Simpson (May 25th, 1867) has an ordinary dark-slide at the wide end of a telescopic conical tube for the sensitive surface, otherwise his arrangement is like the previous one. J. Petrzywalski (June 7th, 1867) uses a box adjustable like a sliding-body camera. The negative and sensitive surface occupy opposite ends, and the lens between is supported on a sliding platform. Three lamps, with reflectors, illuminate the negative. W. Morgan-Brown for J. H. Hermagis (March 13th, 1875) describes the use of a folding, wooden-bodied, portable camera, for enlarging, by fixing the negative in the ground-glass slide, and supporting the sensitive surface on a separate screen.

The disadvantage of the methods just detailed is the difficulty of getting the negative evenly lighted, the consequent need of an illuminated surface, and the uselessness of direct sunlight or any other powerful light for the operation. By such methods it is therefore practically impossible to print enlargements on ordinary albumenized paper. The use of a condenser between the light and the negative overcomes this difficulty, and enables one to use the sun or an electric light by causing convergence of their diverging rays. A. V. Newton, for D. A. Woodward (September 22nd, 1857), describes an apparatus consisting of a reflector, which directs the sun's rays through a hole in a darkened room on to a condenser, and thence through the negative, which gives an enlarged image by means of an ordinary photographic objective. The objective and the negative are adjustable by racks and pinions. P. A. le Compte de Fontainemoreau, for A. Liébert and J. Lafon-Saint-Cyr (February 11th, 1864), gives a similar arrangement, but without the reflector; and the various parts are all enclosed within a taper case, which is mounted, so that the condenser can easily be kept always pointing to the sun. The condenser is an achromatic combination with separated components, and will be included in the section on Lenses. A heliostat may be used with the apparatus. H. A. Bonneville, for D. C. E. van Monckhoven (April 21st, 1864), describes an enlarging camera of the sort under consideration, but the novelty lies in the lenses used. F. H. Warlich and J. W. T. Cadett (November 21st, 1877) use an apparatus like a magic lantern, with an electric light, and if necessary the transparency may be cooled by water circulating around it. The condensers also are kept cool by water. F. H. Warlich (May 21st, 1880) has three enlarging apparatuses round one electric light. The moveable parts are worked to and fro on travelling tables by racks and pinions.

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* Continued from page 772.

A. Browne, for P. A. Despaquis (March 31, 1873), gives a method for perfecting enlargements by receiving the image on a ground glass screen, touching up this image, and then exposing the sensitive surface close behind the screen. C. L. van Tenac (July 7, 1873) describes an amusing invention, which projects images at six yards with a magnification of 512,000 times! He says it is "a useful object, either for distraction or work." This "night microscope" is an arrangement of reflectors and lenses that fits on to the chimney of an ordinary lamp, or two lamps may be used. The enlarged image may be received on a sensitive surface, &c., &c. A large apparatus with mirrors is described by W. F. Humphries, for J. Thom (August 21,1878), which projects enlarged images of opaque objects—pictures, for instance—either direct or reversed, and is used with daylight or artificial light.

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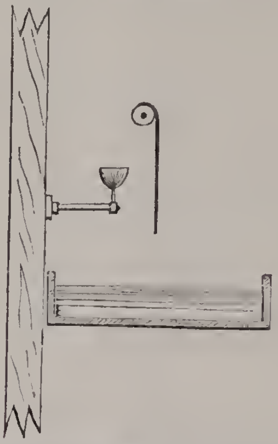
Notes.

Those who have to tone many prints, and wish to turn them out without much variation in tone, may do well to adopt a plan which we saw in operation at the printing works of the London Stereoscopic Company.

An opaque blind hangs so as to screen the eyes of the operator from all direct light, and, moreover, this screen is so placed as to shade about one-third of the slate tank in which is the toning solution. The toning is invariably done by gaslight. In reply to a question, the toner informed us that it would be impossible to get such a uniform tone by working in daylight, and that when a slate tank is used, the strain on the eyes is far less than if a white dish were used.



At the same works, the Woodburytype process is carried on with very great success, and economy of labour. It has often surprised us that there are so few firms in the country who do large orders by the Woodburytype method.

As a curious example of what is possible in the way of instantaneous photography, *La Nature* reproduces a photograph of M. Lumière in which a man is shown in the act of dashing the contents of a pail of water against a wall. The water spray is sharply defined, the exposure having been about one three-hundredth of a second.

Photographers' exaggerations are, as a rule, far behind those which the angler tells on his return from fishing expeditions; but that photographic amateur who describes the opening of his slide in full daylight, and the subsequent exposure in the camera of the plate, must excuse us if our belief stops at this point, and refuses to follow him as far as the development and the production of good negatives.

The good luck which, as a rule, attends the photographer when he chances to find himself in a court of law has deserted a Stockton professional, who was summoned by a lady for the return of money paid into a portrait club, on the ground that the photograph of her husband was not like him. It seems that the portrait in question was a coloured enlargement, and that somehow, in the course of production, a squint was imported into one of the eyes, whereas no squint was apparent in the original. We learn from a report which appeared in the *Globe* that the verdict was given against the photographer, who was ordered to refund twenty-two shillings, and pay the costs; but there are one or two points which we should like to see cleared up. We do not understand why the wife proceeded against the photographer and not the husband, unless indeed the wife considered herself specially aggrieved by the imputation that she possessed a squinting husband. It would be interesting to know, too, how the judge decided. Did the husband present himself in the witness box and submit to the scrutiny of His Honour in respect to his alleged obliquity of vision? What defence also did the photographer make? Why did not he contend that the camera had done its work well, but that the fault lay with the colourist, whose brush had erred? Perhaps he did so argue, and if his contention be right, has he not a remedy against the artist? But whether this be so or not, a dangerous precedent has been set up; and if photographers who go in for portraits are expected to please their sitters, the relatives, and their friends in every case, an impossible task is set them.

By the way, the *Globe*, in a comment on the case, supposes the portrait club to be "an institution more or less resembling a goose club." Does our contemporary really imagine there is any analogy, so far as procedure is concerned, between the two, or is the comparison with *malice prepense?*

The Admiralty are progressing. They have just discovered that photography might be useful—a fact that has long been patent to the military authorities. They have started with the notion that commissioned ships when completely fitted out should be photographed, and they suggest, in a circular sent to the superintendents of the various dockyards, that "a general broadside view, a view from forward, and a view from aft of each ship should be taken before any vessel leaves a Government fort." The superintendents are requested to report whether the suggestion can be conveniently carried out. It is to be hoped that before the superintendents report they will call in the assistance of an expert. We are not aware that any government dockyard possesses what it should possess—namely, a photographic staff.

The conclusion which Mr. Ranyard, the well-known astronomer, has arrived at—namely, that the photgraphic plate is much less sensitive than the eye for detecting small differences in illumination, will, we are inclined to think, be disputed by many. Mr. Ranyard's experiments, which he detailed at the last meeting of the Royal Astronomical Society, consisted in placing] plates by various makers in dark slides, and exposing them in steps by withdrawing the shutters at intervals of seven and a half seconds. He found that under the most favourable circumstances no difference in tint after development could be detected after the nineteenth step, while with some of the common plates, all difference of tint was lost at the sixth step. Mr. Ranyard was therefore of opinion that there was no chance of photographing the corona under ordinary daylight conditions, as he did not think the corona acted much more intensely on the photographic plate than ordinary sunlight. It is worthy of note that both Captain Abney and Mr. Common appear to dispute Mr. Ranyard's inferences; and, indeed, as no standard of vision, either as to accuracy or delicacy of perception, can be established, it is difficult to see how a comparison is to be instituted between a mechanical process like photography, and physical conditions, which are rarely alike in any two persons, and are also subject to variations in the same person, according to health and temperament.

Dr. Waugh has just described in the *Lancet* two very serious cases of poisoning by bichromate of potash. The first case was that of a French polisher who swallowed half-an-ounce of the salt (which is largely used in this trade as a staining agent) in solution. An emetic of mustard and water was administered within five minutes, and this saved his life. The second case was that of a woman who took a similar quantity, and died in great agony fifty minutes afterwards. Only eight such cases have been previously recorded. As bichromate of potash is not mentioned in the Poisons Act, and as it is now in common use for electrical purposes and in photography, it is well to note its very dangerous properties.

Lieut. Greely's narrative of Arctic exploration will be published in January by Messrs. Bentley. It will include 100 illustrations, mostly engraved from the photographs taken by the daring operator who accompanied the American party. The negatives came back, but not the man who took them.

Photographers and tourists will rejoice to hear that the mighty rock called the Buckstone, which fell from its perch in the Wye Valley last June, has been replaced. The cost of doing so was about £500.

In the new House of Commons, science will be well represented by Sir J. Lubbock (London University), Sir H. Roscoe (the only Liberal who was elected for Manchester, Professor of Chemistry in the Owen's College), Sir E. Reed (Cardiff), and Dr. B. Foster (Chester), who is Professor of Medicine in Queen's College, Birmingham.

The Lords, however, are not going to be behindhand in matters scientific. Setting aside Lord Rayleigh, who was Senior Wrangler, and has recently presided over the British Association, we hear that Lord Salisbury intends soon to publish in one of the magazines the results of some recent discoveries he has made in chemical analysis.

W. S. Gilbert turns photography to novel and dramatic account in the short but effective "Story of a Dry Plate" (page 828) he tells this Christmas. The nature of his tale is briefly this. A young fellow falls deeply in love with a girl on board a P. and O. steamer; becomes her accepted lover, and having a camera with him, photographs her during the voyage on a dry plate, which, as he can find no conveniently dark place for its development, he puts carefully by for future manipulation. In due time the steamer arrives at the Far East; he parts from his *fiancée*, and on returning to England, after a year or two of vicissitude, is horrified to hear of her shipwreck and death. Suddenly he bethinks him of his dry plate taken long ago, and now the only link between him and his lost love.

Then, in a powerfully written passage, Mr. Gilbert describes the eager anxiety and feverish caution with which the hero of the tale proceeds to shut himself in a darkened room, and to effect what seems to him well-nigh like calling the dead back to life. With true dramatic art he is made to narrate the progress of the development, and how at length, as every feature he had learned to love slowly appears on the plate, the door is excitedly opened, his valet rushes in, and ere he can hotly upbraid him for the irreparable mischief he has done, tells him the happy news that his *fiancée* was saved by a passing vessel from the wreck, and is alive and well in London waiting to receive him. The story is very brief, but, like all that W. S. Gilbert writes, it is distinctly original, whilst its purely technical photographic details are given with an accuracy which leads us to suppose that the author of the *Mikado* is himself an amateur photographer. Be this as it may, he has certainly made a very interesting sketch out of his "Dry Plate."

Patent Intelligence.

Specifications Published during the Week.

976. Alfred Pumphrey, of Stanhope Street, Birmingham, in the County of Warwick, Manufacturer, for "Improvements in tripods for photographic purposes, applicable also to other similar uses.—Dated 23rd January, 1885.

The patentee says:--

My invention has for its object improvements in tripods for photographic purposes, applicable also to other purposes, by which means collapsing or telescope tripods are made much more secure than formerly.

I make my tripod legs from several pieces of metal or other tubing, and I form, at the ends of each length, either at the outside or the inside, a screw which may be put in as a bush, or it may be formed in the body of the tube itself—that is, one end of the tube has a spigot thread, and the other a corresponding socket thread, so that one will screw into the other easily, and such threads are better of a coarse kind. When the inside spigots and the inside of the sockets are screwed, the lengths will collapse or telescope into a closer compass than when screwed outside, because, in the latter case, there would be a collar outside, and the tubes must be reversed in packing them into one another. These tripods, so secured at the points, offer considerable advantages in bearing more weight in proportion to their size, and in their general firmness and stability. It will be seen that these legs are suitable for many purposes besides photography.

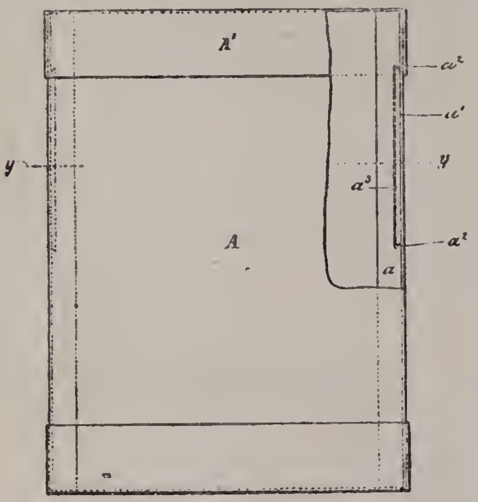
1120. Frederick Woodward Branson, of Leeds, in the County of York, Pharmaceutical Chemist, for "Improvements in the construction of photographic cameras."—Dated 26th January, 1885.

The Patentee says—

The object of my improvements is to provide a more convenient arrangement of adjusting photographic cameras for focussing purposes. For this purpose I provide within the base board thereof a frame, fitted so as to slide longitudinally therein. This frame is moved outwards or inwards by a pinion actuated by the operator and gearing into the rack under the aforesaid framework. By sliding the framework outwards an extension of base is provided. Above this framework the expanding portion of the photographic camera is placed. On the upper surface of the framework is provided another rack, into which is geared a pinion mounted in bearings applied below the body of the camera. By this arrangement of rack and pinion the operator may expand or contract the photographic camera for focussing purposes.

Patents Granted in America.

331,385.—John H. Durham, Chicago, Ill., assigner of one-half to Lawrence C. Moore, same place, for "Shipping-case for photographic dry plates."—Filed May 29, 1885. (No model.)



Claims.—1. A shipping case or box for photographic dry-plates provided with a series of adjustable separators permanently supported within the box, substantially as and for the purposes specified.

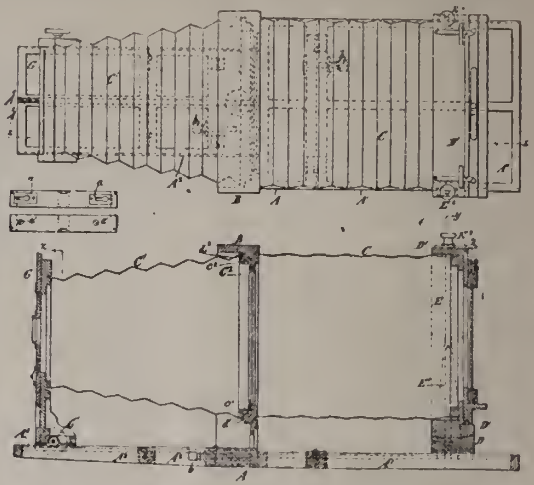
2. The combination, with the box or case, of back pieces attached to its edges, and separator-strips adjustably mounted on the back pieces, substantially as and for the purposes specified.

3 The combination, with the box A, of the back pieces, a^1 undercut at their ends, and the separating strips a, having recesses a^3, to receive the back pieces, a^1, upon which the strips are adjustably mounted, substantially as and for the purposes specified.

331,448. George H. Ripley, Brooklyn, N.Y., assignor to the Scovill Manufacturing Company, Waterbury, Conn. "Photographic camera." Filed March 6th, 1885. (No model.)

Claim.—In a photographic camera, the combination of a base-frame, an upright frame, B, erected thereon, and provided with lips d' d^2, a back piece adjustable along the base-frame toward and from said upright frame B, a body-section, C, extending from the back piece to the upright frame B, a front piece adjustable along the base-frame toward and from said upright frame B, and a body-section, C, attached to the front-piece and having secured to its rear end a frame, C^2, provided with grooves c' c^2, that are adapted to engage with the lips d' d^2 of the upright frame B, substantially as specified.

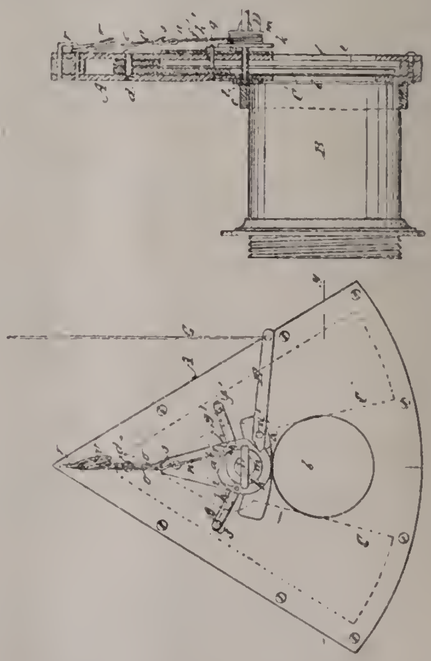
2. In a photographic camera, the combination of a base frame provided with a detachable forward section, an upright frame erected thereon, a back piece adjustable along the base frame toward and from the said upright frame, and a body-section extending from the back piece to the said upright frame, adjustable along the detachable forward section of the base-frame



toward and from said upright frame, and provided at the rear with means whereby it may be adjustably secured to the said upright frame, substantially as specified.

3. In a photographic camera, the combination, with a base frame having grooves in the sides, of a back piece composed of a base or lower section, having an arc-shaped top surface, an upper section having an arc-shaped bottom surface, and screws extending through both sections, and having attached upon the lower ends slides which enter the grooves of the base-frame, and are longitudinally rounded or curved to enable adjustments of the back piece with either side in advance of the other to be made.

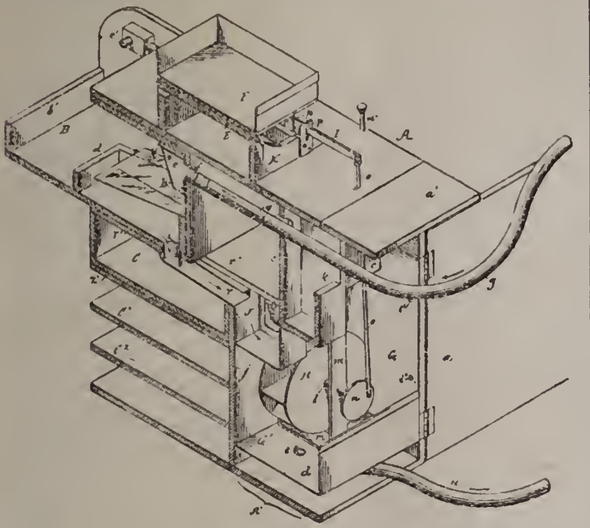
331,494. William C. Hadden, New York, N.Y. "Shutter for photographic cameras."—Filed September 14th, 1885. (No model).



Claim.—1. The rotable button or double crank D k, having opposite crank-pins i i and stops or notches a' a^2, arranged one in advance of the other, in combination with the catch E, a spring controlling the movement of the button in one direction, the pivoted reciprocating shutters C C′, and the links *h* *h′*, substantially as and for the purposes herein set forth.

2. The combination, with the shutter frame or case, of the pendant reciprocating shutters C C′. the rotable button or double crank D *k*, arranged between or within the space occupied by the shutters, and having crank-pins *i i* and duplicate stops or notches $a' \ a^2$, the links *h h′*, the pawl or catch E, and a spring applied to turn the button in the one direction, essentially as herein shown and described.

331,668. Horace F. Witmer, Philadelphia, Pa. "Apparatus for developing and washing photographs." Filed May 18th, 1885. (No model).



Claim.—1. The combination, substantially as herein described, of a bath for washing photograph-plates, and having an inlet and an outlet for water, a motor operated by water escaping from said bath, developing or fixing pan, and mechanism, substantially as herein described, whereby said motor is caused to give a rocking motion to said pan.

2. The combination, in photographic apparatus, of the washing tray B, having an inlet and an outlet for water, water-motor H, and a valve for opening and closing communication between said tray and said water-motor, all substantially as described.

3. The combination, in photographic apparatus, of the tray B, having an inlet and an outlet for water, water-motor H, a valve for opening and closing communication between said tray and said water wheel, and an overflow-outlet for the free escape of water from said tray when said valve is closed, all substantially as set forth.

4. The combination, substantially as and for the purpose described of tray B, having an inlet and an outlet for water, a water-wheel, H, and a tank or reservoir, J, communicating with said tray and said water-wheel, and having a valved outlet and an over-flow outlet.

5. The combination, with box A, of a tray, B, arranged to slide therein, having a perforated inlet-tank, *e*, and an outlet for water, and furnished with a flexible or extensible inlet-pipe, *g*, attached to the tank *e*, and free to follow the motions of said tray within the box, substantially as and for the purposes herein set forth.

6. The combination, substantially as set forth, with box A, of tray B, arranged to slide therein, outlet-pipe *i*, and stationary trough or spout *r*.

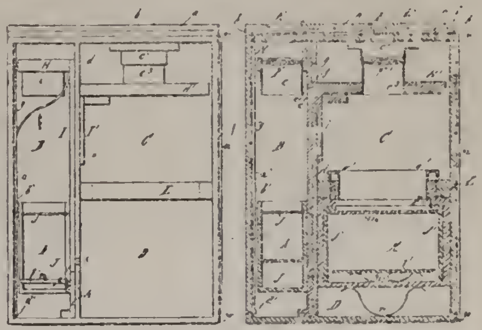
7. The combination, in box A, of sliding tray B, having an inlet and an outlet for water, trough or spout *r*, tank or reservoir J, spout *s*, and water-wheel H, all arranged substantially as and for the purpose herein set forth.

331,677.—George B. Brainerd, Brooklyn, N.Y., for "Photographic Camera."—Filed Dec. 2, 1884. (No model.)

Claims.—1. In a photographic camera, the focusing device consisting of telescopic tubes, a lens therein fixed, and a finder-lens, combined with a carrier and screens, substantially as described.

2. In a photographic camera, a focusing device consisting of telescopic tubes, a support therefor in a dark chamber, and a lens therein fixed, combined with a finder-lens in a separate chamber, and a carrier, substantially as described.

3. In a photographic camera, a lens-support in an exposing-chamber, combined with a lens-support in a separate finder-chamber and a carrier, substantially as described.



4. In a photographic camera, a lens-support in an exposing-chamber, combined with a lens-support in a separate finder-chamber, a carrier, and a removal finder, substantially as described.

5. In a photographic camera, a lens-support in an exposing-chamber, combined with a lens-support in a separate finder-chamber, a carrier, and a removable plate-box, substantially as described.

6. In a photographic camera, a lens-support in an exposing-chamber, combined with a lens-support in a separate finder-chamber, a carrier, a removable finder-box, and a removable plate-box, substantially as described.

7. In a photographic camera, a lens-support in a dark chamber, combined with a carrier and a removable plate-box, substantially as described.

8. In a photographic camera, a movable lens-support, combined with a carrier, a slotted partition, and a spring, substantially as described.

9. In a photographic camera, a separate plate-box and a separate finder, combined by a detachable joint, substantially as described.

10. In a photographic camera, a separate plate-holding box, and a separate finder-box, combined with a removable focussing-screw, substantially as described.

11. The combination of a finder-box and a plate-box united by a dovetailed or separable joint with a slotted fixture attached to the combined box, a slotted fixture attached to a photographic camera, and a focusing-screw, substantially as described.

12. In a photographic camera, a finder-lens in a finder-chamber and a photographic lens in a separate exposing-chamber, combined with a finder-box and a plate-box united by a separable joint, and a device for moving both boxes forward or backward, or retaining them in any position, substantially as described.

13. A fixed lens, a removable reservoir of plates in separate holders, and a slot attached thereto, combined with a removable focusing or retaining screw and a slotted fixture attached to a photographic camera box, substantially as described.

14. A focusing device consisting of a slot attached to a removable plate-holding box and a slotted figure attached to a photographic camera, combined with a focusing screw, and nut flanged to fit therein, substantially as described.

15. In a photographic camera, a plate-reservoir, smooth inside, with a flexible cover and a projecting nose, substantially as described.

16. In a photographic camera, the combination of a plate-holding magazine smooth inside, and having a flexible cover and a projecting nose with a partition or frame adapted to fit on said nose, substantially as described.

17. In a photographic camera, a plate-holding box with a projecting nose, a removable bottom, and a frame forming one side of an exposing-chamber, substantially as described.

18. In a photographic camera, a separate plate-holding box with a projecting nose, a removable bottom, a flexible cover, a flap and a spring, combined with a frame forming one side of an exposing-chamber, substantially as described.

19. In a photographic plate-holder, the combination of a flexible cover with a box open on one side containing a spring compress, and having a sliding bottom, substantially as described.

20. The combination of a double flexible cover with break-

joint seams with a box to form a photographic plate-holder, substantially as described.

21. The combination of a wedge-shaped flexible bag with a box to form a photographic plate holder, substantially as described.

22. The combination of a double wedge-shaped flexible bag with a box to form a photographic plate-holder, substantially as described.

23. The combination of a double wedge-shaped bag having break-joint seams with a box to form a photographic plate-holder, substantially as described.

24. In a photographic plate-holding box or reservoir, the combination of a plate-holder with thin edges and a flexible cover, substantially as described.

25. In a photographic camera, a plate reservoir or plate-changing box with a light-tight flexible cover, combined with a plate-holder having thin edges, substantially as described.

26. In a photographic camera, a plate-reservoir or plate-changing box with a light-tight double flexible cover, combined with a plate-holder having thin edges, substantially as described.

27. In a photographic plate-holding box, a wedge-shaped flexible cover combined with a plate-holder having thin edges, substantially as described.

28. In a photographic plate-holding box, the combination of a light-tight double wedge-shaped flexible cover with plate-holders having thin edges, substantially as described.

29. In a photographic-plate-holding reservoir, the combination of a flexible cover with a box adapted to contain one or more plates or plate-holders, and provided with a lining terminating so far below the top of the plates or plate-holders as to leave space to insert the fingers between the top of the plates or plate-holders and the inside of the box above said lining, and thereby grasp and withdraw a plate or plate-holder, substansially as described.

30. In a photographic camera, a plate-box or changing-box cover consisting of two pieces of opaque flexible cloth of the form shown, combined to constitute a wedge-shaped bag with break-joint seams, substantially as described.

31. In a photographic plate-holder or changing-box, a movable screen or dummy plate, in combination with a flexible opaque bag, substantially as described.

32. In a photographic camera, a plate box or reservoir, smooth inside and having a flexible cover, combined with plate-holders and a compress, substantially as described.

33. In a photographic camera, the combination of movable lens-supports, a carrier, and a finder with a plate-reservoir or plate-changing compartment, smooth inside, having a flexible cover, and containing plates in separate plate-holders compressed by a spring-compress.

34. In a photographic camera, a removable plate holding reservoir or changing-box with a projecting nose, a hinged or sliding bottom, and a frame forming one side of an exposing-chamber, substantially as described.

35. In a photographic camera, a plate-holding reservoir or changing compartment having an inner reduced lining, a flexible cover, and a spring-compress, and open on one side toward an exposing-chamber, substantially as described.

36 In a photographic camera, the combination of a flexible cover with a plate-changing compartment adapted to contain separate plate-holders, and reduced in size by an inner lining so arranged as to leave a space between the front and sides of the plates or holders near the top, substantially as described.

37. In a photographic camera, an exposing-shutter operated behind a false front and before the lens, and where it is visible before or after exposure, through the exposure aperture, coloured or ornamented to conform with the colour or design upon the front of the camera, substantially as described.

38. In a photographic camera, a flexible plate-holder cover constructed of two layers of flexible material glued together only at the edges, and not throughout, substantially as described.

39. In a photographic camera, a photographic lens in an exposing-chamber, and a finder-lens in a separate chamber, combined with a finder-box and a plate-box united by a separable joint, and a device for moving both boxes forward and backward, or by retaining them in any position, substantially as described.

40. In a photographic camera, a plate-holding reservoir or plate-changing compartment having a flexible cover and a spring-compress, and open on one side toward an exposing-chamber, substantially as described.

A TALE OF A DRY PLATE.

BY W. S. GILBERT,

Author of "The Mikado," "H.M.S. Pinafore," "The Pirates of Penzance," &c.

I am a junior partner in a large mercantile house. Certain irregularities had occurred in our Singapore branch, and I was despatched by the firm to investigate them, and to place matters on a more satisfactory footing. I need not go into details on this point, as they are irrelevant to my story.

I sailed by the *Kaiser-i-Hind* from Tilbury, accompanied by my valet. At the Liverpool-street terminus an elderly lady in widow's mourning asked me some questions as to the conveyance of luggage from the Tilbury station to the ship; she should have sent her luggage to the docks, but had omitted to do so. As I replied to her question, I saw that she was accompanied by a very beautiful girl of eighteen. There is no need to beat about the bush. I fell in love with her, there and then. It is a common-place way of putting it, but I don't know that I could make matters clearer by a more elaborate method of expression. As they and I travelled to Tilbury in the same compartment, we entered into conversation, as people will readily do who know that they are about to travel many thousand miles together. I learnt that the lady was a Mrs. Selby, widow of a Colonel Selby, who had died about six months since. Broken in health, and weakened by long weeping, she had been advised to take a sea voyage, in the belief that change of scene and beneficent sea air would do much to restore her to health, if not to happiness. As I happened to have met Colonel Selby on two occasions—once in London, and once in a country house—my acquaintance with his widow and daughter rapidly ripened into friendship. We sailed on a fine October afternoon, and by the time we were off the "Start" I had almost established myself on the footing of an old friend.

Pass over the voyage. It lasted five weeks, but it seemed like five days. I lived but in Clara's presence. I scarcely spoke to anyone on board except to Clara and her mother. People see more of each other, if they care to do so, in a few weeks' voyage than in a lifetime on shore, and before we reached Colombo I had declared my love to Clara, and she had accepted it. If there is unalloyed happiness on earth, it was given to us as we neared Ceylon.

Unalloyed, save by the thought that we were about to part for a time; for Clara was to go on to Calcutta, where her late father's brother was quartered, whereas I was to remain in Singapore for three months. We were to return to England at about the same date, and it was arranged that as soon as possible after our arrival we were to be married.

I have some *little* skill in photography, and I had brought with me a camera and some dry plates, intending to photograph any striking scenes that I might come across during the journey. By the aid of dry plates, photography, and especially travelling photography, is much simplified. The traveller can take a photograph, shut the plate in a light-tight box, and develop it twelve months afterwards if he pleases. There is no need to encumber oneself with chemicals; all the messy portion of the process can be done at home, in the seclusion of one's own dark room. I had not intended to take any photographs on the voyage, for dry plates are extraordinarily sensitive to the action of the faintest ray of light, and it was practically impossible to make my cabin dark enough to allow of my transferring plates from the dark box to the slides without absolutely spoiling them. But I happened to have left two plates in one of the slides, and before we reached our destination I devoted one of these to Clara, and one to Mrs. Selby.

We parted tearfully, but not unhappily. We were to meet in three months' time, and our lives were then to be passed together. I believe we were too full of happiness over this prospect to grieve very much over our parting. As the *Kaiser* steamed away for Penang, I kept the happiness of our next meeting steadily before me, and it served me in good stead.

The time passed slowly, but it passed. I had received two letters from Clara, written from Calcutta, full of life and hope and joy at the prospect before us. She was going to spend a month at Allahabad, and a fortnight at Bombay, and she was then to return to Marseilles by a Messageries ship, the captain of which was an intimate friend of the uncle with whom she had been staying at Calcutta. By this arrangement she would arrive in England about a month before me.

At length my sailing orders came, and on one of the happiest days of my life I set foot on board the good ship *Mirzapore*, in photographs, said one method often employed in Daguerreotype days was that of a black velvet screen, used to cover the strong lights during a portion of the time of exposure.

The **Chairman**: That was for the purpose of making them bluish white.

H. **Nisbet** strongly objected to patches of white, such as shirt fronts, large collars, &c.; he considered sitters should place themselves in the hands of the photographer, who would indicate the most suitable attire, and he was convinced the sitters would act upon the suggestions given.

A. L. **Henderson** thought if any photographer were to make such a studio, and dictate to his sitters in the way referred to by Mr. Nisbet, he would not do much business.

C. **Heinrich Trinks** congratulated the author on his paper, which he said was shown to be practicable by the artistic productions of Fritz Luckhart, of Vienna. He then narrated how a gentleman of high position wished Luckhart to photograph him according to his own idea, and Luckhart consented on the understanding that another negative should be taken according to the artist's ideas. Five thousand copies of this latter negative were sold, and only a few dozen of the former were ordered.

H. **Nisbet** remarked that if Rembrandt had given way to his sitters, he never would have created the demand for his work which he did.

W. **England** observed that in landscape work they were obliged to have recourse to art. He did not see how they were to leave out objectionable parts of a landscape by any alteration in the construction of the instrument. When travelling in America he usually carried an axe for the purpose of cutting away and making alterations in the foreground.

H. **Nisbet** admitted that he did not possess a thorough knowledge of the technics of photography, but something should be done to soften down ugly patches, or, if need be, obliterate them altogether.

C. H. **Trinks**, referring to Walter Woodbury's photograph of the Bay of Naples, with Mount Vesuvius in the background, said a shade was used to stop out the objectionable portions of the picture

H. **Nisbet** thought if any light passed through the lens its action would be general over the plate.

The **Chairman** said that very much could be done by stopping out portions of a negative in printing, and he knew one gentleman, a member of a club, whose pictures were always more artistic than any of the others for this reason.

W. **England** considered the selection of lenses of primary importance, and Cowan's method of lowering the camera had often a marked advantage for some foregrounds.

C. O. **Murray** said Mr. Nisbet does not recommend photographers to interfere with nature. He (Mr. Murray) had a great respect for nature, but it always had been interfered with by artists with the best results. Who had taken such liberties as Turner? Yet look at his results. Art was greater than Nature, and any improvement in that way was not objectionable. He should not object to eliminate trees to improve the composition. In many cases pictures from nature exhibit a want of composition, and of grouping. He did not think Mr. Nisbet e answered the question, "Where Art Begins." If a photo-her wants to do his work well, he must be an artist. The the photographer labours towards that end, the better. He did not think shirt fronts very objectionable. In many of Rembrandt's works he painted large collars. Regarding the toning down of whites, Mr. Nisbet would agree that wood engravers found nothing so difficult as putting in whites, high lights, &c., while the photographer had a great advantage in this respect.

H. **Nisbet** replied that the powers of the wood engraver and photographer were reversed in this respect: the former could not easily create light, and the latter could not create shadow.

W. **Cobb** did not think the author fully recognised the difficulties which beset photographers in their daily practice in the studio. Many of them had opportunities of studying their sitter's expression from the dark room window, and he thought a mirror in the exposing-room was the worst thing in the world.

A. L. **Henderson** said if he had to take his sitters with such accessories as usually surround him, he should never get premises large enough, neither did he think the perfect operator would ever be available.

H. **Nisbet** replied that if the photographer were an artist he could, with a few chalks and some canvas, make fresh backgrounds for every sitter without much trouble. He believed the photographer of the future would be an artist, who would study chemistry, anatomy, and physiology as part of his training.

A. **Cowan** remarked that a part of Mr. Nisbet's idea was carried out by the use of long or short focus lenses; he had noticed many cases where the one gave a much better effect than the other. Lowering a lens to within eighteen inches from the ground had been found beneficial.

H. **Nisbet**: That is doing just what any artist would do.

The **Chairman** then read a portion of an article by B. Tyler, of San Francisco, published in a recent number of *Anthony's Bulletin*, bearing on this subject.

Upon the motion of the Chairman a hearty vote of thanks was accorded to H. Nisbet for his able and admirable paper, after which the Chairman exhibited and explained the action of W. M. Ayres' "adjustable flange" for preventing light entering a lens at the diaphragm slit.

Upon motion it was decided to adjourn until Thursday, January 7th.

Hyde Amateur Photographic Society.

The usual fortnightly meeting was held in the Mechanics' Hall, Hyde, on Wednesday evening, the 16th inst.

After the preliminary business had been disposed of, the President, Mr. **Cheetham**, said that a general development by the members, as announced at the last meeting, would then take place, and asked those members who had brought exposed plates to come forward and develop them at the meeting.

The room was well lighted by seven ruby lamps, and the members proceeded to develop their plates. Those who had no plates looked on and made remarks. Four of the members developed with the ammonia developer, and two with Beach's potash developer. After the plates had been all developed and fixed, they were handed round for inspection.

Mr. **Pennington** showed one which he had developed with the potash developer, and he said that he had been experimenting for the last two months with this developer, and had been so pleased with it that he now used it exclusively.

Mr. **Batty** said that he had been using a cheap commercial plate lately, but had had to give it up, as he had been unable to get density. He had tried these same plates with the Beach developer, and had found it a great improvement. He also showed a plate he had developed at the meeting, and said that he was just beginning to use the Beach developer, and had been very successful with it so far.

Mr. **Wild's** negative was very thin, and wanting in detail, giving an idea of under-exposure. This, however, Mr. Wild said was not the case, as he had given a full exposure. He attributed the thinness to damp, as he had put his box of plates in a damp place, and he had found that all the plates gave thin negatives, and wanting in detail, no matter how long he exposed them.

Mr. **Cheetham** then announced that at the next meeting he would give a paper on "Toning."

Glasgow Photographic Association.

The first popular meeting of the members and friends took place Thursday, 10th December, in the large hall of the Philosophical Society, Bath Street, Wm **Lang**, jun., President of the Society, in the chair.

J. W. **M'Call** delivered an interesting lecture on "A Month at the Lizard and Land's End, with a trip to the Scilly Isles," illustrated by limelight views, photographed from nature, and brilliantly coloured. The views chiefly illustrated interesting pieces of scenery in Cornwall between Falmouth and St. Ives, and Mr. M'Call likewise showed how interesting the country was alike to botanists, geologists, and archæologists. He opened the entertainment by showing a very striking view of Falmouth, showing the bay and the harbour; and then took his audience to Pendennis Castle, standing on a peninsula 190 feet above sea level. He then proceeded along the coast from the Lizard, visiting all the places of interest, and narrating scraps of history and legends. One of the most instructive parts of the whole entertainment was when Mr. M'Call gave a view at Lloyd's signalling station, the most southerly house in England, when he showed the means of signalling vessels by flags, and explained how they were used, for which he gained much applause. He then went on to show and relate the dangerous nature of the coast, and, coming to St. Martin's, he terminated his lecture with a very pretty view of the beach there. Mr. McCall then passed through a number of slides of snow-scenes, flowers, and children. These last were considered to be admirably caught.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

REGULAR meeting, held at No. 1262, Broadway, New York, on Tuesday, November 10, President BEACH in the chair.

F. C. BEACH said: I received a letter from the London Camera Club, informing me that they had elected me as the first honorary member of the club; and as Captain Abney is the President of the club, I think it will be proper for the Board of Directors to elect him an honorary member of this Society, and it will be my endeavour to have something of that kind done. I have to bring before you now an improved time shutter. It is an invention of Mr. Birdsall, formerly a member of our Society, and at my invitation he kindly brought it here this evening that you might see how it operated. The principle is that of a falling weight. You know a drop shutter descends very rapidly, but if we have a means of checking it for certain periods of time it is very desirable. (The shutter consisted of a metal slide and one edge being provided with cog teeth, which, as it fell, engaged with the cogs on a small spur wheel, the latter acting upon others, thereby rotating rapidly a fan wheel similar to the train in the striking mechanism of a clock. The shutter is held in position by a small pin, which, upon being pulled out, allows it to fall. The pin may be drawn by fine black thread, so the person making the exposure may be in the picture. A spring-pin checks the fall of the slide.) The only peculiarity Mr. Birdsall says that he has noticed is that it attracts so much attention when you are taking a group of persons, that it sets them thinking very pleasantly, and they all smile, and consequently the picture is sometimes blurred. So he sets it off three or four times beforehand, in order that they may get accustomed to the noise and the motion; but you see it works very easily.

REPORT OF THE DRY PLATE COMMITTEE.

Boxes sent by F. D. Buel, representing his proposed methods, have been submitted to the Committee for inspection and report. One of them opens by holding the box flat and removing the top, the plates being placed in pairs, back to back, and each pair separated from others at both ends by movable strips of corrugated manilla paper, the whole wrapped in paper said to be free from hypo, and packed in the box. The other opens from the narrow side, the plates standing on edge, back to back, and separated from each other by strips of corrugated manilla paper attached to each end of the box. After carefully examining both methods, and giving due weight to the advantages which each seems to possess, we have come to the conclusion that the one in which the corrugated paper is placed permanently at each end of the box is the best, for the following reasons:

First.—The plates can be removed with greater ease and rapidity than from the other box.

Second.—That after one or more are removed, the balance of the plates remain entirely separated and firm, even if the box is laid down flat.

Third.—If proper material is used for the corrugated strips, there can be no friction or scratching of the film in handling or in transportation.

Fourth.—It compels the makers to have the plates cut true, and of nearly identical thickness, errors in either of these being manifest at the factory, and not when they come into the hands of the amateur.

Your committee would also state that the following objections arise to this mode of packing in this particular specimen, but these objections can be easily obviated.

First.—The plate standing in these corrugated strips, and resting upon the box unprotected by any substance free from hypo, are liable to be impregnated with it, especially should the box become damp.

Second.—The corrugated paper is liable to ruff up, and even tear in packing or removing the plate, and thus possibly injure the film.

To obviate these objections, the inside of the box, and especially when the plate is in contact, should be varnished or coated thinly with wax or paraffin; and that a very thin metallic plate, corrugated and placed in each end of the box, would be preferable to any paper that can be procured, and thus obviate the second objection.

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As packing in this way will neither increase the size or weight of the box materially, if at all, and has many advantages over the present mode, the use of separators, &c., we would, in conclusion, recommend that the Society suggest to the plate makers that they adopt this method in packing their plates.

F. C. BEACH read a paper on "The Appearance of the Image during Development" (see p. 821).

Talk in the Studio.

ANNUAL DINNER OF THE SOUTH LONDON SOCIETY.—On Saturday last this dinner took place at the Holborn Restaurant, about twenty being present. H. Trueman Wood, the new President, occupied the chair. The usual toasts were honoured, and it was quite evident that the most hearty good feeling prevails throughout the Society.

THE GERMAN YEAR-BOOK.—We have received from K. Schwier, of Weimar, a copy of his excellent and useful annual, "Deutscher Photographen Kalendar" for 1886. It is a combined pocket-book and diary, being neatly bound in cloth, and having a socket for a pencil. It is surprising how much useful information the Editor has managed to compress into a small space—useful formulæ, memoranda, and data. Our German-reading subscribers should obtain it. The price is 1 mark 50, or 1s. 6d.

NOTTS PHOTOGRAPHIC ASSOCIATION.—The second annual dinner of the above was held at the Clarendon Hotel, Nottingham, on Thursday evening, Dec. 17, the President, Mr. G. Shepperly, in the chair, when between thirty and forty gentlemen sat down, and a most enjoyable evening was passed.

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To Correspondents.

⁂ We cannot undertake to return rejected communications.

F. N. DYMOND.—Write to the Secretary of the City and Guilds Institute, Gresham College, London, E.C.

CLUBBIST.—Your conjecture as to the business arrangements by which the cigars are supplied, seemed absurd on the face of it; but on reading the extraordinary cuttings you sent us with your second letter, we felt inclined to think there may be some show of probability in your conjecture.

DR. GEO. L. SINCLAIR.—Thank you very much for sending us such charming studies of frost and snow. We are glad you found Debenham's formula so satisfactory, and shall be pleased if you will write us a short paper detailing your experience with it.

G. E. WALES.—The views you send are very interesting. Perhaps a stronger silver bath would prove advantageous.

F. C.—1. It is hardly likely that the proposition would be seriously entertained; but you can write yourself just as well as doing the business through a third party. 2. Nitrate of silver is intended. 3. Very full directions for making ceramic and enamel photographs will be found in the YEAR-BOOK.

H.—1. The nearest approach to black that is attainable can be produced in a gold bath. Sensitise on a strong bath, and print from a negative absolutely opaque in the lights. 2. We know of no method; but why not make them with the so-called carbon tissue sold as "red chalk"? 3. If the dishes are made of porous earthenware, there is no method of entirely removing the hypo. 4. They are injurious to the lungs, much in the sense that dust generally is injurious. The best way will be to lead out of the window, or into a chimney.

HETTY.—1. There is nothing for it but to wait patiently until you acquire experience, but the tables to which you refer may help you. 2. Considerably more of the bromide solution should be added; perhaps thirty drops to the ounce may be enough. 3. It is a very bad plan, as the film is almost sure to discolour after a few weeks.

NITRATE.—Some kind of lubricant is required, one of the be[illegible] Luckhardt's encaustic paste. White wax cut into shreds, [illegible] to oil of turpentine, 5 ounces. Warm together until tho[illegible] united.

L. R. MORRIS.—1. Further particulars should be given if you wish us to give you useful information. 2. Make it much stiffer; probably half the quantity of water will be sufficient. 3. Paraffin wax, or solid paraffin, should be used. 4. As the weather is cold, make the solution a little stronger. 5. It cannot be bought at the present time; you must prepare it yourself.

JOHN TIMMS.—It is rather a matter for our advertisement department.

THOS. BOARDMAN.—To reduce the prints, immerse them in the following:—

Cyanide of potassium	10 grains
Ammonia	5 drops
Water	1 pint

When sufficiently reduced, wash.

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